

F.D.N.Y.

PROBATIONARY FIREFIGHTERS MANUAL

VOLUME I



DANIEL A. NIGRO

Fire Commissioner

Thomas J. Richardson

Chief of Department

Brendan D. McSweeney

Chief of Training

Frank A. Leeb

Chief of the Fire Academy



PROBATIONARY FIREFIGHTERS MANUAL
TABLE OF CONTENTS – VOLUME ONE

CHAPTER

SUBJECT

INTRODUCTION

ORIENTATION

1. GENERAL DEPARTMENT: SUBSTANCE POLICY

2. CHEMISTRY OF FIRE

3. FIRE DEPARTMENT APPARATUS

4. SAFETY

5. ROPE

6. SELF CONTAINED BREATHING APPARATUS (SCBA)

7. COMMUNICATIONS

8. BUILDING CONSTRUCTION

9. BUILDING DESCRIPTIONS



Probationary Firefighters Manual

INTRODUCTION

A BRIEF HISTORY OF THE FDNY

Organized fire fighting began in New York in 1648 when the first *Fire Ordinance* was adopted by the Dutch Settlement of New Amsterdam. Fines levied for dirty chimneys provided funds for the maintenance of buckets, hooks and ladders. It also established a fire watch of eight Wardens and required that each male citizen stand his turn on watch.



Old time method of transporting water buckets to a fire. Buckets were made of leather by the Dutch shoemakers.

After the first Wardens were appointed, an organization known as the *Prowlers* was formed and furnished with buckets, hooks and ladders. Often called the *rattle watch*, they patrolled the streets on the lookout for fire from nine o'clock at night until dawn.

When the colonists were organized in 1658, bucket brigades were formed and equipped with 250 leather buckets made by Dutch shoemakers of the colony. Thus, our first inauspicious beginning was made. Seven years later, in 1664, the colony

became a British settlement and was renamed New York.

It was not until 74 years later, in 1731, that fire brigades were put into service. Two hand-drawn pumpers, brought from distant London were the first fire engines to be used in the colony. They were designated as Engine Company 1 and Engine Company 2. All able bodied citizens were required to respond to alarms and perform duty under the supervision of the Aldermen.

Faced with the problem of a fast growing colony, the General Assembly established the volunteer Fire Department of the City of New York, in December of 1737. Able, discreet and sober men were appointed as firefighters to be ready for service by night and day and be diligent, industrious and vigilant.

Following the Revolutionary War, the Department was reorganized and incorporated as the **Fire Department of the City of New York.**

The volunteer Fire Department continued to protect the lives and property of the citizens of the city until after the close of the Civil War when, in 1865, they were superseded by the paid Metropolitan Fire Department. The change created resentment and bitter actions were taken by some who opposed the elimination of the volunteers. This resulted in rough and tumble battles fought on both personal and political levels.

The introduction of the steam engine spelled the final doom of the volunteer department in New York. The steam apparatus eliminated the need for men to pump the water, and the horses ended the problem of hauling engines by hand.

At the beginning, the paid fire service extended only to certain parts of New York City (Manhattan). The Act of 1865 united Brooklyn and New York (cities) to form a Metropolitan District. By the end of 1865 the department consisted of 13 Chief Officers and 552 Company Officers and firefighters. They worked a continuous tour of duty, with 3 hours a day for meals and one day off a month. They were paid salaries according to their rank or grade. The first regulations were also formulated and they were fairly strict and straight-laced.



First Company of paid Fire Department to go "in service" was Engine Co. 1, located in lower Manhattan at 4 Centre Street. Apparatus was horse-drawn Amoskeag steam-powered pumper which was same type issued to later companies. Wheels were steel rimmed.

The volunteers, despite their disappointment, accepted the decision and publicly declared that they would continue to function and serve until properly relieved by paid units.

The Act provided that members of the volunteers were to be given preference over all others in filling the rolls of the paid department.

Due to major fires, which resulted in excessive fire losses and a rise in insurance rates, the department was reorganized in 1866 under the command of General Alexander Schaler. Under military discipline, the department began to realize its full potential and fire losses began to generally reduce.

The merit system of promotion in the Fire Department was instituted in 1870.

In 1874 Westchester County (later called the Bronx) was annexed and gradually volunteers there were replaced by companies of the paid department, until the last volunteer unit was disbanded in 1928.

A further consolidation occurred in 1887 covering what we now know as the Borough of Queens. Again volunteer units were gradually replaced by paid companies until, by 1929, this Borough was protected by the paid department of the City of New York.

Richmond became a part of the greater City of New York in 1898. No change in the volunteer status took place, except for nominal supervision, until 1905 when the first group of volunteers was disbanded and replaced by paid units. More paid companies were installed in 1915, 1928, 1932 and 1937, when all but two volunteer companies were disbanded. These two were the only legal volunteer companies still active in the City of New York.

New Year's Day 1898 heralded the consolidation of the different areas of the city and the beginning of a new era for the Fire Department. All fire forces in the various sections were brought under the unified command of the first Commissioner of the Fire Department.

Following this amalgamation many changes took place involving many aspects of the job including installation of the high pressure systems, motorization of fire apparatus, creation of a Marine fleet, adoption of vastly improved working conditions and the utilization of perfected radio communications.

Today the Fire Department protects more than 8,000,000 residents in an area of 320 square miles. The department is administered by the Fire Commissioner appointed by and responsible to the Mayor. The uniformed force is under the command of the Chief of Department and consists of more than 11,400 Fire Officers and firefighters. In addition, the Department includes 2,800 Emergency Medical Technicians, Paramedics and Supervisors assigned to the Bureau of Emergency Medical Service (EMS), as well as 1200 civilian employees.

Ranking Order of the FDNY Uniformed Force



Firefighter Marine Engineer/Wiper Pilot Fire Marshal Lieutenant



Captain Battalion Chief = Gold
Battalion Commander = Silver Deputy Chief Division Commander



Deputy Assistant Chief Assistant Chief of Department Chief of Operations Chief of Department

THESE ILLUSTRATIONS ARE FOR THE INFORMATION AND GUIDANCE OF MEMBERS IN THE PROPER WEARING OF INSIGNIA ON THE UNIFORM DRESS SHIRT AND/OR WORK DUTY SHIRT.

PROBATIONARY FIREFIGHTERS SCHOOL

ORIENTATION



ORIENTATION

Congratulations on your appointment to the Fire Department of New York City

On behalf of the Fire Commissioner and the Chief of Department, welcome to the New York City fire Academy. Each of you have passed the written and physical examinations and further being qualified both mentally and medically, have demonstrated a fine potential for service to the city of New York and to the people who live and work here.

The FDNY is a semi-military organization. Rules and regulations govern the conduct and actions of all members of the department.

The department requires people with intelligence, determination, integrity, self-discipline, strength and character, endurance, and willingness to work hard. During your stay at the Academy, the training you will be receiving is designed to teach you the basic fundamentals of firefighting and help develop some of the discipline, toughness and self-reliance required of a firefighter.

Analyze yourself as objectively as you can. Become a member of the FDNY because you accept its opportunities and are willing to meet its demands and obligations. Drive yourself to your best efforts, develop your talents and strive to rise to higher ranks of the department.

Your success in training can make you part of the greatest firefighting force in the world.

ORIENTATION

WORK HOURS: _____
REPORTING TIME: _____

- UNIFORM
1. Dark blue trousers and black belt
 2. Dress blue shirt and tie
 3. Black, plain toe, laced, military shoe
 4. Black socks
 5. Cap and badge
 6. Official dark blue jacket
 7. Black duffel bag, no logos

Above items shall be worn to and from the Fire Academy each day.

We suggest you compose a **PERSONAL DATA SHEET** to assist you in completing the many forms that you will be receiving during orientation. Some of the information that will be needed is listed below.

1. Social Security Number. (Self and Spouse)
2. Birth dates of your immediate family. (COPIES of birth certificates for dependents)
3. Marriage dates. (COPY of marriage certificate)
4. Person(s) to be notified in case of an emergency, i.e. Their address and telephone number.
5. Fire Department unit nearest your residence if you live within the city limits.
6. Prior civil service employment, dates and other pertinent data.
7. Prior health plan and health plan number.
8. Military service; dates entered and discharged.
9. Veteran status.
10. Blood type.
11. The name, address and phone number of an alternate person to be notified in case of serious injury or death.
12. The name, address and phone number of a friend or relative to accompany the chief officer and chaplain to the home of the person to be notified in case of serious injury or death.
13. The house of worship nearest the member's residence representing your religious affiliation.
14. Clothing size; neck, sleeve, waist.
15. Supply your own lunch.
16. Lock for your locker
17. Names and unit number of family members affiliated with the department.

ORIENTATION

Probies shall park their automobiles in the parking lot located **outside** the Academy. The parking lot is across from the main gate as you enter the Fire Academy grounds.

- 1) Automobiles belonging to Firefighters 6th Grade are prohibited from parking inside the Academy Gates.
- 2) Commercial vehicles – such as tow trucks, dump trucks, trucks with advertising, etc. are prohibited.

Probies requesting medical leave shall promptly notify, or where necessary, have a responsible person notify, Probationary Firefighter School and the medical leave desk prior to 0700 by telephone of any injury or illness that requires the granting of medical leave.

Medical Desk	(718) 330-2204
P.F.S.	(212) 360-4429
Housewatch, if unable to contact PFS	(212) 360-4421

Probies shall report to the Bureau of Health Services at headquarters on the same day unless otherwise instructed.

When a trainee is admitted to or discharged from a hospital, he/she shall promptly notify the P.F.S. Office. If personal notification can not be made, notification shall be made by a responsible person.

Any notices received which might be of interest to the Fire Department must be delivered to the P.F.S. office as soon as possible. Such notices might include but are not limited to: military orders, subpoenas, jury notices and court appearances.

The P.F.S. shall be immediately notified of any change of residence, signature or telephone number.

GENERAL GUIDELINES

- ◆ Always wear the complete uniform and PPE as prescribed by the Officer in Charge of the Probationary Firefighter School (PFS) while attending the Fire Academy.
- ◆ Conduct yourself at all times in a manner which will not bring reproach or discredit upon the Department.
- ◆ Extend military courtesy to all officers and instructors at the Fire Academy.
- ◆ Not engage in a physical or verbal altercation, or perform any act which may be, or intend to be, detrimental in arousing religious or racial matters.
- ◆ Not engage in any activity, whether by actions, speech, writings, or dissemination of material which may cause sexual harassment as defined in Title VII of the Civil Rights Act of 1964 and Mayoral Directive 80-5, which are set forth in the Supplement to Department Order No. 28, dated February 27, 1981. (D.O. 60/84).

ORIENTATION

- ◆ You will not use the FDNY logo or name on any social media websites or on any webpages. You will not make any postings that will bring discredit upon the FDNY or will bring this Department or any of its members into disrepute if viewed by other members or the public. **You will be held responsible for what you post.**
- ◆ You will not post photographs of yourself or any other member in PPE or uniform unless worn during an event for which the uniform is required.
- ◆ You will not consume, or be under the influence of, alcohol while on duty.
- ◆ You will not use, or have in your possession, narcotics, tranquilizers, methadone, drugs of the amphetamine group, barbiturate derivatives or non-prescribed medications. Paraphernalia used to administer the above are also banned.
- ◆ Not make a false statement, report or record with the intent to deceive.
- ◆ Not maliciously damage any Department property, tools or equipment.
- ◆ Not engage in any extra departmental employment, profession, occupation, or business while attending Probationary Firefighter School, including working as a Volunteer Firefighter or on a Volunteer Ambulance.
- ◆ Not carry, possess, store or use any firearm while on Departmental property.
- ◆ Report loss of badge and/or I.D. card or other Department property immediately to the Administrative Officer of the PFS.
- ◆ Remain with their squads at all times and not absent themselves from an assigned class or other duty unless otherwise directed by an official of PFS.
- ◆ You will not use first or second floor bathrooms, except for auditorium and the designated restroom in the second tube.
- ◆ You will not fraternize with field units.
- ◆ You will not read newspapers on Fire Department grounds. Read your proby manual.
- ◆ No walking on or crossing sidewalks except passage between bldgs. 11 and 12, bunker locker room, and auditorium.
- ◆ Do not use glass doors to enter or exit building 11 or 12.
- ◆ Be at least one hour early for roll call. **Lateness will not be tolerated and could lead to your termination.**
- ◆ Stay hydrated, drink plenty of fluids. You will always carry a water bottle.
- ◆ “MAKE WAY” – First Proby to See an Instructor shall yell “MAKE WAY” and promptly step aside. Everyone else will repeat the command loudly and step to the side, back to the wall.
- ◆ You will follow all orders from instructors, exactly as they are given.
- ◆ You will form up in roll call area 15 minutes prior to scheduled roll call.
- ◆ You will yell “good morning/afternoon, sir/ma'am”, whenever you make eye contact with any FD member on the rock.

ORIENTATION

- ◆ Always have kneepads on your bunker pants and always wear your suspenders.
- ◆ If one person makes a mistake, everyone pays the price. You are a team. You will act like a team.
- ◆ You will never travel alone.
- ◆ You will show respect to all superiors. **Everyone** is senior to you.
- ◆ No sitting, lying or leaning on objects outside during evolutions.
- ◆ Raise your hand if you have a question and speak up. Begin with “sir, probationary firefighter _____” then your question.
- ◆ When your name is called, sound off loud and clear “here sir / ma’am”.
- ◆ When asked a question, your response will be “yes/no sir / ma’am”.
- ◆ Squad leaders are an extension of the drill instructors. You will treat them with the same respect.
- ◆ Always utilize the chain of command.
- ◆ When you hear the command “LOCK IT UP” you will repeat the command loudly, stop moving and stop speaking, until given the command “carry on”.
- ◆ Take the initiative to empty garbage cans and pick up trash from the floor. Don’t wait for someone to tell you.
- ◆ Police the locker room every day prior to final formation.
- ◆ You will make sure to maintain clearly and neatly marked gear.
- ◆ We are always there for you if you show us you want to learn. Don’t be afraid to ask for help.
- ◆ Give 110% every day in everything you do here. Poor attitudes will not be tolerated.
- ◆ Always finish on this job. Quitting prior to completing your task is not an option.
- ◆ If someone asks for a volunteer, everyone should step up.
- ◆ Committee work will be performed every day (instructor and common areas).
- ◆ You will enter the academy everyday carrying only your black bag in your left hand
- ◆ You will enter and leave the rock in your class A uniform every day.
- ◆ Use or possession of cigarettes, cigars or smokeless tobacco of any kind is prohibited on the Rock or at Fort Totten at any time. This includes electronic cigarettes or vapors.
- ◆ **Absolutely no cell phones on the Rock or Fort Totten at any time, unless special permission is obtained from the DI’s.**
- ◆ You will not wear jewelry of any kind, earrings, body piercings, etc. This includes wedding rings.

ORIENTATION

- ◆ Medical leave or light duty will result in missed training days and could result in your termination.
- ◆ You will maintain Fire Dept. grooming standards. Your face will be clean shaven daily, your uniform clean and pressed and your shoes polished. You will have your hair cut weekly to the required specifications.
- ◆ You will provide your own lunch every day, and it will be secured in the large refrigerators located outside of the auditorium. Make sure your belongings are clearly marked.
- ◆ You will need a black bag with no markings, a notebook, 3 black pens, 3 sharpened #2 pencils and a black permanent marker with you at all times.
- ◆ You will bring your **entire** proby manual to every class every day unless otherwise instructed.



GENERAL DEPARTMENT

OBJECTIVE:	<ul style="list-style-type: none">• To ensure the safety of all members• To prevent accidental injury to persons or property caused by impaired ability.• To promote good health and job fitness of all members.• To provide assistance to any member who seeks the Fire Department's help in overcoming addiction to, dependence upon or problems with alcohol or drugs.• To maintain the reputation of the Fire Department and its members as responsible public servants worthy of public trust.
CONTENTS:	<ul style="list-style-type: none">• Definitions• Prohibited Conduct• Duties regarding substance policies• Testing Procedures• Guidelines for Violations of this Policy• Social Media Policy
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY All Unit Circulars 202• FDNY PA/ID 1-2013, 2-2017

1

1. PRELIMINARY STATEMENT

This Circular:

- 1.1 Sets forth Department policy concerning the use and possession of illegal drugs; use and possession of legally prescribed drugs in a manner or purpose other than that which is lawfully prescribed; and use and possession of alcohol by Department members.
- 1.2 Sets forth prohibited conduct related to illegal drugs and alcohol.
- 1.3 Clarifies responsibility for enforcement of this policy.
- 1.4 Establishes conditions for mandatory testing for the presence of illegal drugs or alcohol.

2. POLICY

2.1 As first responders to fires, public safety and medical emergencies, disasters and terrorist acts, the FDNY protects the lives and property of New York City residents and visitors. The Department advances public safety through its fire prevention, investigation and education programs. The timely delivery of these services enables the FDNY to make significant contributions to the safety of New York City and homeland security efforts. The efficient performance of this mission demands the highest level of mental and physical fitness of Department members. The lives of citizens and co-workers are dependent upon the fitness, stamina and alertness of firefighters and fire officers. Drugs and alcohol alter alertness, judgment, physical agility and the ability to fulfill one's work responsibilities. Any impairment of the member's physical and mental capabilities increases the danger of accidents and injuries, not only to the member, but to fellow firefighters and to the public. Accordingly, this circular sets forth the Department's policy with respect to alcohol and illegal drugs. The purposes of this policy are as follows:

- 2.1.1 To ensure the safety of all members.
- 2.1.2 To prevent accidental injury to persons or property caused by impaired ability.
- 2.1.3 To promote good health and job fitness of all members.
- 2.1.4 To provide assistance to any member who seeks the Fire Department's help in overcoming addiction to, dependence upon or problems with alcohol or drugs.
- 2.1.5 To maintain the reputation of the Fire Department and its members as responsible public servants worthy of public trust.

- 2.2 All members are required to be familiar with and to follow the policies and procedures set forth in this AUC and any addenda.
- 2.3 All members must be cognizant that time is of the essence with respect to substance-related misconduct, and that their duties as set forth below in Section 5 must be fulfilled immediately.
- 2.4 Violation of this policy may result in disciplinary action up to and including termination. A range of penalties is set forth in Section 8, below.

3. DEFINITIONS

- 3.1 Alcohol: any substance, including medication, that contains alcohol in any amount.
- 3.2 Illegal drugs include:
 - 3.2.1 Marijuana (cannabis) as currently defined in section 3302 of the N.Y.S. Public Health Law.
 - 3.2.2 Any substance listed in Section 3306 of the N.Y.S. Public Health Law (including, but not limited to, amphetamines, anabolic steroids, barbiturates, cocaine, codeine, hashish, heroin, LSD, mescaline, methadone, methylenedioxymethamphetamine (ecstasy), morphine, narcotics, opiates, PCP, tranquilizers) that are:
 - a. obtained **without** a lawful prescription, or
 - b. used in a manner or for a purpose other than that which is lawfully prescribed.
 - 3.2.3 Marijuana (as defined above) and certain substances (e.g. ecstasy, heroin) listed in Section 3306 of the N.Y.S. Public Health Law may not be used or possessed lawfully.
 - 3.2.4 Any substance used in a manner prohibited by Federal, State and local laws, rules and regulations.
- 3.3 Level of alcohol that elicits a positive test result: .05 blood alcohol concentration (“BAC”) (this is the amount of alcohol in your blood) as determined by a urine, blood or saliva test.

3.4 Levels of illegal drugs that elicit a positive test result:

Substance	Urine EMIT Test Level	Urine GC/MS Confirmation Test Level
1. Methadone	300 ng/ml	300 ng/ml
2. Opiates	2000 ng/ml	2000 ng/ml
2.a. 6MAM (Heroin)		10 ng/ml
3. Cocaine	300 ng/ml	150 ng/ml
4. Barbituates	200 ng/ml	200 ng/ml
5. Benzodiazepine	300 ng/ml	300 ng/ml
6. Darvon	300 ng/ml	300 ng/ml
7. PCP	25 ng/ml	25 ng/ml
8. Amphetamines	1000 ng/ml	500 ng/ml
9. THC	50 ng/ml	15 ng/ml
10. Methaqualone	300 ng/ml	300 ng/ml

- 3.5 Positive test result: A laboratory test result that is certified by the Chief Medical Officer, or his or her designee, after reviewing the laboratory report and the completed Drug and/or Alcohol Testing Questionnaire (BHS-1) form or the Random Drug Testing Questionnaire (T-1) form, as applicable.
- 3.6 Premises: any FDNY division or battalion office, firehouse, ambulance station, or other location owned, leased or operated by FDNY including parking facilities adjacent to such premises.
- 3.7 Substance: alcohol or illegal drugs as defined in Sections 3.1. and 3.2.
- 3.8 Substance Test: A test for the presence of alcohol and/or illegal drugs analyzed by a laboratory facility licensed by the New York State Department of Health to perform forensic toxicology and approved by the Department.
- 3.9 Use: any ingestion, inhalation or injection of alcohol or illegal drug(s).

4. PROHIBITED CONDUCT

The following conduct by members is strictly prohibited:

- 4.1 Use, positive presence, possession, attempted possession, sale, transport or delivery of any **illegal drug** as defined in Section 3.2 while on-duty or off-duty; or while in uniform; or while in any Department premises, property or vehicle(s).
- 4.2 Use, possession, sale, transport or delivery of any **drug paraphernalia (e.g. hypodermic needles used to inject illegal substances)** while on-duty; or while in uniform; or while in any Department premises, property or vehicle(s).
- 4.3 Use, positive presence, possession, sale, transport or delivery of **alcohol or related paraphernalia (e.g. beer taps, beer kegs)** while on-duty; or while in uniform; or while in any Department premises, property or vehicle(s).
- 4.4 Any use of alcohol that may elicit a positive test result while on-duty.
- 4.5 Refusal to cooperate in any substance test ordered by the Fire Department, including the completion and signing of any required forms.

5. DUTIES REGARDING SUBSTANCE POLICIES

Duties of All Members

- 5.1 Every member (who is on duty or is off-duty and present in any Department premises, property or vehicle) who reasonably suspects or knows of a violation of this policy is required to report the violation **immediately** to the officer on-duty at the location of the violation, to the direct supervising officer of the member who may be in violation of this policy or, if appropriate, to the next superior officer. Any member who fails to report a suspected or known violation of this policy shall be subject to disciplinary action.
- 5.2 Use of Prescription Medication(s)

Every member on light or full duty who is taking a prescribed medication that might be impairing the mental or physical ability to fulfill his or her work duties shall immediately notify his or her commanding officer (or civilian supervisor, if the member has such a supervisor). No member is required to reveal any confidential medical information to their commanding officer or other supervisor. The member may provide a simple statement without revealing either the nature of the medication or the condition for which it was prescribed. Failure by a member to report this information to his or her commanding officer may subject the member to disciplinary action. The member's supervisor shall seek a determination from the Bureau of Health Services ("BHS") by ordering the member to BHS for a fitness for duty determination. The member's supervisor shall document the referral to BHS in the Unit Journal, or if a Unit Journal is not maintained, in a memorandum to his or her immediate supervisor. The member is required to inform BHS of all relevant medical information.

Duties of All Officers

- 5.3 Every officer on-duty or while in any Department premises, property or vehicle(s) will be held accountable for compliance by their subordinates with these policies. Failure on the part of officers to enforce these regulations will result in appropriate disciplinary action and will be reflected in the officer's performance evaluation.
- 5.4 Every officer who observes a member exhibiting possible signs of alcohol or drug abuse shall consult with the Counseling Service Unit (“CSU”) and may refer the member to CSU.
- 5.5 Every officer (whether on-duty or while in any Department premises, property or vehicle(s)) who reasonably suspects or knows that any member has engaged in conduct prohibited by this AUC or any addenda **shall immediately**:
1. Prohibit on and off-duty members present at the time of discovery of any violation of this policy from leaving premises without permission of the investigating officer. If any member is permitted to leave premises during an investigation, the investigating officer shall document the reason for the release in a report to be sent to the Chief of Department via the chain of command.
 2. Immediately relieve the on-duty member(s) from emergency response duty.
 3. Immediately have the affected unit placed out of service.
 4. Notify the administrative Battalion Chief or, if appropriate, the next superior officer.
 5. Notify the Bureau of Investigations and Trials (“BITs”).
 6. Document the incident in the company journal.

Duties of All Chiefs

- 5.6 Every Chief (whether on-duty or while in any Department premises, property or vehicle(s)) who reasonably suspects or knows that any member has engaged in conduct prohibited by this AUC or any addenda **shall immediately**:
1. Notify the Borough Command through the chain of command weekdays 0800 hours to 1600 hours or the Command Chief at all other times, i.e. nights, weekends and holidays and ensure that the affected unit has been placed out of service;
 2. Ensure that all notifications required under section 5.5 have been made, and
 3. Consult with Command Chief to designate an officer as the investigating officer.

Duties of Investigating Officer

- 5.7 The officer charged with investigating a suspected or known violation of this policy **shall immediately**:
1. Conduct a roll call. All on-duty and off-duty members present in premises shall be part of the roll call.
 2. Advise all officers and firefighters whom the investigating officer reasonably believes may be subject to charges of their right to representation before being questioned.
 3. Following notification, conduct an investigation to ascertain which member(s) may have engaged in any conduct prohibited under this policy.
 4. If the officer has reason to believe that any member(s) has violated this policy, the officer shall immediately order that such member(s) be tested for alcohol and illegal drugs. If the officer orders testing, he or she shall document the reasons for the determination in a report to the Chief of Department via the Chain of Command. If the officer determines that there is no reason to believe that this policy has been violated, he or she shall not order testing and shall document the reasons for his or her determination in a report to the Chief of Department via the Chain of Command.

Duties of Other FDNY Units and Personnel

- 5.8 After a suspected or known violation of this policy has been reported, Fire Officers, Medical Officers, BITs and the Testing Unit are authorized to order testing for alcohol and illegal drugs. All testing ordered by a Fire Officer, BHS, BIT or the Testing Unit may be conducted by BHS, BIT or the Testing Unit. All reasons for testing shall be properly documented by the person or unit ordering the testing.

6. TESTING OF MEMBERS

6.1 All Members

The following members shall be tested for the presence of illegal drugs and/or alcohol:

- 6.1.1 Every member ordered for testing pursuant to Section 5 of this policy.
- 6.1.2 Every member who has been arrested on or off-duty for any reason related to the prohibited conduct specified in section 4.3.
- 6.1.3 Every member who has been arrested on or off-duty for any reason related to the use or possession of an illegal drug.
- 6.1.4 Every member whose on-duty conduct leads to a reasonable suspicion that he or she is violating any provision of this policy.

- 6.1.5 Every member who has been on disciplinary leave or suspension that resulted from (a) the alleged use or possession of alcohol or illegal drugs, or (b) any violation of this AUC or any addenda (including the Random Drug Testing Policy). The BHS shall ensure that the testing takes place prior to the member's return to duty. Such testing may be conducted by BHS or the Testing Unit.
- 6.1.6 Every member who has operated a Department vehicle that has been involved in a major accident as defined in Safety Bulletin 56. The highest ranking officer who has responded to the accident shall ensure that the testing takes place in an expeditious manner and shall coordinate such testing with the Testing Unit. If any personnel required to be tested are immediately transported to a hospital, the Medical Officer on-duty shall ensure that the personnel transported are tested in an expeditious manner, and shall coordinate such testing with the Testing Unit, BIT or other required BHS personnel. The highest ranking officer (or where applicable, the Medical Officer), shall document the reasons for the failure to test a member via the chain of command in a written report to the Fire Commissioner and Chief of Department.
- 6.1.7 Every member who, after a supervisory referral to the CSU, fails to comply with the treatment recommendations of the CSU. CSU will send the employee to BHS for a duty status evaluation that will include a substance test. The employee's noncompliance will be reported by BHS to the BITs. Any member who receives a supervisory referral and fails or refuses to comply with the treatment program recommended or approved by CSU will be deemed:
- A. To have disobeyed an order to comply with the treatment plan recommended;
 - B. To have exhausted this treatment opportunity.
- 6.1.8 Every Probationary Firefighter, Firefighter, Wiper, Marine Engineer, Pilot, Fire Marshal, Lieutenant, Captain, Supervising Fire Marshal, Battalion Chief, Medical Officer, Deputy Chief, Deputy Assistant Chief, Assistant Chief Fire Marshal, Assistant Chief, Chief of Staff, Chief Fire Marshal, Chief of Operations, and Chief of Department shall be subject to illegal drug testing on a random basis.
- 6.1.9 Every member ordered for testing by a Fire Officer, BHS, BITs or the Testing Unit.

6.2 Members of the Bureau of Fire Investigation

- 6.2.1 Every applicant to the position of Fire Marshal shall be subject to a substance test.

6.3 Probationary Firefighters

- 6.3.1 Every probationary firefighter shall be administered an alcohol and illegal drug test as part of the 5th Grade medical examination.

6.4 Members Who Have Signed a Testing Agreement

- 6.4.1 Every member who has signed an agreement to be tested for illegal drugs and alcohol as a condition of employment or in settlement of a disciplinary matter shall be tested according to the terms of the agreement at the discretion of the Department and without prior notice.
- 6.4.2 Members subject to drug and alcohol testing pursuant to agreements with the Department may be tested while on-duty at any work locations. Testing Unit personnel shall administer such testing. Upon arrival of the Testing Unit, all personnel at the work location of the member to be tested shall comply with the instructions of the Testing Unit. The member's supervisor shall be responsible for promptly locating the member and for ensuring full and prompt cooperation with Testing Unit personnel.
- 6.4.3 Members shall not make any public announcement over the intercom or otherwise regarding the arrival of the Testing Unit personnel assigned to conduct substance testing of members.
- 6.4.4 Members on light duty or administrative assignment shall be tested as follows. The ranking Commanding Officer of the unit where member is on administrative assignment or light duty will order the member to report to the Testing Unit forthwith when so informed by the Testing Unit. Transportation will be provided if necessary.

7. TESTING PROCEDURES

- 7.1 The Department shall test members according to the following procedures, unless the Department is conducting random drug testing.
 - 7.1.1 In all instances, the Department will make every effort to ensure the integrity of the testing procedure and the privacy and dignity of members being tested.
 - 7.1.2 A request to a member to provide urine blood constitutes an order. Every member shall comply with such orders. Members must cooperate fully in providing urine or blood specimens and shall follow instructions given by a Department doctor, nurse, BITs or Testing Unit personnel.
 - 7.1.3 Trained personnel assigned to BITs or the Testing Unit will administer a urine test.
 - 7.1.4 A doctor or nurse assigned to BHS will administer any blood tests.

7.1.5 BHS, BITs or the Testing Unit shall confirm the identity of the employee being tested by checking the member's:

- ◆ FDNY photo identification card; or
- ◆ New York State Driver license.

7.1.6 Members shall list on the Drug and/or Alcohol Testing Questionnaire (BHS-1) form:

- ◆ all prescriptions, over-the-counter medications or dietary supplements ingested, inhaled or injected, or otherwise taken within the previous 72 hours; and
- ◆ all substances containing alcohol consumed within the last twenty-four (24) hours, and
- ◆ all food ingested within the previous 24 hours. The information must be as specific and exhaustive as possible.

7.1.7 Re-Testing Procedure

1. Any employee who has tested positive for any illegal drugs may, within 30 days of notification of such result, submit a Request for Drug and/or Alcohol Re-Test (T-3 Form) to BITs, seeking that the specimen be re-tested by a laboratory other than the one that conducted the first test.
2. Such request shall be granted provided that:
 - A. The laboratory selected by the member for re-test is certified by the New York State Department of Health and approved by the Department for such testing;
 - B. The member had provided a specimen sufficient for additional testing;
 - C. The re-test by the second laboratory is performed solely at the member's expense;
 - D. The re-test by the second laboratory is performed on a specimen contributed at the same time as that specimen tested by the Department's designated laboratory;
 - E. The specimen is transported directly from laboratory to laboratory without handling by the member or any agent of the member, and
 - F. The second laboratory provides test results directly to the Department as well as to the member.

7.2 Random Drug Testing

7.2.1 The FDNY shall comply with the random drug testing procedures set forth in AUC 202, Addendum 1. Every member who is subject to testing and other Department personnel shall comply with random drug testing as defined in AUC 202, Addendum 1.

7.3 Substance Testing for Members Who Have Signed Testing Agreements

7.3.1 Testing Unit personnel will call the officer on-duty, after the start of the tour, to ascertain that the member is working. The member is not to be notified until the tester arrives.

7.3.2 When the Testing Unit arrives at the work location, the officer on-duty should direct the member to report to the company office where the member will receive further instructions in connection with the testing to be administered.

8. GUIDELINES FOR VIOLATIONS OF THIS POLICY

The Department regards violations of this Substance Policy as serious offenses, and has established penalty guidelines for its violation. These guidelines are designed to cover the most common infractions, but there may be cases that do not fit precisely within them. The Department reserves the right to depart from these guidelines as the exacerbating or extenuating circumstances of each individual case require (including the number of supervisory referrals available to the member pursuant to PA/ID 1-84). Moreover, settlement and testing agreements may contain additional conditions.

The following are guidelines only and are not meant to abrogate in any way the due process rights provided under the N.Y.S. Civil Service Law, the N.Y.C. Administrative Code or any applicable collective bargaining agreement. In addition, the Department's use of these guidelines will take into consideration any findings and recommendations made by an Administrative Law Judge after a N.Y.C. Office of Administrative Trials and Hearings trial or by a Hearing Officer after a disciplinary proceeding.

8.1 Suspensions

Pre-Penalty Administrative Action

Members may be suspended for up to thirty (30) days in the following situations:

- Any violation of Section 4 and 5 of this policy
- Positive test result for Illegal Drug or Alcohol (on-duty)
- Drug or Alcohol Related arrest
- DWI / DWAI arrest
- Any other violations of existing Fire Department policies, rules or regulations

8.2 Any Violation of Section 4 of this Policy Relating to Alcohol

First Offense: Up to 90 days pay, 2 years testing, referral to CSU, final warning for substance-related misconduct

Second Offense: Up to TERMINATION

8.3 Positive Test Result for Illegal Drug/Refusal to Provide Specimen: Penalties

First offense: TERMINATION

8.4 Drug Related Arrest: Penalties

Up to TERMINATION

8.5 DWI / DWAI Convictions: Penalties

First Offense (not involving an accident or injuries):
15-30 days' pay, 1 year of testing, referral to CSU, final warning for violations of substance-related misconduct

First Offense (involving a motor vehicle accident, any injury or other aggravating factor(s)):
30 to 60 days' pay, 2 years of testing, referral to CSU, final warning for violations of substance-related misconduct

First Offense (resulting in the serious injury or death of any person):
Up to TERMINATION

Second Offense: Up to TERMINATION

8.6 Termination of Probationary Firefighters

8.6.1 A probationary firefighter shall be terminated under the following circumstances:

- A. Refusal to cooperate in a required substance test; or
- B. Positive drug test indicating conduct prohibited by this policy.

8.6.2 A probationary firefighter may be terminated for any violation of this policy.

FDNY SOCIAL MEDIA POLICY

1. PURPOSE

- 1.1 The New York City Fire Department (FDNY or the Department) has established for all FDNY employees the guidelines below concerning the use of social media (Policy). This Policy is based on the New York City Social Media Policy (published by the Office of the Mayor in April 2010), which provides overall guidance for the use of social media by employees of City agencies.
- 1.2 The improper use of social media can undermine the confidence of the public in the integrity of the Fire Department and its employees, and can impact our ability to effectively deliver life-saving services. As such, this Policy applies to both official and personal use of social media by FDNY employees. All employees are reminded that they are accountable for their conduct while on duty and are accountable for off duty conduct when it could reasonably be expected to be disruptive of the workplace or agency operations, or bring the agency into disrepute.
- 1.3 All supervisors, including civilian managers, and Fire and EMS officers, must familiarize themselves with this policy and ensure that this policy is distributed to all employees within their bureaus, units, commands or companies.
- 1.4 Nothing in this policy is meant to interfere with or limit any rights of any employee organization or its members to engage in protected union activity as defined in the Taylor Law and the New York City Collective Bargaining Law (NYCCBL).
- 1.5 Violations of this Policy may subject employees to disciplinary action, up to and including termination from the Department.

2. DEFINITIONS

- 2.1 "Social media" is defined as virtual communities and networks used to exchange information that includes but is not limited to messaging and data transmission, blogging and/or photo and video-sharing. Social media include proprietary sites or applications such as Facebook, Instagram, Tumblr, YouTube and Twitter, websites and other content-rich sites, instant messaging, video conferencing and collaboration services such as Wikipedia or any emergent social media platform or service.
- 2.2 Common social media outlets to which this Policy applies include, but are not limited to:
 - 2.2.1 Social networking platforms: A social networking platform allows users to connect with other users and create profiles online with status updates, photos, videos, messaging and other features (e.g., Facebook).
 - 2.2.2 Blogs: A blog is an online journal to which the host regularly posts material on which other users can comment; some blogs, such as microblogs, limit entries to short, text-message-like entries (e.g., Twitter).

- 2.2.3 Video or image-sharing outlets: A video or image-sharing outlet is an online platform on which users can upload, share and view video clips or digital images (e.g., YouTube or Instagram).
- 2.2.4 RSS feeds: An RSS (Really Simple Syndication) feed is an online alert system that notifies subscribers of new content on a website.
- 2.2.5 Podcasts: A podcast is an audio file that has been published on the internet and can be downloaded to a computer or a mobile-listening device.
- 2.2.6 Websites: A set of interconnected webpages, usually including a homepage, generally located on the same server, and prepared and maintained as a collection of information by a person, group, or organization.

3. ROLE OF OFFICE OF PUBLIC INFORMATION IN SOCIAL MEDIA

- 3.1 The Department's Office of Public Information (OPI) has been designated as the point of contact for the New York City Department of Information Technology and Telecommunications (DoITT) for operation of existing Department social media sites. OPI is required to register with DoITT any social media pages, sites or outlets related to the FDNY that are maintained by Department employees, as directed by the New York City Social Media Policy. OPI will be responsible for the registration of any social media pages, sites and outlets relating to the Department that are created in the future. Assigned managers of approved social media will be required to adhere to the New York City Social Media Policy and will be bound by the same rules and standards governing all New York City social media managers.
- 3.2 OPI is responsible for posting official content on the Department's official social media sites and will ensure that the Department's official social media usage comports with the New York City Social Media Policy.

4. OFFICIAL FDNY USE OF SOCIAL MEDIA

- 4.1 All FDNY employees must be aware of and abide by the following:
 - 4.1.1 No employee is authorized to post social media content on an official FDNY social media platform except those members specifically assigned to that task by OPI. All such social media usage will be clearly branded as official Department communication.
 - 4.1.2 No Department-related social media site or application is to be created or maintained, except as authorized by the Fire Commissioner and OPI. This includes pages and sites dedicated to individual companies, EMS stations, civilian bureaus, affiliated organizations, photo sharing groups, etc. Requests for authorization are to be submitted to OPI via the Website/Social Media Registration Form attached to this policy.

5. PERSONAL USE OF SOCIAL MEDIA

- 5.1 FDNY employees are responsible for what they write or post on social media. Activities and statements made on social media sites are done in an online domain where users have no reasonable expectation of privacy. Even if an FDNY member has created "private" or "limited access" accounts or has customized "privacy settings", any statements, photographs, video clips or information that are sent over the internet may still be viewed and disseminated by third parties, even after the content has been edited or deleted by the user. Whether intended to be private or not, postings will be available on the web for a long time and may spread to large audiences by re-posting, sometimes without the knowledge or consent of the original poster. Before posting, consideration should be given to whether the post will disrupt operations or bring the Department or any of its members into disrepute if viewed by supervisors, co-workers, or members of the public.
- 5.2 Employees participating in social media are subject to all applicable Department and City policies even when using social media while off duty or not at work. Department and/or City policy prohibits engaging in conduct tending to bring the City or the FDNY into disrepute, including engaging in harassing or discriminatory conduct. Engaging in such behavior on-line, even in a personal capacity, may subject an employee to disciplinary action. In addition, all postings on social media must comply with all laws and FDNY policies regarding the confidentiality of information. Accordingly, FDNY members will comply with the following:
- 5.2.1 Employees should be mindful about disclosing or alluding to their status as a member of the FDNY. Divulging identifying information on social media sites may provide an opportunity for someone to use that information to undermine an employee's personal or professional credibility or that of the FDNY and/or affect the employee's employment status with the Department.
- 5.2.2 Employees are prohibited from revealing Department affiliations of other individuals (e.g., co-workers, supervisors) without the express consent of that individual.
- 5.2.3 Employees may not use the FDNY's logo or name (e.g., FDNY) in any postings or feature the logo or name on any web page (e.g., a website/social media banner or profile photo) for commercial purposes.
- 5.2.4 FDNY personnel shall not post photographs of themselves in uniform, unless the uniform was worn during an event for which a uniform is required. FDNY personnel are prohibited from posting a photograph of themselves if, at the time, the wearing of a uniform is prohibited. These prohibitions will not apply to photographs taken at official Department ceremonies (e.g., promotions, Medal Day). Employees must ensure that any photographs posted on social media sites pursuant to this exception must comply with the regulations set forth in Section 5.2.2 above.

- 5.2.5 Employees are prohibited from posting on the Internet nonpublic items (e.g., information about, or photos or videos of, patients or fire scenes) that were obtained as a result of their position with the Department. Members of the Department are prohibited from taking photographs, videotaping or recording audio while working unless authorized to do so by OPI.
- 5.2.6 Employees are prohibited from engaging in any type of social media contact with patients, fire victims or any members of the public with whom they interact in their capacity as FDNY employees, to the same extent contact is prohibited by other means of communication. Such communications may be deemed inappropriate, a breach of confidentiality or an invasion of privacy.
- 5.2.7 Employees are prohibited from engaging in any type of social media contact (e.g., "friending," or "following") with minors with whom they interact in the course of their FDNY employment, unless specifically authorized by a Department Assistant Commissioner (or higher rank) or Deputy Chief (or higher rank). Such unauthorized communications may be deemed inappropriate and create an appearance of impropriety.
- 5.2.8 Employees should never use their City e-mail addresses when participating in social media. Inasmuch as the FDNY monitors employee Internet use, employees have no right to privacy with respect to any information transmitted, received, created, accessed, obtained, viewed, stored or otherwise found at any time on the FDNY's computer system.
- 5.2.9 Employees currently using social media must immediately ensure that all of their personal social media pages, sites and outlets are reviewed and in compliance with the regulations set forth in this Policy.
- 5.2.10 Employees who identify themselves as FDNY employees, or hold positions with the FDNY that are known to the general public, must make sure that their profile, comments and other postings are consistent with how they want to present themselves publicly. Employees should make a clear disclaimer that the statements and views expressed are theirs and do not reflect the views of the FDNY. Managers and others with leadership responsibilities, in particular, must consider whether their personal thoughts and views may be misconstrued by virtue of their position as expressing the FDNY's view.
- 5.2.11 Employees – including work units such as Fire companies and EMS stations -- are prohibited from posting their own web or other media sites, without prior authorization from the Fire Commissioner and OPI, if such site creates the appearance of being affiliated with or sponsored by the FDNY. Requests for authorization are to be submitted to OPI via the Website/Social Media Registration Form attached to this policy.
- 5.2.12 Guidelines set forth in this Policy will not apply to social media outlets used for investigative purposes.

6. INQUIRIES AND GUIDANCE

- 6.1 Employees are encouraged to seek guidance from the OPI (718-999-2056) or the Bureau of Legal Affairs (718-999-2040) if they have questions regarding compliance with this policy.

7. RELATED PROCEDURES

- FDNY Civilian Code of Conduct
- FDNY EEO Policy
- New York City Social Media Customer Use Policy
- Conflicts of Interest Law, Chapter 68 New York City Charter, §§ 2600-2606
- EMSC OGP 101-01 Oct. 2, 2008 (EMS)
- HIPAA (AUC 334, EMSC OGP 113-05 and Title 45 of the Code of Federal Regulations Parts 160 and 164 and NYS Public Health Law)
- New York City Acceptable Use Protocol
- Chapter 25 of the Regulations for the Uniformed Force, General Department
- FDNY Intranet - Bureau of Technology Development and Systems Policy on Limited Use of Office and Technology Resources

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

Website/Social Media Registration Form

Website/Social Media Manager Information – Main Point of Contact for Page

Name _____

Unit _____

Phone _____

Email Address _____

Social Media Account

Page Name _____

Page URL _____

General Type of Information Shared on the Page _____

**Please complete one form for each website and/or social media page.
Return completed forms to the Office of Public Information.
Fax: 718-999-0033
Email: FDNYdigital@fdny.nyc.gov**



GENDER-NEUTRAL SINGLE-OCCUPANT RESTROOM POLICY AND POSTING

1. PURPOSE

- 1.1 To establish policy governing single-occupant restrooms in accordance with Local Law No. 871-A, which amended the administrative, plumbing, and building codes of New York City, and went into effect on June 28, 2016.

2. SCOPE

- 2.1 This policy applies to all Department facilities that contain single-occupant restroom(s).

3. DEFINITION

- 3.1 **Single-occupant restroom:** A restroom containing no more than one water closet and one urinal, *except where egress from it is through a male- or female-designated changing area.*

4. POLICY

- 4.1 To the extent that they exist at a given facility, all single-occupant restrooms must be made available for use by persons of any gender.

5. PROCEDURES

- 5.1 The sign shown in (Photo 1) must remain affixed on or near the entrance to the restroom if it is an Americans with Disabilities Act (ADA) accessible restroom.



(Photo 1)

- 5.2 The sign shown in (Photo 2) must remain affixed on or near the entrance to the restroom if it is not an ADA accessible restroom.



(Photo 2)

- 5.3 Facilities may be subject to random inspection by the EEO Office.

Note: Any questions or concerns regarding this policy should be directed to the EEO Office: Phone: (718) 999-1446 (Monday through Friday 9 a.m. to 5 p.m.) or (718) 999-7900 (after hours); Fax: (718) 999-1289; Email: eeo@fdny.nyc.gov.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT



ANTI-HAZING/ANTI-BULLYING POLICY

1. PURPOSE

- 1.1 The New York City Fire Department expects all of its employees to treat one another with dignity and respect. Consistent with that principle, this policy prohibits employees from engaging or participating in, or encouraging others to engage or participate in, any act of hazing or bullying.
- 1.2 The Department seeks to foster a professional, welcoming and safe work environment for all of its employees. Hazing and bullying are contrary to this goal, as well as to the FDNY's core values of honor, dedication and service. Such acts can impact an employee's ability to function at work and damage trust and confidence among co-workers, undermining the cohesiveness of the work unit. Every employee must be afforded the opportunity to be a productive and contributing member of their work unit, free of hazing or bullying.
- 1.3 Hazing and bullying have no place in any workplace or organization and will not be tolerated by the Department.

2. DEFINITION

- 2.1 Hazing is an act that, includes, but is not limited to, any form of initiation or a "rite of passage" into an employee group, unit, or work location that involves the potential for, or causes, physical injury, mental harm or personal humiliation. It includes but is not limited to conduct that is cruel, abusive, humiliating, intimidating, oppressive, demeaning or harmful. Soliciting, coercing, participating in, or condoning others to engage in any such activity is also considered hazing. Hazing need not involve any physical contact among or between employees; it can be, in part or wholly, verbal or psychological in nature.
- 2.2 Bullying is conduct that can be humiliating, intimidating, demeaning or cruel to a colleague in order to exclude or reject another member from the team.
- 2.3 Examples of hazing/bullying include, but are not limited to, the following types of conduct:
 - 2.3.1 Requiring physical exercise for non-legitimate reasons;
 - 2.3.2 Orchestrating exclusion or silent treatment;
 - 2.3.3 Tampering with food or drink;
 - 2.3.4 Pouring a bucket of water or other substance over any part of an employee's body;
 - 2.3.5 Using cruel, abusive or discriminatory language toward an employee;

- 2.3.6 Destroying or otherwise damaging an employee's personal property;
 - 2.3.7 Singling out an employee to do tasks not given to others or multiplying tasks given to others in an effort to intimidate, undermine or harass that employee;
 - 2.3.8 Requiring an employee to wear embarrassing or humiliating attire;
 - 2.3.9 Performing degrading, crude or humiliating acts against an employee;
 - 2.3.10 Tampering with an employee's uniform or bunker gear (e.g., cutting buckles, putting foreign objects in boots or pockets, poking holes in clothing);
 - 2.3.11 Removing or defacing an employee's locker;
 - 2.3.12 Creating or posting demeaning signs or photo-shopped faces;
 - 2.3.13 Using social media to demean, intimidate, or otherwise harass an employee;
 - 2.3.14 Playing abusive tricks or engaging in acts intended to ridicule;
 - 2.3.15 Any inappropriate physical contact;
 - 2.3.16 Requiring excessive physical exertion beyond what is required to meet established training and performance standards; and/or
 - 2.3.17 Forcing or requiring the consumption of food, alcohol, drugs or any other substance.
- 2.4 Hazing/Bullying is not limited to superior-subordinate relationships. It may occur between peers or, under certain circumstances, may involve actions by junior personnel toward those more senior in rank.
- 2.5 Hazing/Bullying does not include authorized activities such as required operational or training exercises/activities (but not including abuse of those activities as listed in Section 2.3); remedial training selected by the employee or as directed by Training Academy staff or other training or instruction authorized by the Chief of Training, Chief of Operations or Chief of Department; as well as daily work, e.g., roll call, inspection of equipment, housewatch duties, committee work (maintaining the bunkroom, cleaning bathrooms, preparing meals, etc.).

3. POLICY

- 3.1 The FDNY prohibits hazing/bullying of any of its employees by another employee, while on and off duty. Aiding and abetting another person who is engaged in such conduct is prohibited. No FDNY employee may engage in hazing/bullying or consent to be a victim of hazing/bullying. Anyone who witnesses or is made aware of any act or allegation of hazing/bullying must immediately report such information (see Section 4.1). Actual or implied consent to acts of hazing/bullying is not a defense to a violation of this policy.
- 3.2 Hazing/Bullying is not an acceptable method of corrective training. Deficiencies in an employee's performance are appropriately addressed through instruction and the chain of command. Hazing/Bullying is not an effective way to instill discipline or develop skills.
- 3.3 It is the responsibility of the officer or supervisor to set the tone and maintain a safe and welcoming workplace environment. No officer or supervisor may condone or ignore hazing/bullying if the officer or supervisor knows, or reasonably should have known that the conduct has occurred. Once informed or made aware of any such incident or allegation, all officers and supervisors must report the incident through the chain of command and, where applicable, directly to the Equal Employment Opportunity (EEO) or to the Bureau of Investigations and Trials (BITs). Failure of an officer or supervisor to enforce this policy will result in disciplinary action against the officer or supervisor.
- 3.4 The FDNY strictly prohibits retaliation against any complainant of hazing/bullying, or any witness who reported such an incident. ***The Fire Department will not tolerate any such retaliation.*** Employees are prohibited from subjecting individuals to threats, reprimands, negative evaluations, harassment, or engaging in other adverse treatment that may have the effect of discouraging individuals from reporting or cooperating with investigations into any alleged violations of this policy. Offenders will be subject to discipline, up to and including termination of employment.

4. REPORTING

- 4.1 Alleged violations of this policy will be handled confidentially. Information obtained will be disclosed only to those who need to know for purposes of investigation and/or remediation.
- 4.2 The ability to investigate reports and enforce this policy depends on the accuracy and specificity of the information provided. Employees are encouraged to provide as much specific detail as possible so that appropriate action can be taken to address the reported behavior. Employees have the option to submit a report anonymously to BITs or EEO. However, providing one's name and contact information is encouraged.
- 4.3 Reports may be made to any of the following:
- Through the chain of command by notifying the employee's immediate supervisor; and or
 - BITs at 718-999-2646 or EEO Office at 718-999-1446 (Monday through Friday 9 a.m. to 5 p.m.) or 718-999-7900 (after hours).

- 4.4 Any incidents or allegations of hazing or bullying shall be reported by supervisory personnel, in writing, up the chain of command to the Chief of Department. The Chief of Department, in consultation with and working in conjunction with BITs, will determine what action is appropriate following a reported incident of hazing/bullying, and whether such action shall be taken within the chain of command or by BITs.
- 4.5 Hazing/Bullying allegations that may also implicate or violate the Department's EEO policy shall be reported directly to the EEO Office in accordance with the Department's EEO policy. BITs and/or the EEO Office will investigate reported hazing incidents as necessary.
- 4.6 Any reported hazing/bullying incident that would also be considered a crime will be reported by the FDNY directly to the Department of Investigation. Additionally, every officer and employee has an affirmative obligation to report, directly and without delay, to the Inspector General any and all information concerning conduct involving criminal activity. Notifications should be made directly to the Inspector General's Office at 212-825-2402.
- 4.7 Any FDNY employee who has been hazed or bullied, or whom a supervisor or officer believes may have been subjected to hazing or bullying, may be considered a victim and will be offered the assistance of the Bureau of Health Services (BHS) and Counseling Service Unit (CSU). An officer or supervisor who has been made aware of any acts of hazing must advise the victim of the services available to him or her that are provided by BHS and CSU.
- 4.8 No person shall prevent, seek to prevent, interfere with, obstruct, or otherwise hinder any study or investigation being conducted pursuant to this policy. Full cooperation shall be afforded by every officer and member during the investigation.

5. GUIDELINES FOR VIOLATIONS OF THIS POLICY

- 5.1 The Department regards violations of this policy as serious offenses, and has established action guidelines for its violations. These guidelines are designed to cover the most common infractions, but there may be cases that do not fit precisely within them. The Department reserves the right to depart from these guidelines as the exacerbating or extenuating circumstances of each individual case requires. The following are guidelines only and are not meant to abrogate in any way the due process rights provided under the NYS Civil Service Law, the NYC Administrative Code or any applicable collective bargaining agreement. In addition, the Department's use of these guidelines will take into consideration any findings and recommendations made by an Administrative Law Judge after a NYC Office of Administrative Trials and Hearings trial or by a Hearing Officer after a disciplinary proceeding.

- 5.2 The Department may take the following actions, including but not limited to, pending the completion of an investigation:
 - 5.2.1 Immediate detail of any member accused of violating this policy;
 - 5.2.2 Immediate detail of the officer(s) on duty at time of alleged incident;
 - 5.2.3 Immediate detail of the commanding officer(s) of the company, Battalion Chief, and/or Division Chief, where appropriate;
 - 5.2.4 Suspension for up to thirty (30) days; and/or
 - 5.2.5 Restriction of voluntary overtime and mutual privileges in accordance with operational needs.
- 5.3 Any employee found to be in violation of this policy will be subject to discipline, up to and including termination of employment.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT



FIRE BEHAVIOR AND CHEMISTRY OF FIRE

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize the firefighter with the process of combustion & the effects of fire propagation as it relates to firefighting operations.
CONTENTS:	<ul style="list-style-type: none">• An explanation of principles of fire behavior, the phases of fire, methods of heat transfer, the classifications of fires and the theory of extinguishment
SOURCE:	<ul style="list-style-type: none">• Essentials of Fire Fighting (Third and Fourth Editions) – International Fire Service Training Association• International Fire Service Training Association (1998). <i>Essentials of Firefighting</i> (4th ed.). Oklahoma: Fire Protection Publications, Oklahoma State University.
FDNY REFERENCE:	

People first learn about fire as children. They know that fire consumes fuel, needs air, and gives off heat and light. Normally, that degree of understanding is all that one needs. Firefighters, however, have to take their understanding of this process a step or two further. In particular, they have to know more about the chemical process that goes on, the methods of heat transfer a fire can use, the makeup and nature of the fuels, and the environment the fire needs. It is this knowledge that arms the firefighter to fight fire and win.

Fire is actually a by-product of a larger process called combustion. Fire and combustion are two words used interchangeably by most people; however, firefighters should understand the difference. *Combustion* is the self-sustaining process of rapid oxidation of a fuel, which produces heat and light. *Fire* is the result of a rapid combustion reaction.

IMPORTANT TERMS

Flammable or explosive limits – The percentage of a substance (vapor) in air that will burn once it is ignited. Most substances have an upper (too rich) and a lower (too lean) flammable limit.

Flash Point – The minimum temperature at which a liquid fuel gives off sufficient vapors to form an ignitable mixture with the air near the surface. At this temperature, the ignited vapors will flash but will not continue to burn.

Heat – The form of energy that raises temperature. Heat can be measured by the amount of work it does; for example, the amount of heat needed to make a column of mercury expand inside a glass thermometer.

Ignition temperature – The minimum temperature to which a fuel in air must be heated to start self-sustained combustion without a separate ignition source.

HEAT TRANSFER

A number of natural laws of physics are involved in the transmission of heat. One is called the Law of Heat Flow; it specifies that heat tends to flow from a hot substance to a cold substance. The colder of two bodies in contact will absorb heat until both objects are at the same temperature. Heat can travel throughout a burning building by one or more of three methods: conduction, convection, and radiation. The following sections describe how this transfer takes place.

Conduction

Heat may be conducted from one body to another by direct contact of the two bodies or by an intervening heat-conducting medium. An example of this type of heat transfer is a basement fire that heats pipes enough to ignite the wood inside walls several rooms away (See Figure 1-1). The amount of heat that will be transferred and its rate of travel depend upon the conductivity of the material through which the heat is passing. Not all materials have the same heat conductivity. Aluminum, copper, and iron are good conductors; however, fibrous materials, such as felt, cloth, and paper, are poor conductors.



Figure 1-1

Liquids and gas are poor conductors of heat because of the movement of their molecules, and air is a relatively poor conductor. This factor is why double building walls and storm windows that contain an airspace provide additional insulation from outside air temperatures. Certain solid materials, such as fiberglass, shredded into fibers and packed into batts make good insulation because the material itself is a poor conductor and there are air pockets within the batting.

Convection

Convection is the transfer of heat by the movement of air or liquid. When water is heated in a glass container, the movement within the vessel can be observed through the glass. If sawdust is added to the water, the movement is more apparent. As the water is heated, it expands and grows lighter, hence, the upward movement. In the same manner, as air near a steam radiator becomes heated by conduction, it expands, becomes lighter, and moves upward. As the heated air moves upward, cooler air takes its place at the lower levels. When liquids and gases are heated, they begin to move within themselves. This movement is different from the molecular motion discussed in conduction of heat and is responsible for heat transfer by convection.

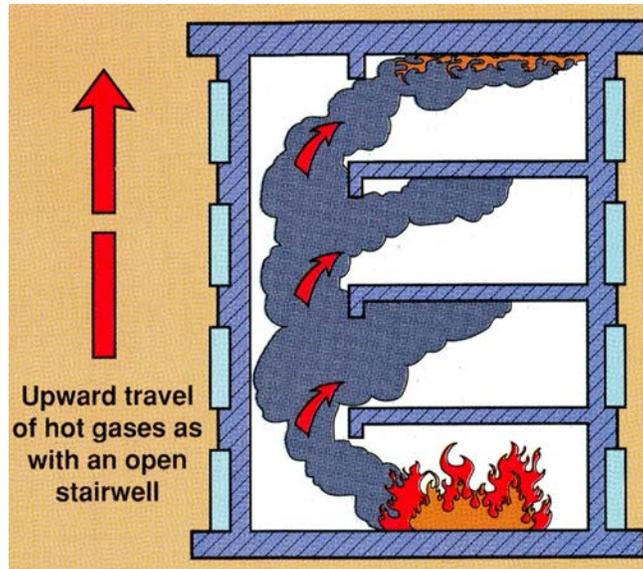


Figure 1-2

Heated air in a building will expand and rise (See Figure 1-2). For this reason, fire spread by convection is mostly in an upward direction; however, air currents can carry heat in any direction. Convection currents are generally the cause of heat movement from floor to floor, from room to room, and from area to area. The spread of fire through corridors, up stairwells and elevator shafts; between walls, and through attics is caused mostly by the convection of heat currents. If the convecting heat encounters a ceiling or other barrier that keeps it from rising, it will spread out laterally (sideways) along the ceiling. If it runs out of ceiling space, it will travel down the wall toward the floor, being pushed by more heated air that is rising behind it. Convected heat encountering a ceiling is commonly referred to as mushrooming. Convection has more influence upon the positions for fire attack and ventilation than either radiation or conduction.

Although often mistakenly thought to be a separate form of heat transfer, direct flame contact is actually a form of convective heat transfer. When a substance is heated to the point where flammable vapors are given off, these vapors may be ignited, creating a flame. As other flammable materials come in contact with the burning vapors, or flame, they may be heated to a temperature where they, too, will ignite and burn.

Radiation

Although air is a poor conductor, it is obvious that heat can travel where matter does not exist. The warmth of the sun reaches us even though it is not in direct contact with us (conduction), nor is it heating up gases that travel to us (convection). This method of heat transmission is known as radiation of heat waves. Heat and light waves are similar in nature, but they differ in length per cycle. Heat waves are longer than light waves, and they are sometimes called infra-red waves. Radiated heat will travel through space until it reaches an opaque object (See Figure 1-3). As the object is exposed to heat radiation, it will in return radiate heat from its surface. Radiated heat is one of the major sources of fire spread to exposures, and its importance as a source of fire spread demands immediate attention at location where radiation exposure is severe.

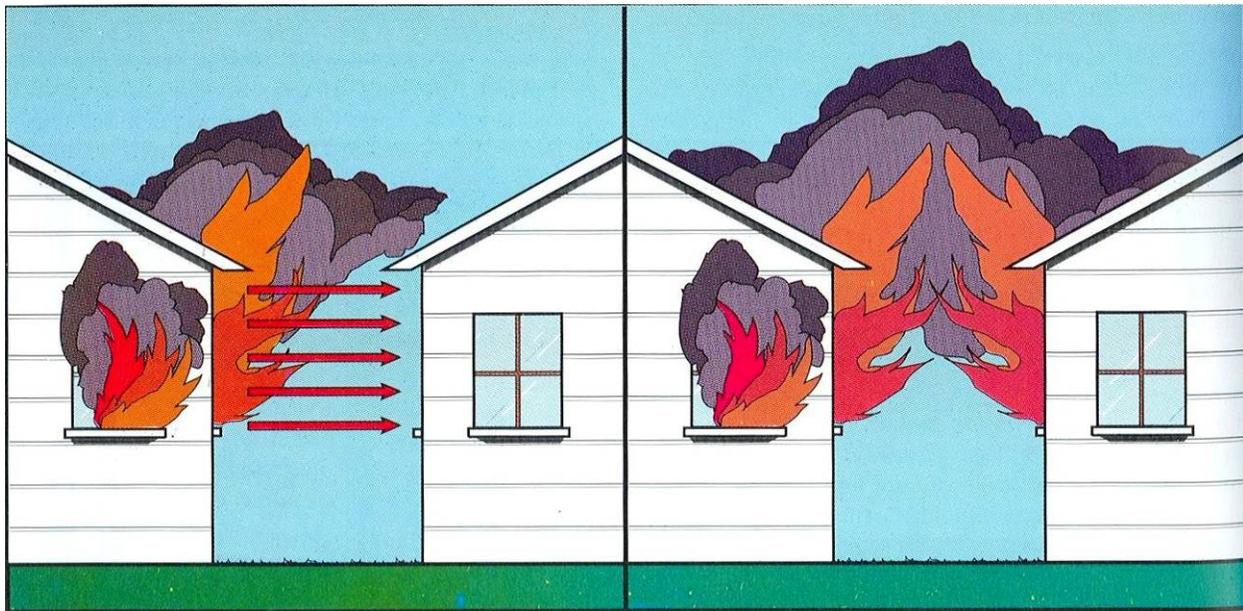


Figure 1-3

PRINCIPLES OF FIRE BEHAVIOR

Fire Tetrahedron

For many years, the fire triangle (oxygen, fuel, and heat) was used to teach the components of fire (Figure 1-5). While this simple example is useful, it is not technically correct. For combustion to occur, four components are necessary:

- ◆ Oxygen (oxidizing agent)
- ◆ Fuel
- ◆ Heat
- ◆ Self-sustained chemical reaction

These components can be graphically described as the *fire tetrahedron* (Figure 1-4). Each component of the tetrahedron must be in place for combustion to occur. This concept is extremely important to students of fire suppression, prevention, and investigation. Remove any one of the four components and combustion will not occur. If ignition has already occurred, the fire is extinguished when one of the components is removed from the reaction.

Fuel may be found in any of three states of matter; solid, liquid, or gas. Only gases burn. The initiation of combustion of a liquid or solid fuel require their conversion into a gaseous state by heating. Fuel gases are evolved from solid fuels by pyrolysis. Pyrolysis is the chemical decomposition of a substance through the action of heat (Figure 1-5).

Fuel gases are evolved from liquids by vaporization. This process is the same for water evaporating by boiling or water in a container evaporating in sunlight. In both cases, heat causes the liquid to vaporize. Generally, the vaporization process of liquid fuels requires less heat input than does the pyrolysis process for solid fuels. This places considerable restraints on the control and extinguishment of liquid fuel fires because their reignition is much more likely.

Gaseous fuels can be the most dangerous, because they are already in the natural state required for ignition. No pyrolysis or vaporization will be needed to ready the fuel. These fuels are also the most difficult to contain.

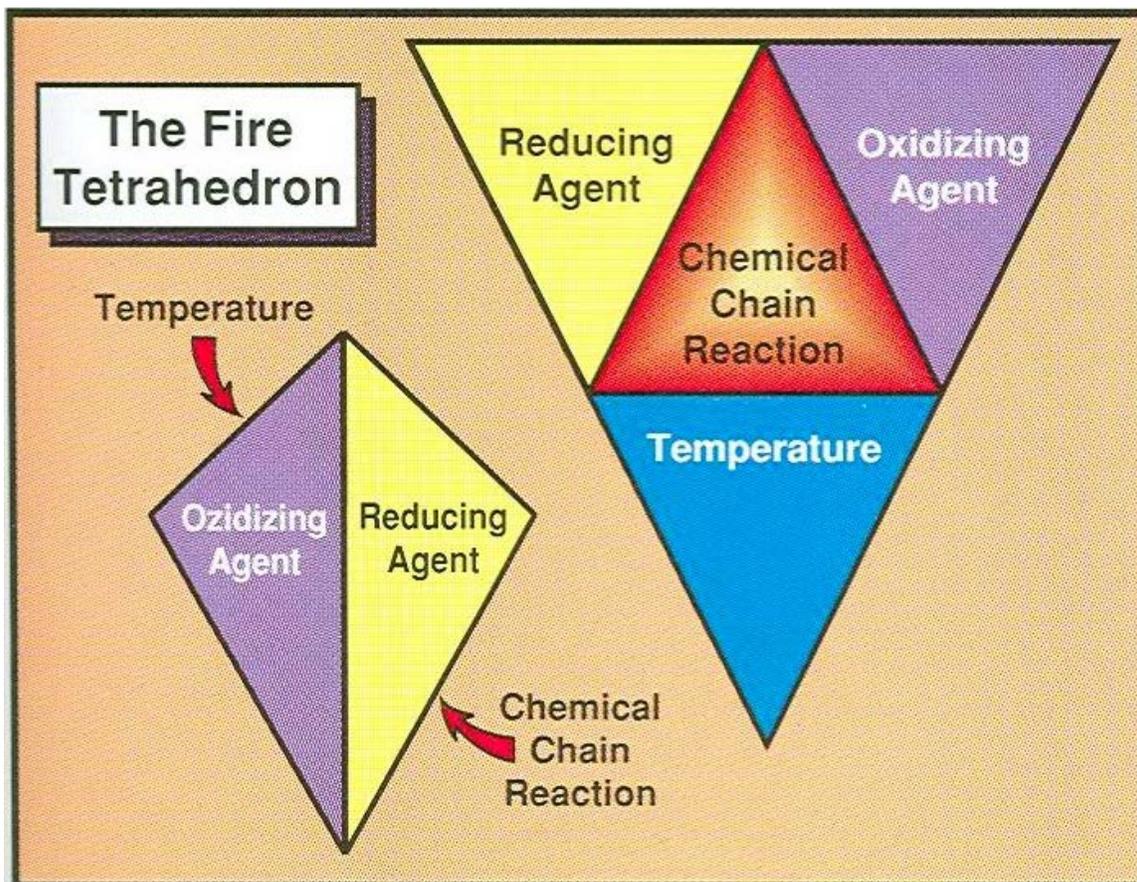


Figure 1-4

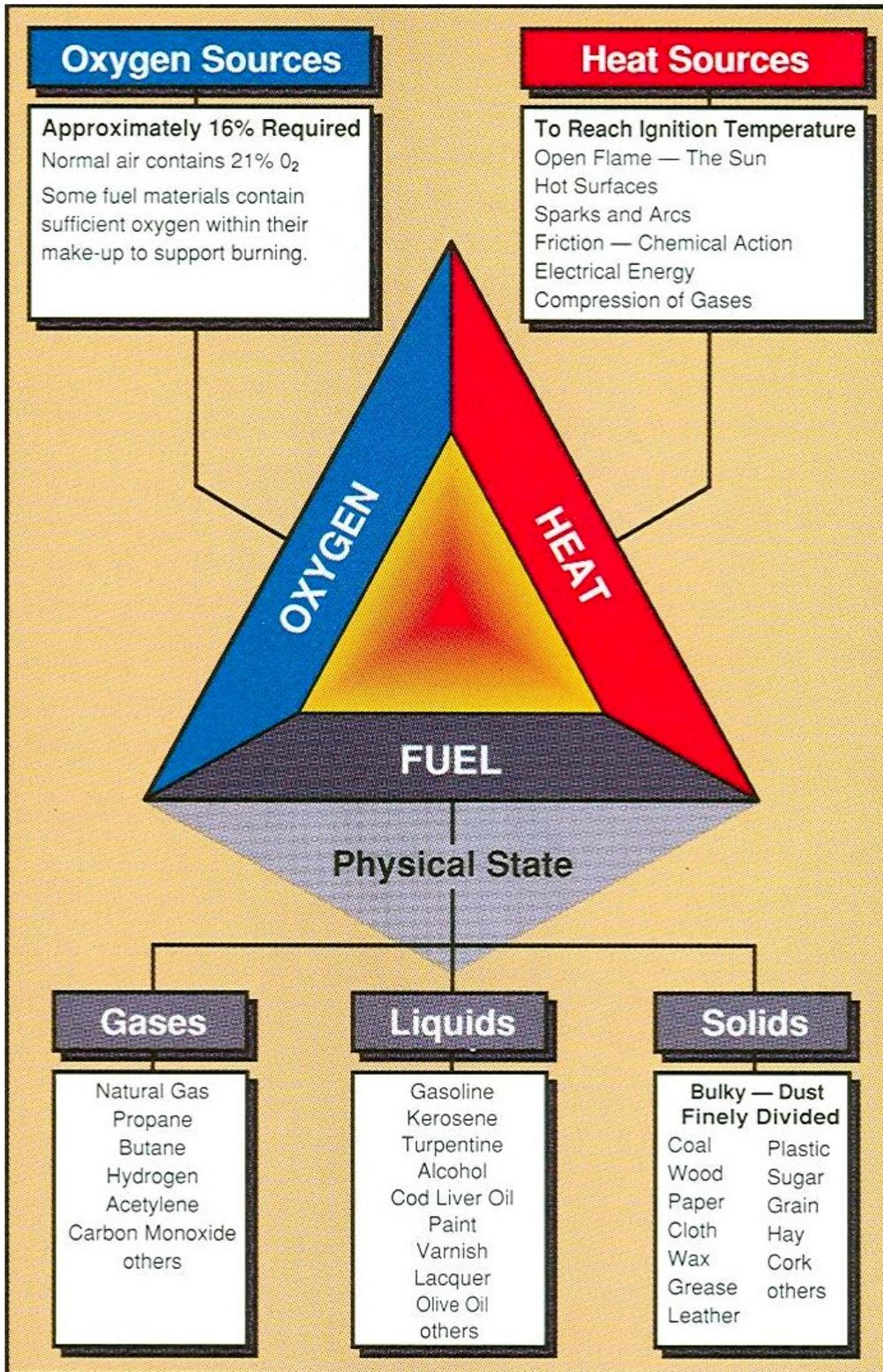


Figure 1-5

PHASES OF FIRE

Fires may start at any time of the day or night if a hazard exists. If the fire happens when the area is occupied and/or protected by automatic suppression and detection systems, chances are that it will be discovered and controlled in the beginning (incipient) phase. If the fire occurs when the building is closed, deserted, and without fixed protection systems, the fire may go undetected until it has gained major headway. The phase of a fire in a closed building is of chief importance when determining ventilation requirements.

Fire in a confined room or building has two particularly important characteristics. The first characteristic is that there is a limited amount of oxygen. This differs from an outside fire, where the oxygen supply is unlimited. The second characteristic is that the fire gases that are given off are trapped inside the structure and build up, unlike outdoors where they can dissipate. When fire is confined in a building or room, the situation requires carefully thought-out and executed ventilation procedures if further damage is to be prevented and danger reduced. Fire confined to a building or room can be best understood by an investigation of its three main progressive phases: incipient, steady-state burning, and hot smoldering. A firefighter may be confronted by one or all of the phases of fire at any time, therefore, a working knowledge of these phases is important for understanding ventilation procedures. Firefighters must also be aware of the variety of potentially hazardous conditions that may be intertwined within the three main phases. These hazards include rollover, flashover, and backdraft.

Incipient Phase

The incipient phase is the earliest phase of a fire beginning with the actual ignition. The fire is limited to the original materials of ignition (Figure 1-6). In the incipient phase, the oxygen content in the air has not been significantly reduced, and the fire is producing water vapor (H₂O), carbon dioxide (CO₂), perhaps a small quantity of sulfur dioxide (SO₂), carbon monoxide (CO), and other gases. Some heat is being generated, and the amount will increase as the fire progresses. The fire may be producing a flame temperature well above 1,000°F (537°C), yet the temperature in the room at this stage may be only slightly increased.

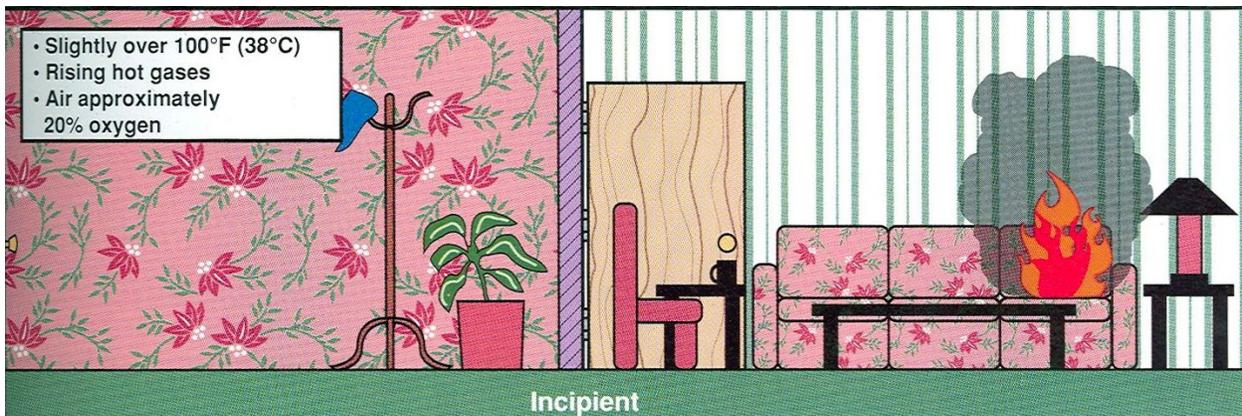


Figure 1-6

Rollover

Rollover, sometimes referred to as flameover, takes place when unburned combustible gases released during the incipient or early steady-state phase accumulate at the ceiling level (Figure 1-7). These superheated gases are pushed, under pressure, away from the fire area and into uninvolved areas where they mix with oxygen. When their flammable range is reached, they ignite and a fire front develops, expanding very rapidly and rolling over the ceiling (Figure 1-8). This is one of the reasons firefighters must stay low when advancing hoselines. Rollover differs from flashover in that only the gases are burning and not the contents of the room. The rollover will continue until its fuel is eliminated. This is done by extinguishing the main body of fire. The rollover will cease when the fire itself stops producing the flammable gases that are feeding the rollover.

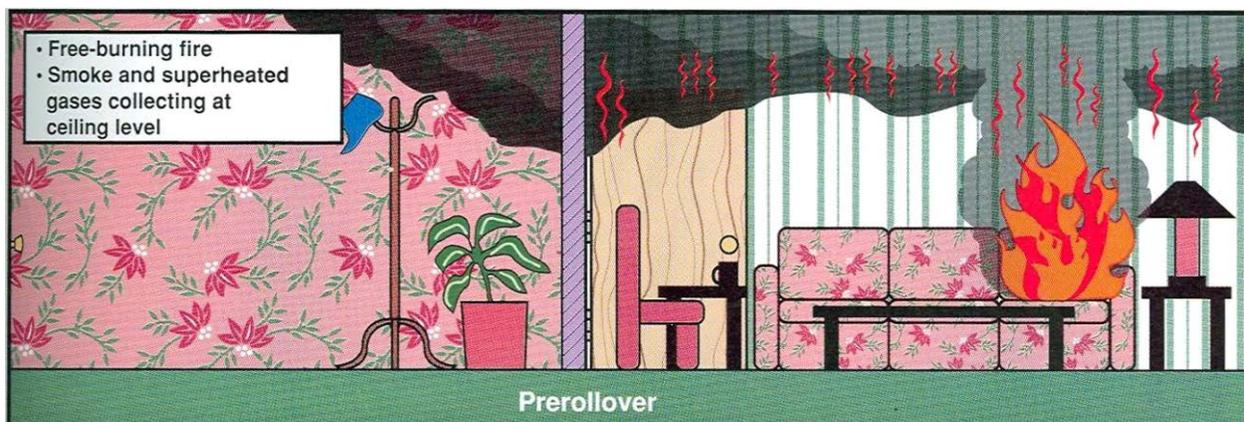


Figure 1-7

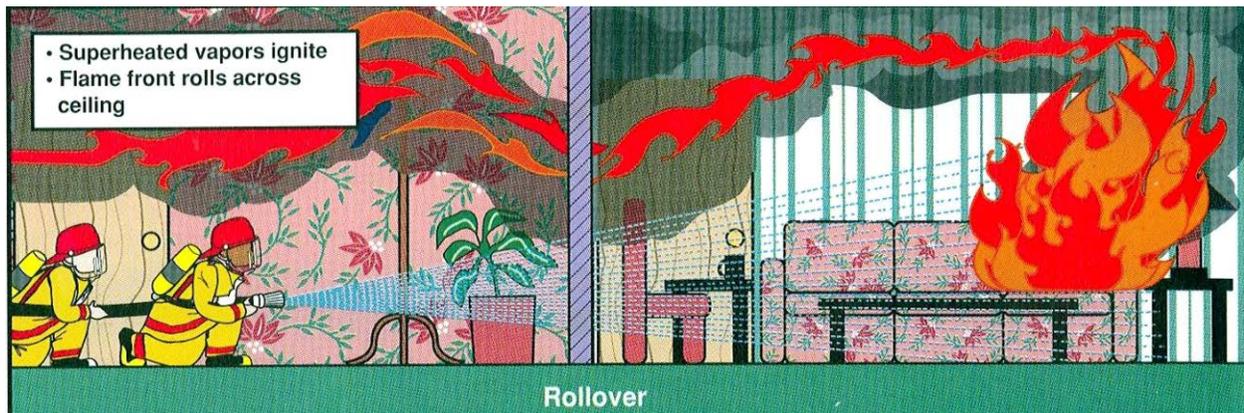


Figure 1-8

Steady-State Burning Phase

For purposes of simplicity, the steady-state burning phase (sometimes referred to as the free-burning phase) can generally be considered the phase of the fire where sufficient oxygen and fuel are available for fire growth and open burning to a point where total involvement is possible. During the early portions of this phase, oxygen rich air is drawn into the flame, as convection (the rise of heated gases) carries the heat to the uppermost regions of the confined area (Figure 1-9).

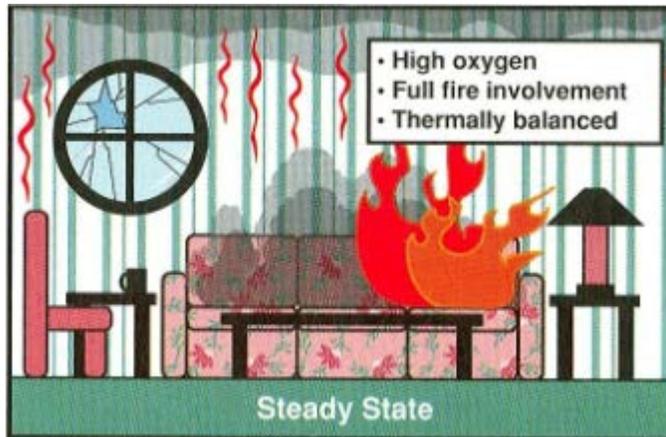


Figure 1-9

The heated gases spread out laterally from the top downward, forcing the cooler air to seek lower levels, and eventually igniting all the combustible material in the upper levels of the room. This early portion of the steady-state burning phase is often called the flame-spread phase. The presence of this heated air is one of the reasons firefighters are taught to keep low and use protective breathing equipment. One breath of this superheated air can sear the lungs. At this point, the temperature in the upper regions can exceed 1,300°F (700°C).

If conditions are perfect, and they rarely are, the fire may achieve what is commonly referred to as “clear burning.” Clear burning is accompanied by high temperatures and complete combustion. Little or no smoke is given off. This fire is usually seen only when very clean fuels, such as methanol-based race car fuels, burn.

Thermal columns will normally occur with rapid air movements upward from the base of the fire. As the fire progresses (in a confined space) through the latter portions of the steady-state burning phase, the fire continues to consume the free oxygen until it reaches the point where there is insufficient oxygen to react with the fuel. The fire is then reduced to the smoldering phase, but this fire needs only a fresh supply of oxygen to burn rapidly.

Flashover

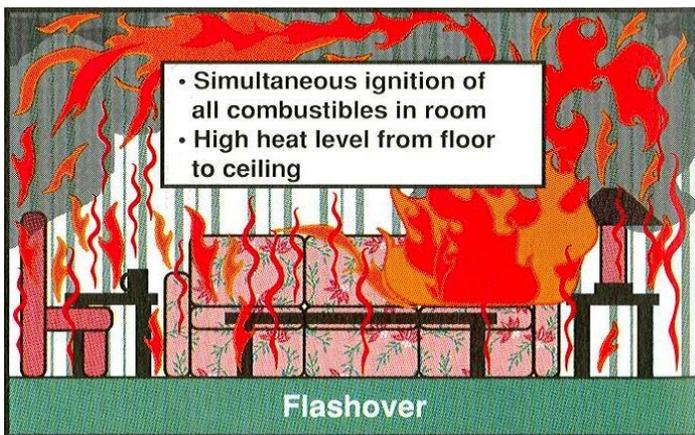


Figure 1-10

Flashover occurs when flames flash over the entire surface of a room or area (Figure 1-10). The actual cause of flashover is attributed to the buildup of heat from the fire itself. As the fire continues to burn, all the contents of the fire area are gradually heated to their ignition temperatures. When they reach their ignition point, simultaneous ignition occurs, and the area becomes fully involved in fire. This actual ignition is almost instantaneous and can be quite dramatic. A flashover can

usually be avoided by directing water toward the ceiling level and the room contents to cool materials below their ignition temperatures.

Hot Smoldering Phase

After the steady-state burning phase, flames may cease to exist if the area of confinement is

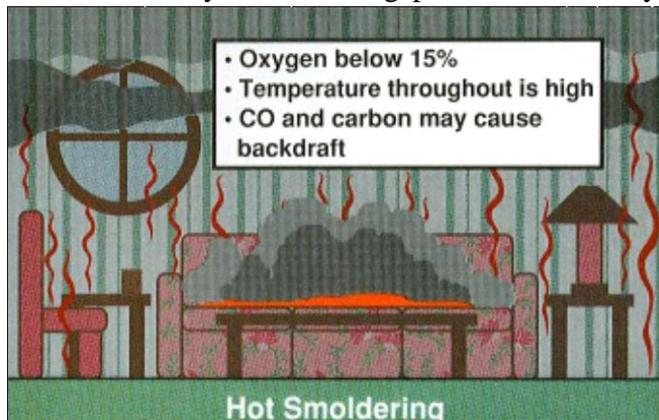


Figure 1-11

sufficiently airtight. In this instance, burning is reduced to glowing embers (Figure 1-11). As the flames die down, the room becomes completely filled with dense smoke and gases. Air pressure from gases being given off may build to the extent that smoke and gases are forced through small cracks. Room temperatures in excess of 1,000°F (370°C) are possible. The intense heat will have liberated the lighter fuel fractions, such as methane, from the combustible material in the room. These fuel gases will be added produced by the

fire and will further increase the hazard to the firefighter and create the possibility of a backdraft if air is improperly introduced into the room. If air is not introduced into the room, the fire will eventually burn out, leaving totally incinerated contents.

Backdraft

Firefighters responding to a confined fire that is late in the steady-state burning phase or in the hot smoldering phase risk causing a backdraft (also known as a smoke explosion) if the science of fire is not considered in opening the structure.

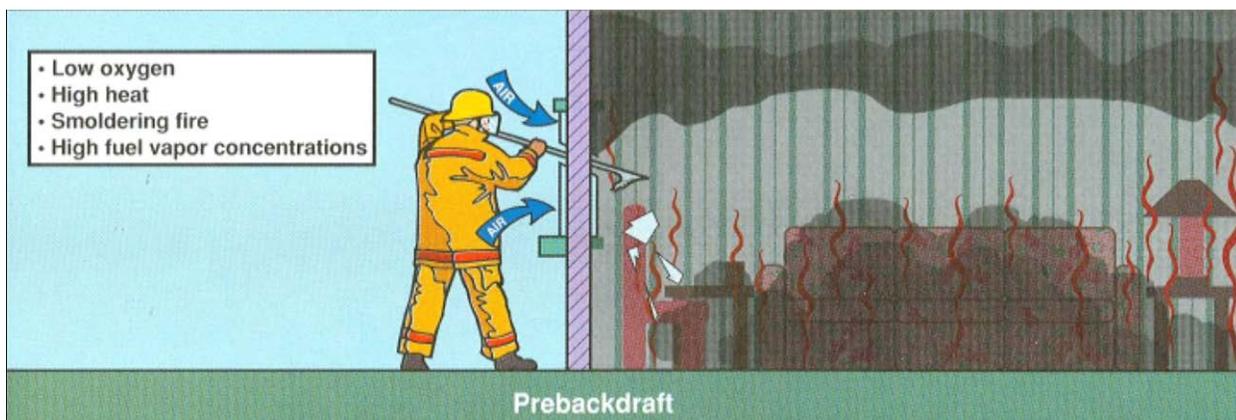


Figure 1-12

In the hot-smoldering phase of a fire, burning is incomplete because of insufficient oxygen to sustain the fire. However, the heat from the steady state burning phase remains, and the carbon particles and other flammable products of combustion are available for instantaneous combustion when more oxygen is supplied (Figure 1-12). Improper ventilation, such as opening a door or breaking a window, supplies the dangerous missing link — oxygen. As soon as the needed oxygen rushes in, the stalled combustion resumes; it can be devastating in its speed, truly qualifying as an explosion (Figure 1-13). Backdraft can be the most hazardous condition a firefighter will ever face.

Combustion is oxidation, and oxidation is a chemical reaction in which oxygen combines with other elements. Carbon is a naturally abundant element present in wood and most plastics, among other things. When the wood burns, carbon combines with oxygen to form carbon dioxide (CO₂) or carbon monoxide (CO), depending on the availability of oxygen. When enough oxygen is no longer available, large quantities of free carbon are released in the smoke. Thus a warning sign of possible backdraft is dense, black (carbon-filled) smoke.

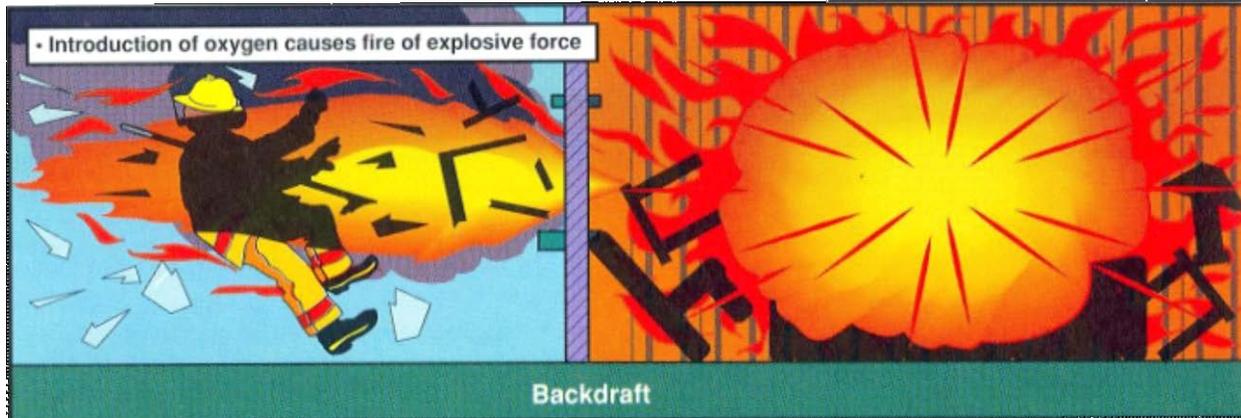


Figure 1-13

The following characteristics may indicate the potential for a backdraft to occur:

- ◆ Pressurized smoke exiting small openings
- ◆ Black smoke becoming dense gray yellow
- ◆ Confinement and excessive heat
- ◆ Little or no visible flame
- ◆ Smoke leaving the building in puffs or at intervals
- ◆ Smoke-stained windows
- ◆ Muffled sounds
- ◆ Sudden rapid movement of air inward when opening is made

This situation can be made less dangerous by proper ventilation. If the room or building is opened at the highest point involved, the heated gases and smoke will be released, reducing the possibility of an explosion.

THERMAL LAYERING OF GASES

The thermal layering of gases is the tendency of gases to form into layers, according to temperature.

Other terms sometimes used to describe this layering of gases by heat are heat stratification and thermal balance. The hottest gases tend to be in the top layer, while the cooler ones form the bottom layer. Smoke is a heated mixture of air, gases, and particles, and it rises. If a hole is made in the roof, the smoke will rise from the building or room to the outside.

Thermal layering is critical to fire fighting activities. As long as the hottest air and gases are allowed to rise the lower levels will be safer for firefighters (Figure 1-14). This normal layering of the hottest gases to the top and out the ventilation opening can be disrupted if water is improperly applied.

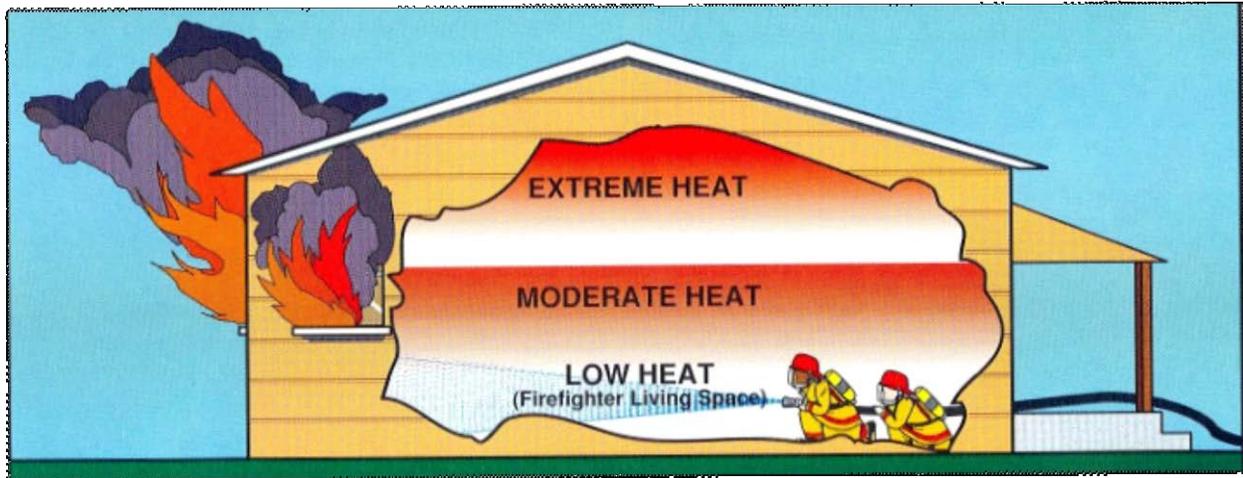


Figure 1-14

If water is improperly applied to the fire area and the area is not ventilated, the water will cool and condense, the steam generated by the initial fire attack. This reaction causes the smoke and steam to circulate within all levels of the fire area. This swirling of smoke and steam is the result of disrupted normal thermal layering (Figure 1-15). This process is sometimes referred to as disrupting the thermal balance or creating a thermal imbalance. Many firefighters have been needlessly burned when thermal layering was disrupted. Once the normal layering is disrupted, forced ventilation procedures must be used to clear the area.

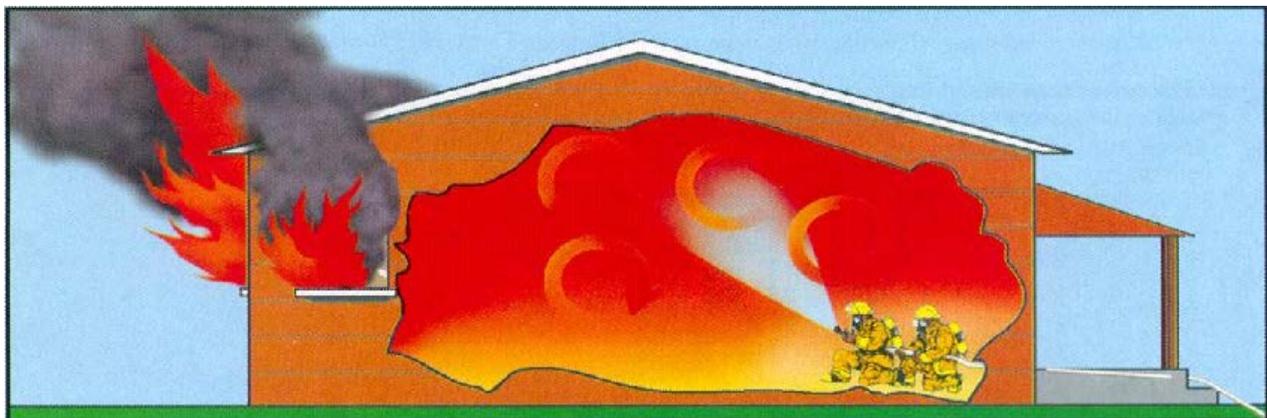


Figure 1-15

PRODUCTS OF COMBUSTION

Incomplete combustion, of course, also leaves behind some unburned or charred school. When a material (fuel) burns, it undergoes a chemical change. None of the elements making up the material are destroyed in the process, but all of the material is transformed into another form or state. For example, when a piece of paper burns, the gases and moisture contained within the paper are liberated. The remaining solids take on the appearance of carbonized, charred flakes. Although it was once thought that the weight of various byproducts was the same as the original weight of the fuel, it is now known that a tiny amount of fuel is indeed converted into energy, so the by-products weigh slightly less than the fuel did.

When a fuel burns, there are four products of combustion: heat, light, smoke, and fire gases (Figure 1-16). Heat is a form of energy that is measured in degrees of temperature to signify its intensity. Heat is the product of combustion that is responsible for the spread of fire. It is also the direct cause of burns, dehydration, heat exhaustion, and injury to the respiratory tract.

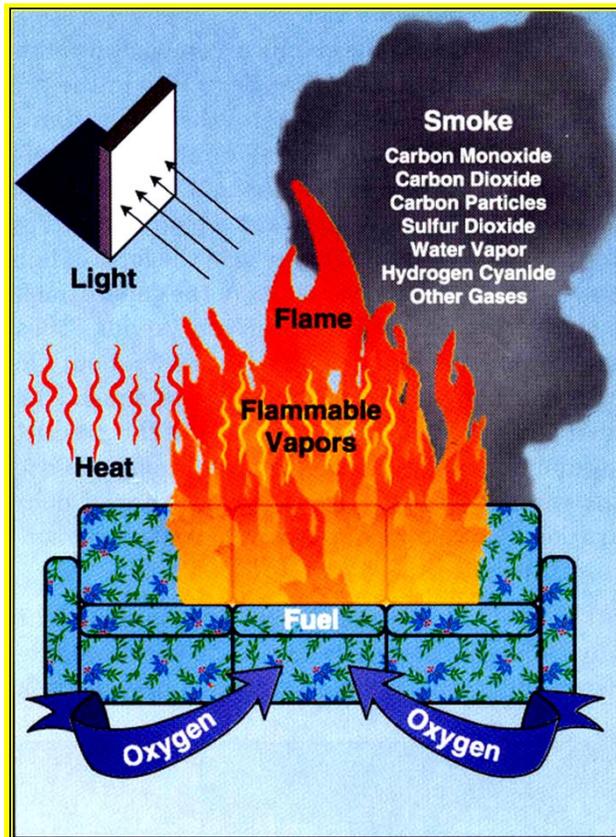


Figure 1-16

Flame is the visible, luminous body of a burning gas. When a burning gas is mixed with the proper amounts of oxygen, the flame becomes hotter and less luminous. The loss of luminosity is caused by a more complete combustion of the carbon. For these reasons, flame is considered to be a product of combustion. Of course, it is not present in those types of combustion, such as smoldering fires, that does not produce flame.

The smoke encountered at most fires consists of a mixture of oxygen, nitrogen, carbon dioxide, carbon monoxide, finely divided carbon particles (soot), and a miscellaneous assortment of products that have been released from the material involved. The contents of the smoke will vary depending on the exact material that is burning; some materials give off more smoke than others. Liquid fuels generally give off dense, black smoke. Oil, tar, paint, varnish, rubber, sulfur, and many plastics also give off dense smoke.

FIRE EXTINGUISHMENT THEORY

The extinguishment of fire is carried out by limiting or interrupting one or more of the essential elements in the combustion process. With flaming combustion, the fire may be extinguished by reducing temperature, eliminating fuel or oxygen, or by stopping the uninhibited chemical chain reaction. If a fire is in the smoldering mode of combustion, only three extinguishment options exist: reduction of temperature, elimination of fuel, or elimination of oxygen.

Extinguishment By Temperature Reduction

One of the most common methods of extinguishment is by cooling with water (Figure 1-17). This process of extinguishment is dependent on reducing the temperature of the fuel to a point where it does not produce sufficient vapor to burn. Solid fuels and liquid fuels with high flash points can be extinguished by cooling. Fires involving low flash point liquids and flammable gases cannot be extinguished by cooling with water, because vapor production cannot be sufficiently reduced. Reduction of temperature is dependent on the application of an adequate flow in proper form to establish a negative heat balance.

Extinguishment By Fuel Removal

In some cases, a fire is effectively extinguished by removing the fuel source (Figure 1-18). Removal of the fuel sources may be accomplished by stopping the flow of liquid or gaseous fuel or by removing solid fuel in the path of the fire. Another method of fuel removal is to allow the fire to burn until all fuel is consumed.

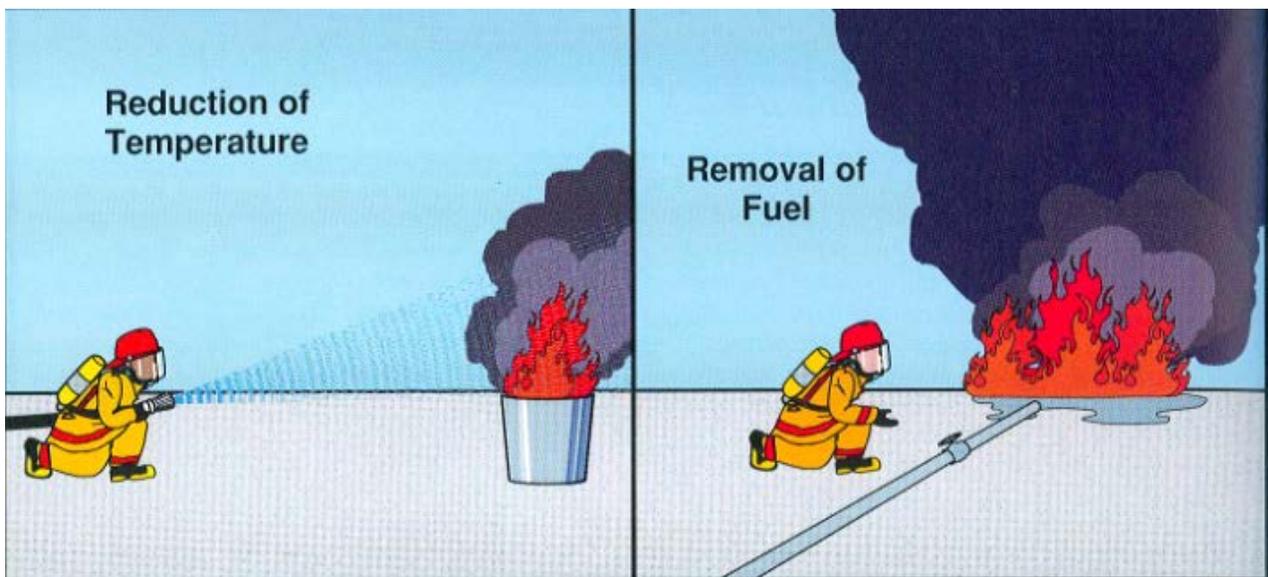


Figure 1-17

Figure 1-18

Extinguishment By Oxygen Dilution

Reducing the oxygen content in an area also puts out the fire (Figure 1-19). Reduction of the oxygen content can be done by flooding an area with an inert gas, such as carbon dioxide, which displaces the oxygen; or the oxygen can be reduced by separating the fuel from the air such as by blanketing it with foam. Of course, neither of these methods work on those rare fuels that are self-oxidizing.

Extinguishment By Chemical Flame Inhibition

Some extinguishing agents, such as dry chemical and halogenated hydrocarbons (Halon), interrupt the flame-producing chemical reaction and stop flaming (Figure 1-20). This method of extinguishment is effective on gas and liquid fuels, because they must flame to burn. Smoldering fires are not easily extinguished by this method because the moment the Halon is shut off, air once again has access to the smoldering fuel and it continues to burn. Cooling is the only practical way to extinguish a smoldering fire.

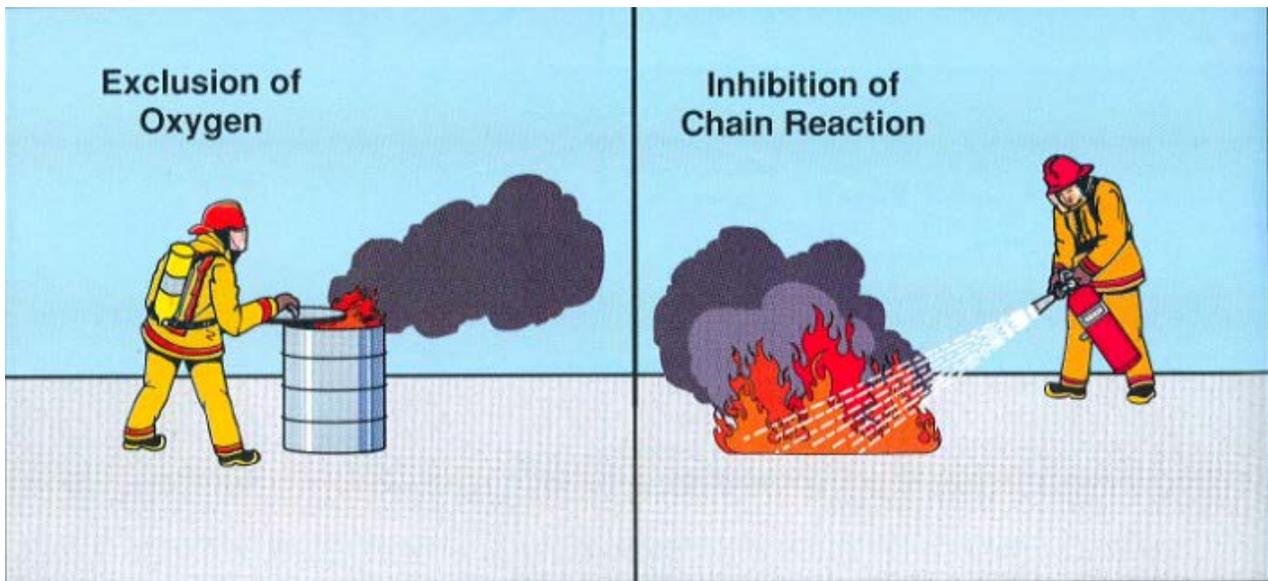


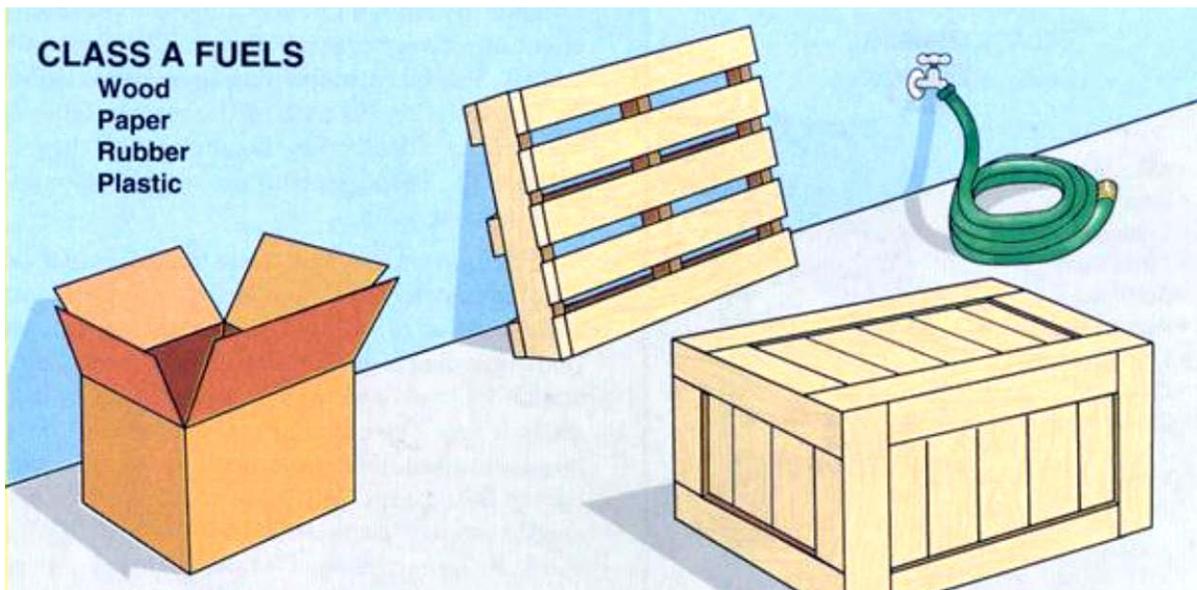
Figure 1-19

Figure 1-20

CLASSIFICATION OF FIRES AND EXTINGUISHMENT METHODS

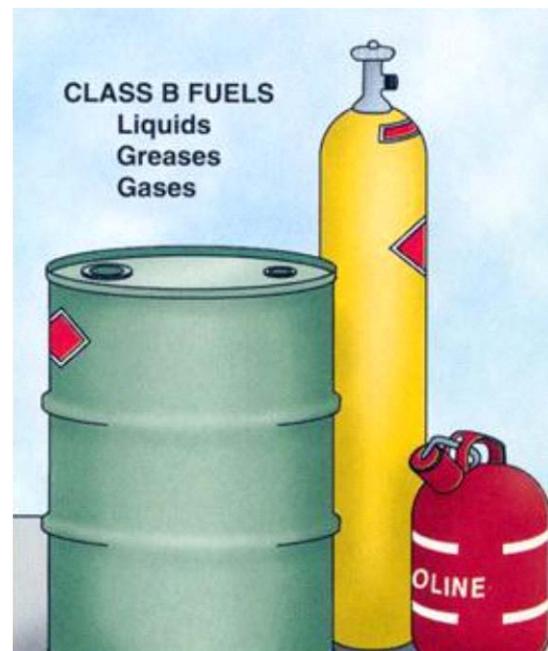
Class A Fires

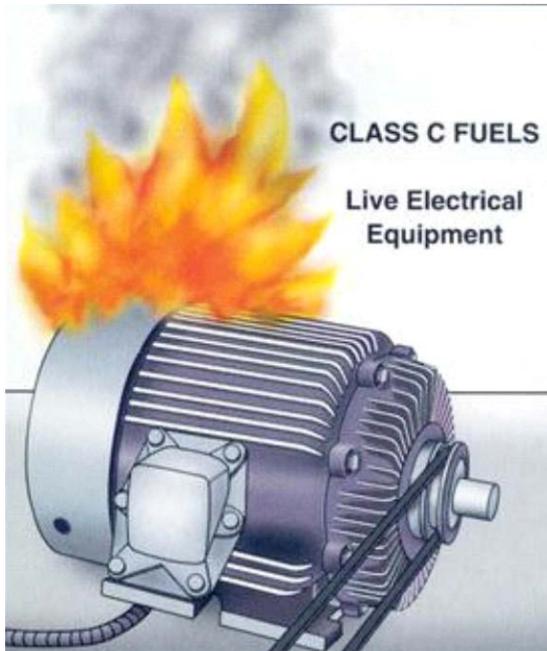
Class A fires are fires involving ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics. Water is used in a cooling or quenching effect to reduce the temperature of the burning material below its ignition temperature. The addition of Class A foams (sometimes referred to as wet water) may enhance water's ability to extinguish Class A fires, particularly those that are deep seated in bulk materials. This is because the Class A foam agent reduces the water's surface tension, allowing it to penetrate more easily into piles of the material.



Class B Fires

Class B fires involve flammable and combustible liquids and gases such as gasoline, oil, lacquers, paints, mineral spirits, and alcohol. The smothering or blanketing effect on oxygen exclusion is most effective for extinguishment. Other extinguishing methods include removal of fuel and temperature reduction when possible.



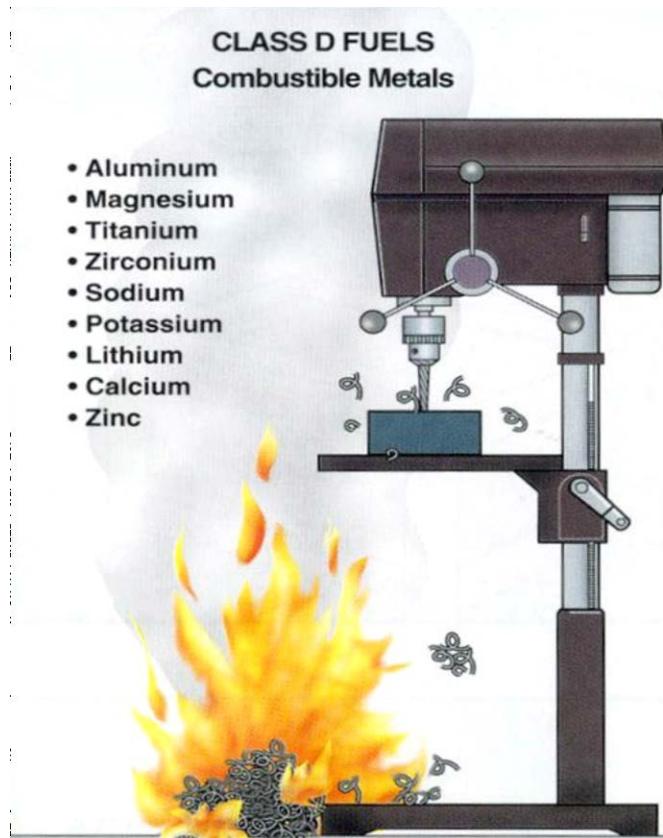


Class C Fires

Fires involving energized electrical equipment are Class C fires. Household appliances, computers, transformers, and overhead transmission lines are examples of these. These fires can sometimes be controlled by a nonconducting extinguishing agent such as Halon, dry chemical, or carbon dioxide. The safest extinguishment procedure is to first deenergize high voltage circuits and then to treat the fire as Class A or Class B fire depending upon the fuel involved.

Class D Fires

Class D fires involve combustible metals such as aluminum, magnesium, titanium, zirconium, sodium, and potassium. These materials are particularly hazardous in their powdered form. Proper airborne concentrations of metal dusts can cause powerful explosions given a suitable ignition source. The extremely high temperature of some burning metals makes water and other common extinguishing agents ineffective. There is no single agent available that will effectively control fires in all combustible metals. Special extinguishing agents are available for control of fire in each of the metals and are marked specifically for that metal. These agents are used to cover up the burning material and smother the fire.





FDNY APPARATUS

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with the apparatus used in the FDNY
CONTENTS:	<ul style="list-style-type: none">• Engine company apparatus• Ladder company apparatus<ul style="list-style-type: none">Rear mount AerialsTiller AerialsTower Ladders
SOURCE:	<ul style="list-style-type: none">• FDNY Tactics and Procedures• FDNY Training Bulletins• FDNY Chauffer Training School Manual
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Tactics and Procedures Ladders 2, Ladders 6• FDNY TB Apparatus• FDNY CTS Engine Reference Manual

PART ONE

ENGINE COMPANY APPARATUS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	OVERVIEW.....	1
2	APPARATUS PUMP.....	2
3	BOOSTER TANK.....	4
4	INLETS AND OUTLETS.....	5
5	DRAIN AND BLEEDER VALVES.....	7
6	PUMP PANEL.....	9
7	DECK PIPE.....	13
8	HOSEBED.....	14
9	STANDPIPE HOSE.....	15
10	HYDRANT CONNECTIONS	16
11	DRAFTING CONNECTIONS.....	16
12	ADDITIONAL HOSE.....	17
ADDENDUM 1	PRO PRESSURE GOVERNOR.....	19

1. ENGINE APPARATUS OVERVIEW



- 1.1 The engine company apparatus is a complex piece of equipment that serves both as a vehicle and as a high capacity water pump.
- 1.2 There are two primary functions of an engine apparatus in the FDNY:
 - 1.2.1 Transport members and equipment to the scene of a fire or emergency.
 - 1.2.2 Deliver water with sufficient pressure to the fire area for firefighting operations.
- 1.3 In order to properly use the engine apparatus effectively, it is necessary for all members to be knowledgeable about the critical components of the apparatus.

1.4 This chapter will describe the critical components of the engine apparatus as it exists in the FDNY. This includes the components listed below, which are described in the following sections:

- Apparatus Pump
- Booster Tank
- Inlets and Outlets
- Drain Valves
- Pump Panel
- Deck Gun
- Hose Beds
- Standpipe Hose
- Hydrant Connections
- Drafting Connections

1.5 Deleted

2. APPARATUS PUMP

2.1 Conventional engine apparatus in the FDNY are equipped with a two-stage centrifugal pump. These apparatus' have a total rated capacity of 2,000 GPM and a maximum pressure rating of 600 psi.

2.1.1 Select engine companies with the two-stage 2,000 GPM pump are designated as "High Pressure Engines" as they have been fitted with a high-pressure discharge elbow, and issued specialized high-pressure equipment (hose, fittings, etc.). This special equipment allows them to safely perform "High-Pressure Pumping" operations up to 600 psi.

2.1.2 A "stage" is the portion of the centrifugal pump that consists of one impeller and generates the force required to discharge water.

- 2.1.3 The FDNY also has a number of engine apparatus that have a 3rd stage, designated as “3rd Stage Engines”, which have a total rated capacity of 2,000 GPM and have a maximum pressure rating of 700 psi. 3rd Stage Engines have been fitted with two special high-pressure discharge elbows, and issued high-pressure equipment. This special equipment allows them to safely perform High-Pressure Pumping operations up to 700 psi.
- 2.1.4 Deleted
- 2.2 Conventional Engine apparatus have the capability to operate their two stages in two different fashions:
- 2.2.1 Volume Operation
- A. When in Volume Operation, the two stages of the pump are operated in parallel, in which water passes through both stages at the same time before it is discharged.
 - B. Volume Operation enables the pump to discharge up to its maximum rated flow capacity.
 - C. The idle pressure of an apparatus in Volume Operation is roughly 55 psi.
 - D. Volume Operation is the default setting for FDNY engine apparatus and is used for the vast majority of engine operations.
- 2.2.2 Pressure Operation
- A. When in Pressure Operation, the two stages of the pump are operated in series, in which water passes through the first stage, and then passes through the second stage afterwards.
 - B. Pressure Operation enables the pump to reach its highest rated discharge pressure, but only half of its maximum rated flow capacity.
 - C. The idle pressure of an apparatus in Pressure Operation is roughly 110 psi.
 - D. Pressure Operation should only be used when head pressure must be overcome, such as when supplying a Fire Department Connection (FDC) for a standpipe system.
- Note:** Head pressure is the static pressure (the pressure when water is not flowing) caused by the weight of water solely due to its height above the measuring point.
- 2.3 Engine apparatus should be maintained in “Volume Operation” unless the pumping operation needs to overcome head pressure (such as when supplying a standpipe system in a high-rise building). When overcoming head pressure is required, the pump should be switched to “Pressure Operation”.

2.4 Switching the pump from Volume Operation to Pressure Operation is done using the transfer valve, which is switched using an operating handle located at the pump panel. Prior to using the transfer valve, the engine RPM should be returned to idle pressure.

3. BOOSTER TANK

3.1 The booster tank is a 500-gallon water tank carried by all FDNY Engine apparatus. It is capable of quickly supplying water to a hoseline or deck pipe for a limited period of time.

3.2 The operation of the booster tank is controlled by operating handles on the pump panel.

3.2.1 One handle allows the booster tank to supply water to the pump.

3.2.2 One handle allows the booster tank to be filled from the apparatus' water supply.

3.3 A Tank Vision Gauge is a lighted, multi-color booster tank water level indicator. There are two on the apparatus, which are located on the pump panel and the panel on the opposite side of the apparatus.(Figure 1)

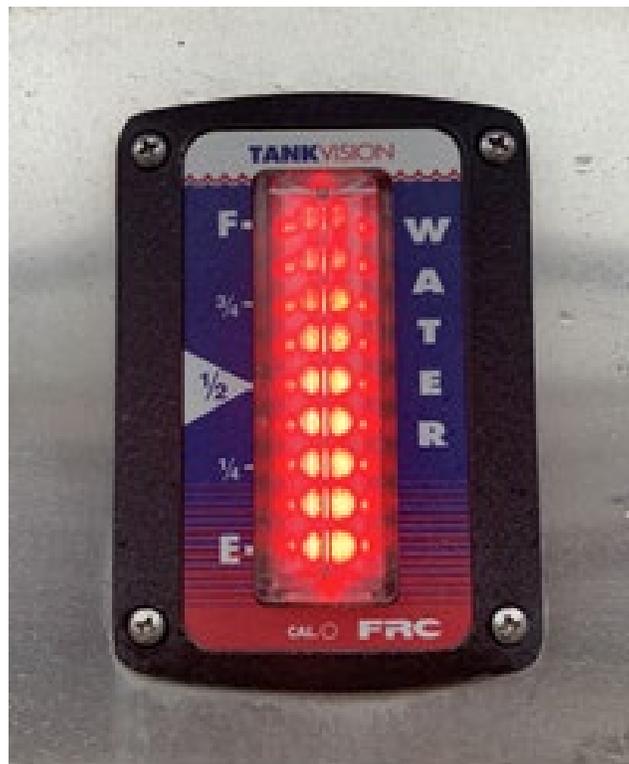


Figure 1

4. INLETS AND OUTLETS

4.1 The apparatus is equipped with a number of connections by which water can be either taken into the apparatus (inlets), or discharged from the apparatus (outlets).

4.1.1 Inlets (Figure 2) are connections by which water can be supplied to the apparatus.

- A. Inlets are also called “suctions”.
- B. Inlets exist in a number of sizes, including 3”, 4 ½”, and 6”.
- C. Inlets may be gated or non-gated. Gated inlets are controlled by an operating handle, which may be located adjacent to the inlet, or at the pump panel.
- D. Gated inlets should always be used in the fully opened position.

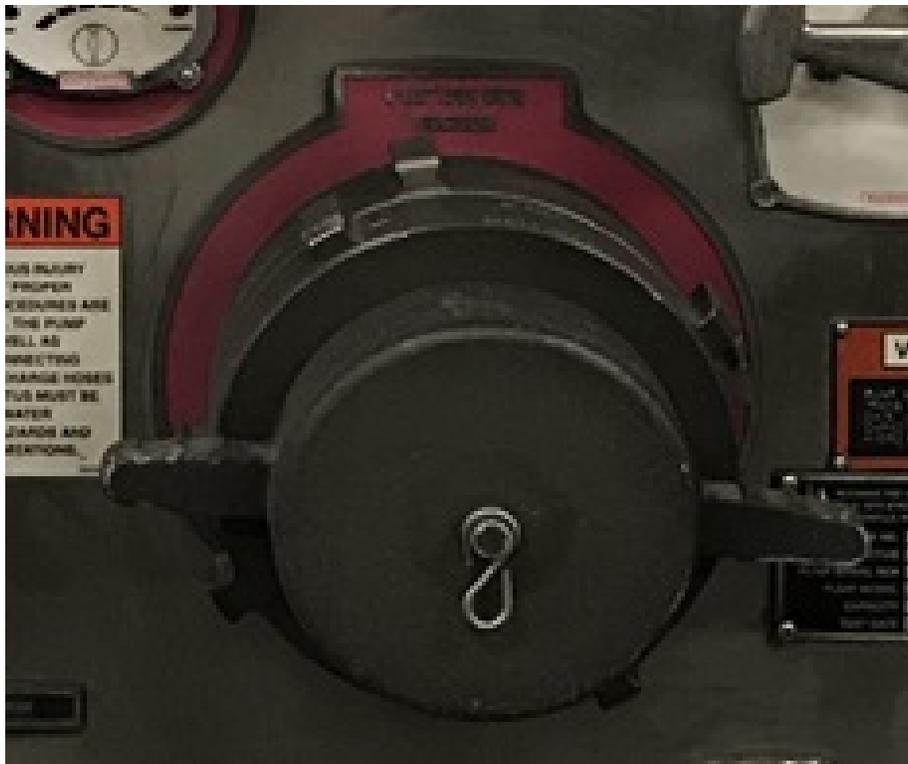


Figure 2

4.1.2 Outlets (Figure 3) are connections by which water can be discharged from the apparatus.

- A. Outlets are also called “discharges”.
- B. Outlets come in a number of sizes, including 2 ½”, 3”, and 4 ½”. A reducer is placed on 2 ½” outlets for hose stretches utilizing 1 ¾” hose.
- C. All outlets are gated and are controlled by an operating handle located at the pump panel. Outlets are often operated in a partially open position to regulate pressure.



Figure 3

4.2 Inlets and outlets may be color coded to match their corresponding operating handle and bleeder valves.

5. DRAIN AND BLEEDER VALVES

- 5.1 Drain and bleeder valves are located at a number of points around the bottom of the apparatus and serve the purpose of bleeding air and draining water from the pipes that supply and discharge water from the apparatus. These valves may be manually operated, or some may be automatic.
- 5.2 There is at least one bleeder valve for each inlet, and one drain valve for each discharge.
Both drain and bleeder valves are the same design and located between a gate and the opening associated with it.
 - 5.2.1 Drain valves can be opened to drain water from a discharge pipe, which can facilitate breaking down hoselines after an operation, as well as prevent freezing in cold weather. (Figure 4)



Figure 4

- 5.2.2 For inlets, the bleeder valve is also used to bleed air coming from an intake hose in order to reduce the introduction of air into the pump, which may cause a loss of prime during pumping operations.

5.3 The apparatus pump itself is also equipped with a designated drain valve. (Figure 5)



Figure 5

6. THE PUMP PANEL

- 6.1 The pump panel (Figure 6) is the area on the Chauffeur's side of the apparatus that provides controls and gauges for managing water flow and monitoring the status of the apparatus pump. Discussed below are the key components of the pump panel and their primary functions.



Figure 6

6.1.1 Operating handles for gated inlets (Figure 7) and outlets (Figure 8)

- A. The flow of water via the various gated inlets and outlets are controlled by operating handles. All operating handles for outlets are at the pump panel, and the operating handles for gated inlets can either be at the pump panel, or adjacent to the inlet.



Figure 7



Figure 8

6.1.2 Discharge Outlet Gauges

- A. Adjacent to the operating handle for each discharge outlet, there is a pressure gauge that provides a reading of the pressure being supplied to that outlet.
- B. There is also a flowmeter for each discharge outlet that provides a reading of the amount of water currently flowing via the discharge outlet.

6.1.3 Booster Tank operating handles

- A. At the pump panel, there is an operating handle to control the supply of water to the booster tank (Figure 9), as well as an operating handle to control the supply of water from the booster tank to the pump.



Figure 9

6.1.4 Master Inlet Pressure Gauge (Figure 10A)

- A. This is also called the “Intake Pressure Gauge”. It is a compound gauge capable of measuring negative pressure.
- B. This gauge provides a reading of the intake pressure of the apparatus. This is the pressure with which the apparatus is being supplied. For example, this gauge will show the pressure a hydrant is supplying to the apparatus.

6.1.5 Master Pressure Gauge (Figure 10B)

- A. This gauge provides a reading of the total amount of pressure currently being generated by the apparatus pump and available for supply to discharge outlets.
- B. When properly primed, this will be equal to the sum of the pressure with which the rig is being supplied (from a hydrant and / or from another pumper relaying water) and the additional pressure being generated by the pump.



Figure 10A

Figure 10B

6.1.6 Transfer Valve (Figure 11)

- A. The Transfer Valve is the handle that switches the operation of the apparatus pump from “Volume Operation” to “Pressure Operation”.



Figure 11

6.1.7 Pro Pressure Governor (Figure 12)

- A. The Pro Pressure Governor (PPG) is a computer that controls engine throttle which ultimately adjusts the pump speed. Its purpose is to automatically maintain the uninterrupted supply of proper operating pressure to all hoselines supplied by an apparatus.
- B. Refer to *Addendum 1: Pro Pressure Governor* for a discussion on the basic operation of the PPG.



Figure 12

6.1.8 Primer Button (Figure 13)

- A. Adjacent to the PPG, there is a button labelled “Push to Prime”. Pushing and holding this button will “prime” the pump, which has the effect of ejecting air from the pump as water is supplied. This prevents air from entering the hoselines that are being supplied.



Figure 13

7. DECK PIPE

- 7.1 The apparatus deckpipe (Figure 13) is permanently affixed to the engine apparatus and supplied directly by a 3-inch pipe from the pump.



Figure 13

- 7.2 The deckpipe has 4 stacked tips (2 ½", 2 ¼", 2", 1 ½").
- 7.2.1 When the 1 ½" tip is used, it will flow roughly 660 GPM with 100 psi at the tip.
- 7.2.2 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.
- 7.2.3 The maximum rated flow of 2,000 GPM is reached when the 2 ½" tip is supplied with 116 psi.
- 7.3 The deckpipe should be maintained with a single gate connected. The single gate allows the ECC to supply the deckpipe with water prior to operating the stream.
- 7.4 Deleted

8. HOSEBED

- 8.1 Conventional Engine apparatus in the FDNY are equipped with 4 hosebeds in the rear of the apparatus.
- 8.2 While the specific organization of the hosebeds may vary among companies based on their response area and response patterns, the following guidelines must be adhered to:
 - 8.2.1 At least one bed must contain 6 lead lengths of 1 ¾" hose.
 - 8.2.2 At least one bed must contain only 2 ½" hose
 - 8.2.3 At least one bed must contain only 3 ½" hose
- 8.3 The lead length of all hosebeds with either 1 ¾" hose or 2 ½" hose must be maintained with a straight-stream nozzle attached. These hosebeds are intended for fire attack.
- 8.4 The 3 ½" hose bed is intended to be used as a supply line. It can be oriented with either the male or female coupling leading away from the apparatus and may be maintained with necessary fittings attached to the coupling.
- 8.5 When a hosebed contains 1 ¾" hose, the first 6 lengths of this hosebed must be 1 ¾" hose. No more (and no fewer) than 6 lengths are permissible. This limitation is due to the high pressures required to overcome the friction loss of more than 6 lengths of 1 ¾" hose.
- 8.6 The proper loading of hose in a traditional hosebed arrangement will allow the hose to play out smoothly when stretched. When properly loaded, 4 folds of hose in the hosebed is roughly one 50' length of hose.
- 8.7 To facilitate stretching hose, the lead lengths of hose in a hosebed may be maintained in a horseshoe arrangement (Figure 14).
 - 8.7.1 Both 1 ¾" hose and 2 ½" hose can be arranged in a horseshoe
 - 8.7.2 Each horseshoe should be comprised of at least one 50' length of hose.
- 8.7.3 A hose bed can have multiple horseshoes. Horseshoes can be stacked on top of each other on the hosebed, with the lead length on top.



Figure 14

9. STANDPIPE HOSE

- 9.1 All Engine apparatus must carry a number of lengths of hose arranged into a “roll-up”, intended for use when stretching from a standpipe system.
- 9.2 This hose may be carried on the side board of the apparatus, and is secured using straps and buckles. They may also be carried inside apparatus compartments.
- 9.3 The following is required to be carried on all engine apparatus:
 - 9.3.1 1 length of 2” lightweight hose, maintained as a roll-up and kept with the 2” nozzle and 1” MST attached. This hose is colored green with a red stripe.
 - 9.3.2 3 lengths of 2 ½” lightweight hose, maintained as roll-ups. One of these lengths must be kept with the 2 ½” nozzle and 1 1/8” MST attached. This hose is white with a red stripe.
 - 9.3.3 For companies staffed with 5 firefighters, 1 additional length of 2 ½” lightweight hose must be carried, maintained as a roll-up.

9.4 Deleted

10. HYDRANT CONNECTIONS

10.1 All Engine companies must carry a number of hydrant connections, as follows:

10.1.1 3 ½" hose to be used for hydrant connection

- A. 3 ½" hose may be carried in the side trays located on each side of the apparatus. This is in addition to the 3 ½" hose on the rear hosebed.

10.1.2 5" yellow hose to be used for hydrant connection

- A. A 35-foot length of 5" yellow synthetic hose (soft hydrant connection) is carried on the apparatus to be used exclusively as a hydrant connection.
- B. It is carried on the front of the apparatus, but may be used to supply inlets on both the front and side of the apparatus.

10.1.4 4 ½" semi-rigid suction and/or 3 ½" soft suction hydrant connection

- A. These are used exclusively for hydrant connection.
- B. Carried on a designated tray on the Chauffeur's side of the apparatus

10.2 Deleted

11. DRAFTING CONNECTIONS

11.1 All Engine companies must carry a number of connections designated to be used for drafting water. FDNY engine apparatus are equipped with the following 3 drafting connections:

11.1.1 10-foot hard connection

11.1.2 10-foot ribbed drafting connection – with a strainer

11.1.3 10-foot ribbed drafting connection – without a strainer

11.2 Deleted



Figure 15

12. ADDITIONAL HOSE

12.1 In addition to hose maintained in roll-ups and hose carried in the hosebeds, additional hose is required to be carried on the apparatus as follows:

12.1.1 At least 1 spare length of 1 ¾" hose, rolled or folded, and maintained with a nozzle attached.

A. This is intended for use as an additional length in a hose stretch, as described in *Chapter 10: Engine Company Emergencies*

12.1.2 Two lengths of 1 ¾" hose to be used as a "booster line". This hose should be maintained with a fog nozzle attached to one length (Figure 16).

A. This hose is intended to be used on outside fires, such as rubbish fires or car fires. In an emergency, it can also be used to apply water from the exterior of the fire building.

B. It should be maintained pre-connected to a discharge outlet. It may also be maintained pre-connected to a gated wye attached to a discharge outlet.

C. This hose may be maintained either rolled or folded. Generally, it is stored on the front bumper of the apparatus.



Figure 16

THIS PAGE WAS INTENTIONALLY LEFT BLANK



PRO PRESSURE GOVERNOR

1. OVERVIEW OF THE PRO-PRESSURE GOVERNOR

- 1.1 The Pro-Pressure Governor (PPG) is a computer located on the pump panel of the engine apparatus that controls the operating pressure of the apparatus pump. (Figure 1)
- 1.2 Its central purpose is to maintain constant pump discharge pressure at each operating outlet throughout the operation, regardless of the opening or closing of other discharge outlets on the apparatus.
- 1.3 When effectively engaged, the PPG will maintain the selected pressure setting in the LED display regardless of the number of discharges that are opened or closed, as long as the water supply is capable of supplying the amount of water required.
- 1.4 This is especially important for operations at which a single apparatus is supplying multiple hoselines. In these situations, the PPG will adjust the engine revolutions per minute (RPMs) whenever a hoseline is opened or closed, in order to maintain the desired pump pressure for each hoseline.
- 1.5 Deleted



Figure 1

2. FEATURES OF THE PPG

2.1 PPG Operating Modes

2.1.1 The PPG can be operated in two different modes, as described below:

- A. **PSI Mode** – In the PSI (pounds per square inch) mode, the PPG will automatically maintain the discharge pressure set in the LED display. This is the setting used by all apparatus in the FDNY.
- B. **RPM Mode** – In the RPM (revolutions per minute) mode, the PPG will maintain engine RPMs set in the LED display. In this mode, it will not automatically compensate for any changes in discharge pressure. For this reason, apparatus in the FDNY do not normally use the RPM mode.

2.1.2 RPM mode is used only in the following two situations:

- A. To initially gain a water supply in a drafting evolution.
- B. If the PSI mode malfunctions, the PPG could be switched to RPM mode.

2.2 PPG digital displays

2.2.1 The PPG has several digital displays, each of which is described below:

- A. **SETTING** – This display is located in the center of the PPG and displays the pressure level at which the PPG is currently set.
- B. **PUMP DISCHARGE** – This displays the total amount of pressure currently being generated by the apparatus pump and available for supply to discharge outlets. This value will match the “Master Pressure” gauge on the pump panel.
- C. **PUMP INTAKE** – This displays the pressure with which the apparatus pump is supplied. This value will match the “Master Inlet Pressure” gauge on the pump panel.
- D. **RPM** – This displays the current speed of the engine.

2.3 PPG buttons

2.3.1 The PPG is equipped with 6 buttons, each of which is described below:

- A. **IDLE** - The “Idle” button will bring the engine to idle. This has the effect of deactivating the PPG.
- B. **INCREASE** - The “Increase” button will increase the pressure setting on the PPG. When pressed momentarily, the pressure increases by 1 psi. When the button is held down, the pressure increases in increments of 5 psi and 10 psi.
- C. **DECREASE** - The “Decrease” button will decrease the pressure setting on the PPG. When pressed momentarily, the pressure decreases by 1 psi. When the button is held down, the pressure decreases in increments of 5 psi and 10 psi.
- D. **PSI** - The “PSI” button will change the PPG operation to the PSI mode (as previously described). This is the standard setting for all FDNY apparatus.
- E. **RPM** - The “RPM” button will change the PPG to the RPM mode (as previously described). The RPM mode is only used if the PSI mode malfunctions or to initially gain a water supply in a drafting evolution.
- F. **PRESET** - The “Preset” button brings the pump pressure quickly to a pre-determined setting. This setting is further described below.

2.4 PPG Preset Value

2.4.1 A key feature of the PPG is the “Preset”, which is a pre-determined pressure value that is uniquely set for each engine apparatus. The purpose of this feature is to quickly set the PPG to a level which will most commonly effectively engage the PPG. This value is the sum of the apparatus idle pressure and the pressure of the water supplied to the apparatus in Volume Operation.

- A. This feature is critical because the PPG will not activate unless the setting on the PPG is at least as high as the actual pressure being generated by the apparatus pump. If the PPG setting is lower than the actual pressure generated, the PPG will not be effectively engaged.
- B. To ensure the activation of the PPG, the “Preset” is set to the minimum pressure generated by the apparatus, which is equivalent to the total combination of the apparatus idle pressure and the pressure of the water supplied to the apparatus.
- C. In various parts of NYC, hydrant pressures can vary significantly, ranging from 40 psi to 100 psi. Due to this variation, the preset value should be set for each apparatus using the procedure described below.

3. PUMP OPERATIONS WITH PPG

3.1 Single Line Operation

- 3.1.1 Before pressure can be supplied to a hoseline, the apparatus pump must be engaged using the following steps:
 - A. Place the apparatus transmission in “neutral”
 - B. Engage the apparatus maxi-brake
 - C. Move the “pump shift control” to the pump position (located in the cab)
 - D. Place the apparatus transmission in “drive”
- 3.1.2 Once the apparatus pump is engaged, water can be supplied to a hoseline using following steps:
 - A. Introduce water to the apparatus
 - B. Press and hold the “Push to Prime” button on the pump panel (this expels air from the pump system)
 - C. Press the preset button on the Pro-Pressure Governor
 - D. Open the desired discharge gate to charge a hoseline
- 3.1.3 Slowly open the discharge outlet until the desired line pressure is reached. If the discharge gate is fully opened and more pressure is required, depress the Increase Button until the desired pressure is reached.
- 3.1.4 The Pressure Governor will adjust engine speed to maintain indicated pump pressure as the hoseline’s nozzle is opened or closed.

4. RELAY OPERATIONS WITH PPG

- 4.1 At a relay operation, the pumper supplying the water is called the “supply pumper” and the pumper receiving water is called the “operating pumper”.
- 4.2 A concern at a relay operation is ensuring the activation of operating pumper’s PPG.
 - 4.2.1 This can be a problem because the operating pumper is receiving water from the supply pumper at a pressure greater than hydrant pressure. The operating pumper is receiving the discharge pressure of the supply pumper, which is hydrant pressure, plus the idle pressure of the supply pumper. This number will be roughly 55 psi higher than regular hydrant pressure. Based on local hydrant pressure, this number can range from 95 psi to 155 psi.

- 4.2.2 Since the operating pumper's PPG will only effectively engage if the setting on the PPG is higher than their actual pump pressure, the PPG will not activate at their normal Preset value.
- 4.3 The ECC of the operating pumper must be aware of this difference and set their PPG to match the "Master Pressure Gauge" of the apparatus. This will be equal to the idle pressure of the operating pumper, plus the pressure supplied by the supply pumper (which is equal to their apparatus idle pressure, plus hydrant pressure). Based on local hydrant pressure, this number will range from 150 psi to 210 psi.
- 4.4 To minimize the difference in supply pressures, the ECC of the supply pumper should supply water at their preset value (which is their idle pressure, plus hydrant pressure)
- 4.5 The operating ECC will coordinate with the supply ECC to ensure enough water is supplied to meet pressure demands of the operating pumper.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

PART TWO

LADDER COMPANY APPARATUS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	INTRODUCTION	27
2	TERMINOLOGY	28
3	AERIAL LADDER USE	30
4	TOWER LADDER USE.....	38
5	CONCLUSION.....	48

PART 2: LADDER COMPANY APPARATUS

1. INTRODUCTION

- 1.1 Until the 1970s, the New York Fire Department placed primary reliance on the use of aerial ladders as an exterior means of access to the upper floor of buildings. It also placed full reliance on metal aerials for developing elevated large caliber streams when water towers were phased out. Today, almost 60% of our ladder companies are equipped with metal aerial ladders; the remaining companies have tower ladders.
- 1.2 The two types of aerial ladder apparatus currently in service are the REARMOUNT and the TILLER. Both types are equipped with a 100' aerial ladder. The difference is that the tiller is a tractor trailer rig with maneuverable rear wheels- this allows for easier maneuvering around tight turns.



Rear mount Aerial



Tiller Aerial

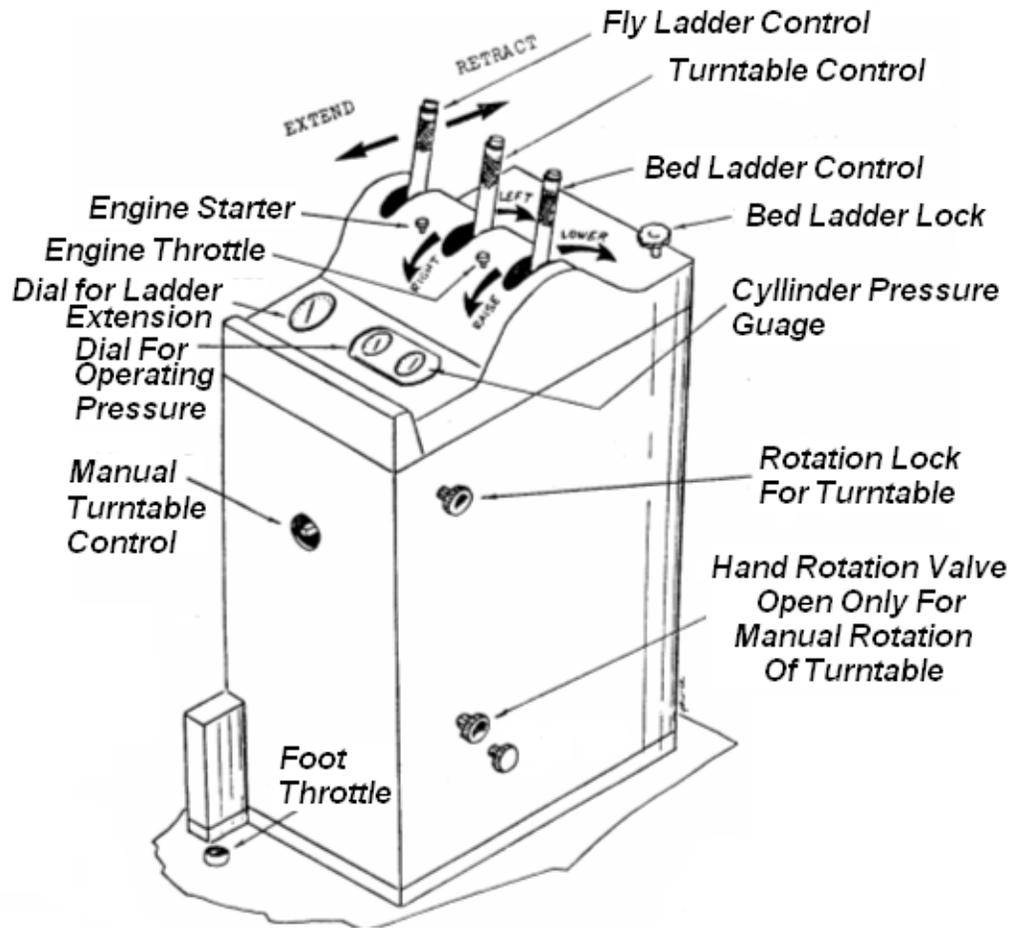
- 1.3 The third type of ladder apparatus currently in service is the TOWER LADDER. The Tower Ladder (TL) was introduced to the fire service several years ago. Its full potential is still being developed. The effectiveness of this apparatus in ladder company operations on the exterior of buildings for access to the interior, and for rescue purposes is without question. In addition, it also provides a superior elevated large caliber stream capability.



Tower Ladder

2. TERMINOLOGY

- 2.1 Tormentors: Hydraulic supports, with direct frame attachment. When lowered and locked each becomes a rigid member, to provide a rigid operating base bypassing the apparatus suspension.
- ◆ Rear mount: (2) tormentors adjacent to turntable at rear with controls on rear of apparatus.
 - ◆ Tiller: (2) tormentors adjacent to turntable at center of apparatus (front of trailer section). Controls are on pedestal.
 - ◆ Tower Ladder: Chassis supported at (6) points. (4) jacks- one at each corner of apparatus and (2) outriggers alongside turntable.
- 2.2 Aerial: 100 foot, 4 section ladder made of Corten Steel. Bed ladder is the base section, which is fixed (does not extend or retract). Upper 3 sections are moving (sliding) sections. Each section has a handrail, which tapers to beam at top.
- 2.3 Rungs: Cross members between beams which are used for climbing. Rungs are spaced 14" apart.
- 2.4 Turntable (pedestal): Platform at the base of the aerial or tower ladder. On aerial ladders this platform is used to mount and dismount the aerial. On both aerial and tower ladders the turntable contains the pedestal controls, from which the operator can operate the aerial or tower ladder.



Rear mount Pedestal Controls

3. AERIAL LADDER USE

3.1 Aerial ladders may be used to effect:

Ladder pipe operations

Observation post to assess conditions

Ventilation (member on ladder or lower tip through window)

Entry

Rescue

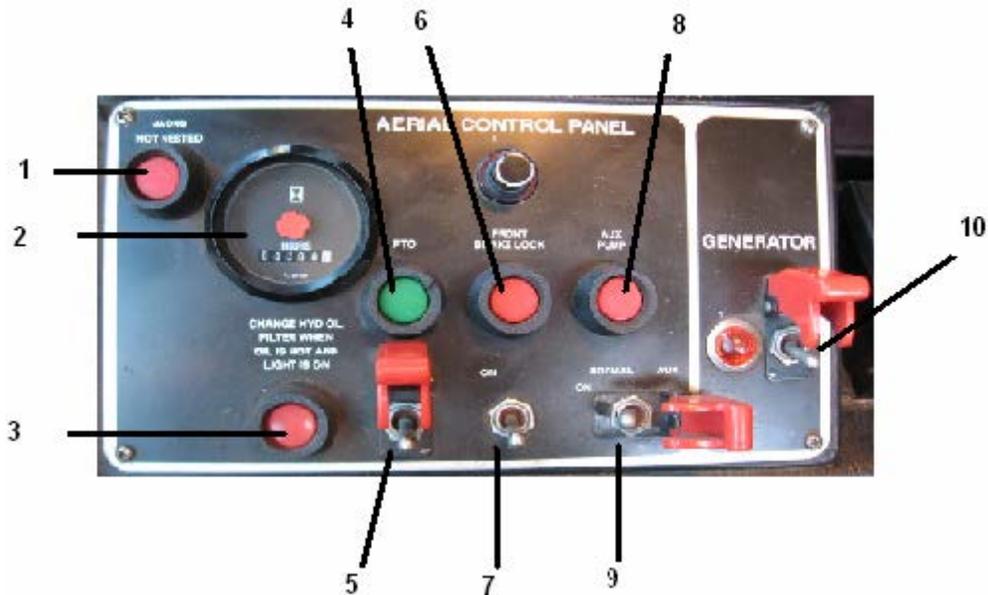
Search

3.2 They may also be used to stretch hose lines to upper floors or roof; bridge a gap; and operate hose lines from the ladder. When their need is evident upon arrival, they should be raised immediately. When their need is anticipated for later use, the ladders shall be positioned and set up.

3.3 Apparatus Set Up and Operation:

- ◆ In Cab Engage Power Take Off (PTO) to transfer power from the drive train to powering the apparatus supports and aerial controls:
 1. Once apparatus in position place transmission in NEUTRAL.
 2. Engage Maxi-Brake (rear brakes). Push to apply.
 3. Engage Brake Lock (front brakes). Flip to ON position.
 4. Place transmission to DRIVE.
 5. Flip PTO lever to IN position.
 6. Return transmission to neutral. Look for PTO light Illumination.
 7. Place Throttle Switch to ON position. NOTE: On some apparatus this switch may be on the pedestal.

AERIAL CONTROL PANEL OPERATIONS



ITEM	SWITCH/LIGHT	FUNCTION
1.	Stabilizer Not Nested Light	When lit, indicates stabilizers are not completely retracted into the body for road travel.
2.	Aerial Hourmeter	Indicates total hours aerial has been operating.
3.	Hydraulic System Indicator light	Indicates when hydraulic filter should be changed
4.	PTO Light	When lit, indicates PTO is engaged.
5.	PTO Control Switch	Used to start/stop PTO for aerial hydraulics
6.	Front Brake Light	When lit, indicates front brakes are engaged.
7.	Front Brake Lock Switch	Used to set front wheel brakes during aerial ladder operation (not to be used for parking)
8.	Auxiliary Pump Light	When lit, indicates auxiliary electric hydraulic pump is activated.
9.	Normal/Emergency Hydraulic Switch	Selects normal PTO pump or auxiliary electrically operated pump.
10.	Generator Switch and Run Light	Switch to activate generator. Light "ON" indicates generator has been turned on.

Stabilizer Controls (also called tormentors)

1. Hydraulically operated "H" frame stabilizers (tormentors) are located behind each rear wheel.
2. The controls for these tormentors are located in rear compartment (stabilizer control compartment), one control handle for each side. On tillers, controls for stabilizers/tormentors are on the pedestal.
3. Tormentors can be placed in operation by one man pulling handle out slightly (towards operator) and then to down position; one side at a time.
4. Before operating tormentors on rear mount apparatus, check for 5' 2" clearance at each side to insure that area on operating side is clear of members, civilians, hose, or obstructions.
5. With hand on lever, it is possible for member to view tormentor in motion. This is not true for all members, however, due to differences in individual reach.
6. If member cannot view tormentor in motion with one hand on lever, he will proceed to lower tormentors by placing lever in down position. Lever will remain in down position unattended. Momentarily, step to side and witness tormentor in motion until operator determines tormentor is properly positioned. Lever is returned to NEUTRAL position at that moment. Repeat procedure for other side.
7. Shifting the feet a few inches as described above, will permit member to operate efficiently without sacrificing safety.
8. Under extreme emergency conditions, where both tormentors cannot be lowered due to obstructions, it is permissible to lower first the tormentor on the side of the apparatus that ladder will be used. The other tormentor shall be lowered as soon as practicable.
9. Before leaving controls, be sure both handles are in NEUTRAL. Engine speed must return to idle.
10. Before operating the Aerial Ladder Controls, Manual Safety Pins must be placed in the highest hole possible in the stabilizers. This will prevent collapse of the stabilizers in the event of a hydraulic fluid leak.

◆ Operate Aerial:

1. Raise Bed Ladder.
 - Depress AERIAL ENABLE FOOT SWITCH at the base of the pedestal.
 - Raise the ladder by pulling back slowly on the hoist lower lever.
 - Release HOIST/LOWER lever when sufficiently elevated.

2. Rotate Ladder.

- Depress AERIAL ENABLE FOOT SWITCH at the base of the pedestal
- Rotate ladder by moving ROTATION LEVER as required for proper direction
- Release ROTATION LEVER when ladder has reached desired rotation

3. Extend Fly Sections.

- Depress AERIAL ENABLE FOOT SWITCH at the base of the pedestal.
- Push the EXTENTION/RETRACTION lever to extend to the desired length.
- Release EXTENTION/RETRACTION lever when ladder has reached desired length
- If possible make sure RUNG ALIGNMENT INDICATOR light is ON before permitting personnel to climb ladder

◆ Placing Ladder.

1. Depress knob on top of Bed Ladder Control and push handle away, directing ladder toward objective. Return handle to NEUTRAL position when underside of beam is about 2" to 6" from objective. It is expected that the weight of the men climbing ladder will place ladder in the supported position.

2. Aerial Ladder Placement:

- **To The Roof:** Extend the ladder so that the tip is at least **5 feet** above the point where the ladder comes in contact with the building.
- **To A Window:** Placement must allow for unimpeded access and egress at this window. Therefore, the ladder tip should be **less than 6"** over the window sill. Recommended distance of the tip from the objective is 2" to 6". In case of rescue, use the 2" positioning so that the ladder will rest against the window sill after weight is put on it.
- **Alongside a fire escape:** Against the building (2" out) with the tip about one to three feet above the balcony railing. This affords easier access to the ladder.

Note: Remember the loss in height resulting from retracting the ladder to apply ladder locks.

3.4 Climbing and Descending the Aerial:

- ◆ Coordination: Always face the aerial when climbing or descending. Eyes should look up or forward- this will provide better balance. Avoid looking down. If necessary to look down, look over shoulder without leaning backwards.
- ◆ Hands- must have one hand in contact with the aerial at all times unless secured to aerial with leg lock or with personal harness/ life belt hook to rung. Hand movement should be coordinated with foot movement- left hand with left foot; right hand with right foot. On steep angles it may be necessary to grab rungs.
- ◆ Feet: Stand on rung with ball of foot, **avoiding** driving heel of boot into rung. Each foot positioned to avoid cable.
- ◆ Body Position: Body should be perpendicular to ground to allow for best balance and best support of weight carried. Climbing too close to aerial will impede climb. Leaning back will cause too much weight to be supported by arms and you are more likely to fall.

3.5 Dismounting the Aerial

- ◆ Stop climbing at roughly the third rung from the tip and keeping the left hand on the handrail, transfer the right hand to the rung near the left beam.
- ◆ Pivoting on left foot, lean to left to butt right shoulder to building with head and body outside the window.
- ◆ Right leg is brought up and over the right side handrail so the climber is now straddling the top rung and facing left.
- ◆ Left hand is moved to top rung, palm down. Right hand is then turned around so that the top rung is grasped in a trapeze fashion.
- ◆ While maintaining grip on top rung with both hands bring left leg into room and gradually ease weight over sill into room to test floor area. Let go of aerial only when certain that floor area is secure.

3.5.1 Mounting the Aerial from a Window

- ◆ Place left hand at top of right handrail (facing the aerial).
- ◆ Grasp the top rung with the right hand palm up.
- ◆ Swing left leg out of window to second rung.
- ◆ Straddle top rung, and then shift weight and move left foot to third rung.
- ◆ Pushing up with left hand pivot body on ball of left foot to swing right leg out and put right foot on third rung.
- ◆ Place right hand on right handrail (facing the aerial) and begin descent.

3.6 Dismounting the Aerial at Roof

- ◆ Stop climbing at rung nearest top of parapet. Bring both feet to same rung.
- ◆ Grasp handrail on dismount side in a baseball grip and bring feet together.
- ◆ Maintaining grip, bring outboard foot to parapet and test stability while supporting weight with leg still on the aerial.
- ◆ Bring other foot off the aerial to the parapet
- ◆ Move outboard hand to underside of rung then follow with the other hand.
- ◆ Supporting body weight with two hands, test integrity of roof with feet
- ◆ **DO NOT RELEASE BODY WEIGHT TO ROOF UNTIL ASSURED THAT THE ROOF IS SECURE.**

3.7 Mounting the Aerial At the Roof

- ◆ Grasp overhead rung, place feet on parapet and pull up. (this step not necessary if there is no parapet or cornice)
- ◆ Move grip from underside of rung to baseball grip on handrail.
- ◆ Turn body to face roof.
- ◆ Place one foot then the other onto rung level with parapet.
- ◆ Bring hand to the other handrail and begin descent.

3.8 OPERATIONS FOR REMOVAL OF VICTIM OR VICTIMS BY AERIAL LADDER

- ◆ Never remove people via aerial ladder when they may be calmed and held safely at that location or removed via a safer means of egress. The preferential order for removal of people is via: INTERIOR STAIRS, HORIZONTAL EXITS, FIRE ESCAPES, LADDERS, LIFE SAVING ROPE.
- ◆ Observe the building continuously while chauffeur is operating the ladder. Someone may appear at another window or the trapped person may move to another location.
- ◆ Prepare for a rapid ascent as the trapped people may attempt to climb onto ladder without assistance. Climbing the ladder while it is being extended or retracted exposes members to severe injury and may jeopardize the rescue effort.
- ◆ Ascend the ladder followed by the chauffeur. Climb into window and assist victim out feet first to the chauffeur and then search the area. Firefighter must realize that other victims may be inside and the victim may be unable to inform him about other occupants.

Note: The chauffer following in ascent on the aerial will keep the chauffeur closer to the controls. (Only in an extreme emergency such as direct exposure to flame or great heat will the movement of the ladder with the firefighter and the victim on it be justified).

- ◆ Always carry small children down ladders.
- ◆ To descend with an ambulatory victim, place yourself one rung below the rung the victim is standing on. Descend in unison, i.e., right foot for right foot and left foot for left foot. Keep the victim between you and the ladder at all times and maintain physical contact with him. At steeper angles, have the victim grasp the rungs. This will facilitate your control. Talk to your victim. **Constantly reassure** the victim and praise his actions. Try to talk him into looking straight ahead or up and not down, as he might freeze on you.
- ◆ If the victim panics, take control by pressing him against the ladder with your body. Do not resume the descent until he is capable of continuing, if the descent is difficult or tiring, another firefighter should 'back up' the member carrying or assisting persons down the ladder.
- ◆ Removal is not considered complete until he has been assisted all the way to the ground. Do not leave him on the turntable.
- ◆ If required, render first aid until relieved. Assist him to an ambulance if necessary. These actions shall not be taken if you are needed to assist in additional rescue operations.
- ◆ When there are two victims to be removed, the order of removal is dependent on variables difficult to predetermine.

- In many instances, one of the people will have climbed out on the ladder before a member has reached this position and there will be no need to make a preferential determination as to removal.
- Occasionally one of the occupants will be aged, infirm, extremely heavy or hysterical and the other one ambulatory and less trouble to remove. The removal order should be based on the length of time needed to completely affect this rescue and the seriousness of the exposure to victims and members.
- A serious **fire in the front** might cut off ladder descent in a short period of time. Both members assist the **most helpless** victim onto the ladder and the chauffeur assists the victim below the point of danger and then to the street. While the chauffeur is slowly descending, the OVM climbs onto the ladder and assists the more ambulatory person onto the ladder and complete descent is made. In this instance, time is the prime consideration, in effecting a complete removal of victims below the danger point and in preventing the possibility of your retreat being cut off.
- A serious **fire in the rear**, cutting off interior descent and no available front fire escape, presents another problem. Since the fire is not pushing out the front windows the time required to effect removal of victims is less critical. In this case, consideration can be given to the **simple removal first** and then concentrate on the difficult removal which will require two members.

4. TOWER LADDER USE

4.1 GENERAL FEATURES OF TOWER LADDERS (TL)

◆ Stabilizer Supports

- The chassis is supported at six points while the boom is in operation, i.e., two hydraulically operated jacks are located at the front and two at the rear of the vehicle (total of four), and two out-rigger type jacks in the middle of the apparatus. All supports have a direct frame attachment to bypass the apparatus suspension and provide a rigid operating base.
- When the stabilizer supports are lowered for boom operation, hydraulic "holding" valves lock the fluid in each cylinder, thus each cylinder becomes a rigid member to support the apparatus under all conditions of operation.
- To eliminate any possibility of stabilizer support collapse brought about by loss of fluid from a cylinder, a mechanical lock is also provided at each jack and outrigger. These locks (pins) must be inserted manually.
- All jacks and outriggers must be lowered until each reaches the end of its stroke before raising the boom. Tower ladders are not designed to operate with outriggers and jacks down on one side only. Exception: If apparatus is not level, lower the jacks and outrigger on the low side first, then the jacks and outrigger on the high side until unit is level as possible. **Note:** Raising the high side fully before raising the low side, or raising only one side when on level ground, can cause damage to the suspension system.
- Outriggers can easily be placed between parked cars when necessary. Jacks and outriggers must be on firm ground and locked.
- To judge that outriggers will clear all obstructions, a 6-ft. hook may be used as a gauge.
- Tower ladders have indentations in the turntable to accept outriggers. This necessitates that outriggers must be moved clear of the turntable **before** operating the boom AND boom must be returned to its original position (turntable arrow markings aligned) **before** outriggers are bedded.
- Any member operating a tower ladder must personally verify the placement of all outriggers and jacks prior to raising the boom from the bedded position. If a member commences to set up a tower ladder apparatus for an operation and then decides to abort the operation, the member must:
 - properly place all outriggers and jacks for operation
 - or**
 - return all outriggers and jacks to the pre-setup position

◆ Boom Assembly:

The boom assembly consists of four box sections which telescope within each other. The first section is alloyed steel and the three telescope sections are aluminum alloy. The extension mechanism consists of two double acting cylinders which provide power in extension and retraction. The boom hydraulic system has hydraulic "holding" valves, which will prevent the boom from moving in the event of a hydraulic line failure.

◆ Basket

The basket is constructed of alloy aluminum and has a floor area of approximately 15 sq. ft. Permanently mounted on the front surface of the platform is a Stang Intelligent Nozzle, permitting flexibility in water tower operations. The underside of the floor and the front railing of the basket may be covered with a fire resistant shield.

◆ Pedestal controls - Turntable

Whenever a tower ladder operation is in progress, the pedestal position must be staffed. This provides an extra pair of eyes to warn of impending danger and override basket controls in an emergency.

- Three controls similar to those on a metal aerial ladder are provided on the turntable. These controls are for raising and lowering, extending and retracting, and rotating the boom assembly. Operating controls at the pedestal allow for smoother positioning than the controls in the basket.
- Master Power Switch - Supplies electrical power for the Master Control Valve, Master Console panel lights, engine start, deadman control and platform (basket) controls.
- Engine Start Button - allows engine to be re-started in case of stall from the Master Control Console.
- Platform Control (Basket) - Activates the basket control station.
- Deadman Control - Depressing the foot pedal at base of console (pedestal) activates the system and the engine throttle control. This movement also deactivates the basket controls by activating the hydraulic system in case of electrical failure. The use of the platform control switch is necessary whenever members or civilians enter or leave elevated basket. This is to insure against movement of basket by accidentally touching the platform control handle.

CAUTION:

1. There is a possibility that a malfunction in one or more of the three boom movements e.g., 1) lower-raise, 2) extend-retract, 3) rotation, can occur in the operating controls of the Tower Ladder causing the elevated boom (basket) to move in the direction of the malfunction. The release of either of the "deadman" controls (foot switch on pedestal, trigger on basket assembly) will immediately halt all boom movement.

2. In the area at the base of the boom and turntable are three sets of manually operated isolation valves, one pair for each hydraulic circuit, e.g., 1) raise-lower, 2) extend-retract, 3) rotation. Should one of these 3 control valves malfunction for any reason, the isolation valves for the particular function can be closed leaving the other systems operable.

- Accessories - Controls light on Master Console front and optional accessories.
 - Pressure Gauge - Indicates system pressure during operation.
 - Communication Switch - Controls intercom system between basket and pedestal.
- ◆ Basket Controls (Platform)
- Single handle controls all functions: with a "Dead Man" trigger in the handle, which must be depressed before the system operates.
 - Intercom - Open circuit, controlled from pedestal.

◆ Escape From Basket

When no other solution is possible, member may escape from the basket by means of the fixed telescoping ladder mounted on top of the boom sections or by life saving rope in conjunction with the Personal Harness, which ever is most appropriate for the situation.

Note: There exists under some conditions of partial elevation and extension, a possibility of boom section adjustment, gradual shifting with one section extending and another section retracting the same distance with no effect on the position of the basket. This results in rungs moving in relation to each other. Because of this possibility, utmost caution must be exercised while using the escape ladder.

◆ Water System

- Boom rotation permits water system coverage of 360 degrees.
- A specially designed water manifold is located on the rotation axle. The water system consists of four telescoping sections of stainless steel pipe, operating through conventional "U" cup seals and packing glands. Diameter of smallest section is 3 1/2". Suitable swivel elbows, fittings, and additional pipe connect this telescoping system, from the basket mounted Stang, through the rotating swivel in the superstructure, to the waterline connections on either side of the apparatus frame.
- The water system hook-up consists of a 3" x 3" gated siamese on the left side and a 4-1/2" inlet on the right side.

Note: There are various model TLs in the field and companies involved must refer to their manuals for specifics.

◆ Communications

- The TL is provided with an intercommunication system (intercom), allowing for basket to pedestal communications and vice versa, which is the most effective means of communications between basket and pedestal.
- In some models, the basket control man faces the opposite direction in relation to the pedestal man. It is for this reason that the reference point is the pedestal and not the basket position.
- When the Basket is being controlled from the pedestal, it is most important to keep the pedestal man informed regarding the results of the basket movement. Directions through the intercom must be utilized whenever the need arises for accurate steady movements.

- Since the pedestal controls allow smoother movements, the pedestal man should, in most cases, perform delicate operations if visibility permits.
 - Emergency operations dealing with strategic action and tactical usage of TL require instant communications between officer in command and members in basket. Most effective means is to have man at pedestal monitor all the Handie-Talkie communications and relay orders or other pertinent information to basket via intercom. Handie-Talkie is difficult to hear due to noise in basket especially if stream is in operation.
 - By monitoring Handie-Talkie transmissions the pedestal man can be continuously aware of changing fire conditions, location of other units during operations, orders issued by officer in command of fire or company officer, or any information regarding safety of members and fire extinguishment that will effect TL operation. He can relay these communications via intercom to basket or, from basket to officer in command of operation should Handie-Talkie at basket be ineffective.
 - In the event of failure of both intercom and Handie-Talkie communications, unit should have a preset plan by which pedestal man can relay orders or information vocally or by hand signal, e.g., tap boom with tool or move boom slightly to attract attention to the pedestal.
- ◆ General Precautions
- For relief of basket man during extended periods of operations or overhauling, the use of the escape ladder shall not be resorted to due to possible rung movement.
 - Detailed members cannot operate on pedestal unless they are presently assigned to a Tower Ladder Unit or are qualified Chauffeur-Tillermen (QCT, School Trained).
 - No member shall operate in the basket unless he is wearing the installed safety belt or a life belt or Personal Harness which is secured to a substantial part of basket. If this is too confining, it is possible to provide working room by forming a loop, one foot in diameter, in a life saving rope around a substantial part of the basket using a bowline to secure the loop, and then hook the life belt or Personal Harness onto this loop.

4.2 POSITIONING OF APPARATUS

◆ General

- Generally placement depends upon conditions encountered on arrival. The Officer in Command of a fire should give specific instructions regarding the placement of apparatus and the operations to be performed. In the absence of a superior, the TL officer must base his decision for placement of the TL on the following conditions:
 - 1) What wall to work on - based on the life factor.
 - 2) Fire conditions location and extent of fire.
 - 3) Type of occupancy - time of day.
 - 4) Type of structure - height and area. (Remember height limitation of TL.)
 - 5) Street conditions - traffic encountered. Overhead wires, trees.
 - 6) Location of pumper and hydrants.
 - 7) Condition and stability of building.
 - 8) Ground stability.
- Generally the apparatus should be parallel to the building. Occasionally the scrub area of the bucket will be reduced by the cab of the apparatus. "Scrub area" is defined as that area of a building wall which can be touched by the basket. This condition can be corrected by parking the apparatus with the front end angled about 15 degrees from the building line. This will put the cab portion of the apparatus farther away than the rear portion, and in this way the boom can be operated the full extent of its scrub area.
- Regardless of initial placement, it must be realized that as conditions change, repositioning may be required.

- Specific Details
 - A properly positioned TL provides wall coverage from grade level or below, up to a maximum basket floor elevation of 70' (approximately), at the maximum 75 degree angle.
 - The basket while touching a point 32 feet horizontally from center of turntable can reach a basket floor elevation of 65 feet.
 - TL scrub area covers the front of a building 60 feet high and 50 feet wide, and will cover a 100 foot frontage on the lower three floors of a building.
 - It has a scrub area of approximately 7750 square feet when the center of the turntable is 32 feet from building wall and cab is at a 15 degree angle to the building line.
 - The basket can also reach points 10 feet below grade.

- Positioning on Hills:
 - Position apparatus parallel to the direction of slope so that boom operations will be in the "up-hill" direction. If possible, apparatus should be facing "down-hill", e.g., if facing downhill, turntable past the objective. If facing uphill, turntable before objective.
 - All operation of boom should be performed at low speed and delicately while on steep inclines. Sudden stops in maneuvering can cause damage to apparatus and/or cause apparatus to "skip" downhill.

Note: Sudden starts and stops should be avoided under all operating conditions.

4.3 USE OF TOWER LADDER FOR RESCUE AND REMOVAL

- ◆ The full capability of the TL can be realized when there are many persons to be removed, and/or victims are unconscious, incapacitated or obese.
- ◆ Rescue via basket is affected in several ways. Entering and exiting from basket shall be through the double-acting swinging gates. Initially the basket is elevated to a point where the middle railing of basket is level with the window ledge, or level with the top railing of the fire escape.
 - Middle basket railing positioning permits placement of basket flooring at a level where a person can easily step onto it without the usual straddling of window sills or fire escape railings.
 - To facilitate removal of incapacitated or obese victims, position the top basket rail level with the window sill or top rail of fire escape.
- ◆ Positioning of basket must be such that the Stang nozzle will not interfere with the rescue operation. This will require an angular approach that will permit ease in entering or alighting from basket.
- ◆ Parapet-less roofs can be safely approached by actually placing the basket directly on the roof, if possible, especially when ice conditions are encountered, to effect removal of persons trapped thereon.
- ◆ When many trips of the basket are required to remove a great number of occupants, safe removal need not necessitate delivery directly to the street level. Occupants may be placed at lower levels of the fire building or any other area of refuge.

4.4 TOWER LADDER STREAM OPERATIONS

- ◆ Authority and Responsibility for Use of TL Streams
 - Only the officer in command of operations may order the use of TL streams.
 - Large caliber outside streams generally should not be directed into occupied buildings. Members must be warned and occupants be removed before starting water. However, in some circumstances fire conditions or life hazard may demand such use.

EXAMPLES:

- Fire extending via cockloft and top floor untenable.
- A stream, preferably fog used at an acute angle to building, used to protect people on the fire escapes because fire is emitting from windows below them.

- In the event hand lines cannot advance due to fire conditions, a fog stream, into floors of certain type occupancies where many windows are accessible. A rapid traverse from window to window affects a quick knockdown of the fire. Use of fog reduces structural and water damage.
 - The air movement resulting from large caliber stream use must be considered. This air movement effect of the stream will drive heat and combustible gases into uninvolved areas of the building
- ◆ Employment of Streams
- Developments requiring the use of TL streams shall be anticipated. Preparations for such usage shall be made as early as possible.
 - When fire building is heavily involved on several floors, heavy stream delivery should generally start at the lowest level and work upward, effecting a quick knock-down on the way up to top floor and/or cockloft area.. Prevention of fire spread upward or extension via cockloft is the prime objective.
 - Positioning the nozzle close to and low in the window will insure:
 - Opening ceiling with stream to expose fire area or cockloft and extinguish fire therein. Operating into cockloft, work stream from party wall of most serious exposure toward center of building then from party wall of other exposure toward center or a roof opening.
 - Maximum stream penetration.
 - Good deflection off ceilings and walls.
 - In extreme situations the stream through attic window of peaked frame dwelling can be used to ventilate by literally blowing off the roof.
 - Removal of partitions with stream and/or moving stock to reach seat of fire.
 - Initially reduce members in basket being exposed to escaping heat at higher level of window operations.

- Primary consideration must be given to the safety of members, particularly in commercial buildings. The TL should be positioned and the boom maneuvered in such manner that damage from falling cornices and collapsing buildings will be avoided. Where stability of the building is in doubt, the basket shall be placed at least the same distance horizontally from building as it will be vertically below the top of the wall to minimize the effects of falling materials.

◆ Water Delivery

For optimum effectiveness of TL streams, the following guidelines are to be considered:

- Supply water to base of TL at 200 to 250 psi. Satellite Water Unit is the best source of supply, if available with largest diameter hose used.
- Relief valve of TL should be set at 250 psi.
- Generally only one source at base of TL is used.
- Conventional pumpers should be placed as close as possible to the TL. If necessary, relay operations should be employed to achieve desired placement of pumper adjacent to TL.
- When necessary to shut down or to regulate pressures, do so at the relay pumper and not at the TL base gated Siamese.
- Be prepared to move TL for greater effectiveness as conditions change. With proper teamwork the relocation can be accomplished within minutes.
- Unless operations can be greatly facilitated, do not use TL as a standpipe. This immobilizes the unit for other services. TL could be used to stretch line up exterior with Engine Co. personnel, line lashed into building and engine operations commenced, freeing TL for other operations.
- When stretching 3-1/2" line to TL Siamese, stretch male end to TL whenever possible to avoid need of extra fittings and time loss.
- Whenever possible and conditions permit, water supply to TL shall be from pumper and water source other than that supplying the 1st due companies hand lines.
- All hose connections at TL shall be spanner tight to avoid leakage.

5. CONCLUSION:

This section introduced the primary apparatus of ladder companies currently in service. At any incident one of the initial objectives is to properly position the incoming ladder company apparatus due to the aerial/tower ladder capabilities and the need for portable ladders and tools to be in proximity of the incident. Since it's so important to achieve this objective, it's equally important that the members operating are familiar with, the operation, as well as capabilities and limitations of this apparatus.



SAFETY

OBJECTIVE:	<ul style="list-style-type: none">• To emphasize the importance of the SAFETY of the members achieved through the proper use of personal protective gear, the dangers of unsafe acts, the proper hydrating of the firefighter wearing bunker gear and operating near waterfronts with bunker gear
CONTENTS:	<ul style="list-style-type: none">• Protective Gear• Unsafe Acts• Hydration and Rehydration• Waterfront operations With Bunker Gear
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Safety Bulletin # 53• All Unit Circular 230• All Unit Circular 310• FDNY Safety Bulletin # 81

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1. OPERATIONAL GUIDELINES IN PERSONAL PROTECTIVE CLOTHING (PPC)	1
2. UNSAFE ACTS	13
3. HYDRATION & RE-HYDRATION	19
4. WATERFRONT OPERATIONS WHILE WEARING BUNKER GEAR	21

PERSONAL PROTECTIVE CLOTHING (PPC)

1. STATEMENT OF POLICY

In an effort to reduce the number and severity of firefighters burn injuries, especially those to the lower extremities, the Department has outfitted all members with Personal Protective Clothing.

2. DESCRIPTION

2.1. The PPC consists of:

- 2.1.1. Bunker Gear (Coat & Pants)
- 2.1.2. Bunker Boots (Rubber, Leather or Chauffeur boots)
- 2.1.3. Station Uniform
- 2.1.4. Gloves and Helmet
- 2.1.5. Protective hoods

2.2. To effectively furnish the desired level of protection, all elements of the PPC must be worn. In particular, the thermal liners of the Bunker Gear must be in place at all times.

2.3. Bunker Gear should be kept clean. Dirty Bunker Gear can absorb more heat, causing the degree of protection to become questionable, and may actually cause the material to ignite.

2.4. Bunker Gear, when properly used and maintained, will afford a limited period of protection, to exit an area which has become, or is about to become, untenable. It is not a "Close Proximity Entry Suit" such as that used in Airport Crash and Fire Rescues. In a flashover situation, a Bunker equipped member must be within 5 to 10 feet of an exit in order to survive.

2.5. FDNY Bunker Pants are provided with either of two different kinds of knee protection. Level II Morning Pride Heat Channel Knee Pads are issued to members already assigned to Ladders, Rescues and Squads. Members assigned to Engine companies and Probationary Firefighters are assigned Level II Morning Pride Heat Channel Knee Pads covered with Arashield. Level I Knee Pads (without heat channels) are no longer acceptable as they do not offer the necessary levels of protection for members. When knee pads wear out, they shall be replaced through the Quartermaster. **Bunker Pants shall never be worn without knee pads in place.**

2.6. The wearing of Bunker Pants Suspenders is an essential part of the Bunker Pants function in protection of the lower extremities. The wearing of the suspenders is **not** optional, but **mandatory**. When members are not wearing the suspenders during fire operations, the Bunker Pants have a tendency to slide down especially when wet, thereby reducing the effectiveness of the knee pads in fully protecting the knee area from burns.

- 2.7. The hood is part of your personal protective equipment (PPC) and its use is mandated by the Department. It is anticipated that the use of protective hoods will have the same positive results as bunker gear, further reducing burn injuries to our members. **The hood shall be worn whether dry, damp, or saturated with moisture.**
- 2.8. If the protective hood is not available, the Officer On Duty shall instruct the member to have his/her helmet ear flaps down and coat collar up and secured by the neck strap prior to entering the fire area.
- 2.9. It must be understood that wearing the hood in a hostile environment somewhat reduces your ability to note changing fire conditions in the immediate area. **Therefore, you must leave the area immediately upon feeling any pain or discomfort through the hood, unless the area can be immediately cooled by a hose line. Remember; always stay alert to deteriorating conditions.**

3. DONNING OF BUNKER GEAR

3.1. Bunker Gear must be donned in the following order:

3.1.1. Pants and Boots (Personal Safety System in place)

3.1.2. Members are advised to use boot jacks when doffing their PRO boots. When used properly, PRO boot jacks will extend the life of the PRO boots significantly.

3.1.3. Handie-Talkie (remote speaker clipped to outside of coat)

3.1.4. Protective Hood*- The Protective Hood must be donned in the following manner to ensure a proper seal of the SCBA facepiece.

- ◆ Don the hood completely over your head before putting on the Bunker Coat.
- ◆ Don the Bunker Coat.
- ◆ Push back the hood from your head onto the back of your neck to store the hood in the ready position.
- ◆ Before entering a smoke filled environment, the mask facepiece is to be donned, **followed** by the pulling up of the hood over the head and around the facepiece.
- ◆ **WARNING:** Failure to don the SCBA facepiece first, before the hood, will result in an improper seal of the facepiece resulting in the loss of air from the positive pressure facepiece.

***NOTE:** The procedures for the proper donning, use, and care of the Protective Hood are found in the training video, "Protective Hoods", issued to each firehouse. All units shall periodically incorporate the viewing of this video into drill periods.

3.1.5 Bunker Coat

3.2. Responding

3.2.1 **Structural Fires** – Due to the possibility of members operating without full PPC and also due to the negative perception by the public, all members except chauffeurs shall don their PPC prior to responding. In hot weather, if the apparatus is not equipped with a functioning air conditioning unit, coats and protective hoods may be dispensed with while responding.

3.2.2 **Non-Structural Fires and Response to BARS Alarms, Non-Fire Responses, ERS NC and Class E Alarms** – In hot weather, coats and protective hoods may be dispensed with while responding. Responding without PPC is permissible. This would also include CPR and CFR-D runs.

3.2.3 When responding from other than quarters, the above rules apply.

3.2.4 Members shall not drive Department apparatus while wearing rubber boots. Driving with bunker pants and the Chauffeur boots or leather boots is optional.

3.2.5 Department Chauffeurs and Tiller operators should not insert their thumbs through the wristlet loops of the bunker coat prior to driving apparatus. The wristlet material may prevent members from getting a firm grip on the steering wheel, which could result in loss of control of the apparatus. After the apparatus is positioned, members can easily insert their thumbs through the wristlet loops at that time.

4. OPERATING AT FIRES AND EMERGENCIES

4.1. Chief and Company Officers shall ensure that all members wear the proper level of protective equipment while operating at the scene of fires and emergencies. Any member entering the fire building must have all **PPC** donned.

4.2. Chief Officers when operating in a command capacity outside the fire building, may dispense with wearing the complete bunker ensemble when, in the exercise of their best judgment, wearing the bunker gear is not necessary. The helmet must be worn at all times. However, Chief Officers required to enter the fire building, must have all **PPC** donned.

5. OPERATIONAL FACTORS AND LIMITATIONS

- 5.1 Members wearing Bunker Gear must be alert to rising heat levels and heat buildup. The thermal protection provided by Bunker Gear can mask signs of high heat conditions, allowing members to over-commit or delay backing out when conditions warrant. This can greatly increase the member's risk of incurring a serious burn injury. A bunker equipped member exposed to moderate heat conditions for a prolonged period can eventually be burned through the clothing.
- 5.2 When a unit has some members wearing protective hoods and other members operating without hoods, additional pre-cautions must be observed, particularly by the Officer in Charge.
- 5.2.1 Members operating without protective hoods may be overextended and overexposed to injury producing heat levels more than members wearing protective hoods. In this case the operating limit of heat exposure is the level that members without hoods can continue to operate safely.
- 5.2.2 Members wearing Bunker Gear and protective hoods retain more body heat and are more readily subjected to heat exhaustion than members operating without hoods. The operating limit is the maximum safe period of operation for Bunker and hood clad members.

6. OPERATIONAL CONSIDERATIONS

- 6.1. The removal of pent up heat and humidity within the Bunker Garment is a high priority. As soon as operations permit, members should start ventilating their bodies, by removing the coat and opening the front flap of the pants. This is of particular importance during the summer months. Because of the debilitating effect of operating while in Bunker Gear, Chief and Company Officers must be more keenly aware of the need for relief of units that have been engaged in firefighting.
- 6.1.1. Units shall be promptly relieved. Additional units should be utilized to perform overhaul and salvage functions, where necessary.
- 6.1.2. Lack of oxygen contributes to heat stress; therefore a greater emphasis on mask usage during extinguishment and overhaul is essential.
- Rotation and relief of personnel during the firefighting periods are an essential part of good fire management when companies have been engaged in operations that are unusually demanding,
- 6.2. The fire environment must be continuously monitored to detect elevated heat levels. Use of the technique known as the duckwalk is recommended when members encounter heat conditions which are felt through the bunker pants or where operations involve areas where water has accumulated.

6.2.1 Chief Officers and Company Officers must be aware that due to the weight and restrictive nature of bunker gear, operations in both engines and ladders will be performed in a less rapid fashion and will require a greater period of time to complete.

6.3 Chief Officers must monitor the units under their command and provide appropriate periods of rest and rehabilitation when indicated. Officers must be **proactive** and consider the following factors:

- Members age and physical condition
- Weather conditions
- Type/duration of operations
- Number of responses
- Number of hours a member has been on duty.

6.4 An attitude of mandatory early relief and rehabilitation must be adopted.

6.4.1 To allow for the early relief of fatigued units, Chief Officers should consider special calling additional units for this purpose, and when necessary, transmitting additional alarms

6.4.2 Incident Commanders shall establish a Rehabilitation Area when conditions indicate that rest and rehabilitation at the scene may be required. Chief and Company Officers shall be guided by A.U.C. 230R-Medical Recuperation and Care Procedures.

6.4.3 Battalion Chiefs may authorize up to 2 hours of rest and rehabilitation and Deputy Chiefs up to 3 hours.

7. CARE AND MAINTENANCE

Advanced cleaning of bunker coat and pants is performed by a private contractor. Upon return of bunker gear, the member must inspect bunker gear for serviceability. If there are any doubts on the serviceability of the gear, an evaluation shall be made at the Quartermaster.

7.1 Routine Cleaning

7.1.1 Easily removed dirt particles should be brushed off of the coat and pants at the scene of operations. Other debris can be rinsed off with a stream of water.

7.1.2 When necessary, the bunker gear can be washed in the decontamination sink in quarters using the following procedure:

- Water shall not exceed 105 F

- Only mild detergents shall be used. **Never use chlorine or bleach.**
- Only a soft bristle brush shall be used for lightly scrubbing away any dirt or stains
- The cleaned item shall be thoroughly rinsed.

7.1.3 The protective hood shall be washed in lukewarm water using a mild detergent. Do not use soap or chlorine bleach. They are harmful to the hood's stitching.

7.1.4 Never wring water out of the protective hood, this can stretch the material, instead squeeze the water out. When washing the protective hood, it is necessary to follow the guidelines stated in the training video.

7.2 Drying Requirements

7.2.1 Wet bunkers and protective hoods should be hung up to dry in a well ventilated area out of direct sunlight. The knee pads should be removed during drying.

7.3 Second Set of Bunker Gear

7.3.1 This will consist of member's second bunker coat and bunker pants. The two sets of bunker gear shall be worn alternately by members between advanced cleanings. Members shall commence wearing the one set of bunker gear continuously from tour to tour when the other set of gear is picked up for advanced cleaning. On return from advanced cleaning, this second set of gear shall be stored and worn only when the first set of gear is drying or being repaired. After the first set of gear is dried or repaired, the member shall place the second set back in storage and wear the first set of gear. Approximately six months later, when the first set of gear is picked up for advanced cleaning, the member shall start wearing the second set of bunker gear continuously from tour to tour for the next six months, except when it is drying or being repaired. Members shall continue on the schedule, alternating use of each set of bunker gear approximately every six months, with the advanced cleaning cycle indicating when to switch wearing the sets of gear. This also allows for each garment piece to annually undergo an advanced inspection to identify unserviceable gear that requires repair or replacement.

7.4 Gloves

7.4.1 Brush debris from your gloves. When necessary, hand or machine wash with a mild detergent/soap and water. **Do not use bleach.** An alternative washing method is to wear your gloves and wash them while they are on your hands. Do not wring the water from the gloves as it may tear the moisture barrier. Allow the gloves to dry naturally, inside and out. Provide a means to permit air to circulate within the interior of your gloves. **Do not machine dry or dry gloves on a radiator.** Soft brushing will help maintain suppleness of the gloves. When the gloves are wet they can cause steam burns if holding hot objects. Dry gloves will also keep members hands warm in cold weather.

8. EXAMINATION AND REPAIR (RETURN OF BURNED, DISCOLORED OR DAMAGED BUNKER GEAR)/ PROTECTIVE HOOD INSPECTION & EXAMINATION

8.1. Bunker Gear Integrity Examination

- 8.1.1. When bunker gear has been ripped, torn, or subject to severe heat (thermal loading) its effectiveness as personal protective equipment may be significantly compromised. Members must routinely examine their bunker gear for rips, tears and the signs of thermal loading: a charring, burning, or brown discoloration of the bunker gear fabric. Whenever a member's Bunker Gear has been ripped, torn, or displays any signs of thermal loading the garment(s) must be examined at the Department's Quartermaster to determine whether repair or replacement is necessary.
- 8.1.2. Bunker Gear Integrity Examinations will be conducted at the Quartermaster by representatives of the Quartermaster and Total Fire Group in conjunction with the FDNY Liaison Officer.
- 8.1.3. The FDNY Liaison Officer will make the final determination as to whether the garment will be condemned and replaced or repaired.
- 8.1.4. Loaner gear is available for members with burned, discolored and/or damaged bunker gear for use pending evaluation, repair and/or replacement. Loaner gear may be obtained from SOC. Call SOC via telephone, Special Operations Command will fax loaner gear form to company who will complete the form and fax back to SOC. Unit must then contact their division messenger to pickup loaner gear at SOC. Loaner must be returned to SOC by the division messenger.

8.2. Protective Hood Examination

- 8.2.1. At the start of each tour and after each use, inspect your hood for tears, discoloration, stretching or open seams. If you find any problems notify the officer on duty.
- 8.2.2. Members shall be guided by the department guidelines as stated in section 2.9, 5.2.1 and 5.2.2 of this AUC 310 if you are unable to use your protective hood due to:
 - ◆ Damage detected during a serviceability inspection.
 - ◆ Contamination resulting from bodily fluids or hazardous materials which require cleaning.
 - ◆ Any others reasons or conditions which result in the hood being unserviceable.

8.3. Delivery Of Bunker Gear To The Quartermaster

- 8.3.1. There are two separate procedures for delivering bunker gear to the Quartermaster for an integrity examination. The procedure to be used depends on whether or not the member who had been wearing the bunker gear has incurred a burn injury which requires medical leave to be granted.
 - A. When the affected member does not require medical leave for a burn injury the division messenger of member's assigned division shall deliver his/her bunker gear to the Quartermaster at the Fort Totten location only. If necessary member can obtain loaner gear from SOC as per 8.1.4.
 - B. When the affected member does require medical leave for a burn injury the Officer on Duty must comply with section 11.3.6 of the Regulations by tagging the bunker gear, placing it OOS, and contacting the Safety Battalion for instructions. The Safety Battalion will arrange for the collection of the bunker gear for its own investigation. At the conclusion of its investigation, the Safety Battalion will determine if the garment should be examined at the Quartermaster for repair or replacement due to thermal loading. Safety will deliver the garment to the Quartermaster for this evaluation. (Note: If the assigned Safety Battalion will be retaining control of the bunker gear for an extended period, pending completion of its investigation, they shall forward a report to the Chief of Safety and a copy to the members unit indicating that loaner gear shall be issued to the affected member.)

8.4. Repair Or Replacement Of Bunker Gear

- 8.4.1. If a determination is made that the bunker gear is to be repaired, the Quartermaster will arrange for the gear to be cleaned and repaired.
 - A. The Quartermaster will notify the officer on duty of the member's assigned unit when the repairs have been completed. The member's assigned division messenger shall report to SOC to return any loaner gear that has been issued and obtains a signed receipt. The division messenger then proceeds to the Quartermaster with signed receipt and picks up member's repaired gear and signs Quartermaster's voucher.
- 8.4.2. If a determination is made that the bunker gear is to be condemned and replaced, the Quartermaster will either issue new bunker gear, if the member is present, or notify the officer on duty of the member's assigned unit to notify the division that the affected member's new gear is ready to be picked-up by the member's assigned division messenger.
 - A. The member's assigned division messenger shall report to SOC to return any loaner gear that has been issued and obtain a signed receipt. The division messenger then proceeds to the Quartermaster with signed receipt and picks up member's replacement bunker gear and signs Quartermaster voucher.

8.5 Contamination Bodily Fluids And Blood Borne Pathogens

- 8.5.1 The following procedures shall be followed for the collection, bagging, temporary replacement, transporting and cleaning of contaminated non-disposable personal protective equipment and work duty uniform.
- 8.5.2 When personal protective equipment or work duty uniforms are contaminated with large amounts of body fluids:
 - A. The Incident Commander shall have all items requiring decontamination bagged using a double sealed clear plastic bag with a biohazard label attached. Bagged items shall be placed on the apparatus in an appropriate location to preserve the integrity of the bag and transported to quarters. The bagged items shall be placed in a light traffic area (remote location) on apparatus floor pending collection by SOC. The bag shall be marked with the member's name, assigned unit, and nature of the contamination. Contaminated PPC must not be forwarded to the Quartermaster.
 - B. If in the opinion of the Incident Commander a member(s) must remove their personal protective equipment and/or work duty uniform at the scene of a fire or emergency, the Incident Commander shall select a suitable location where a member shall change into a coverall. The Incident Commander shall insure the members PPE and/or work duty uniforms are bagged for decontamination.

- C. Body Substance Isolation precautions shall be followed when handling bagged items.
- D. Distribution of replacement equipment and collection points for bagged items shall be established by the Incident Commander.
- E. The Incident Commander shall notify Special Operations Command of the need for temporary replacement equipment if member has no second set of bunker gear as per section 7.3.1

8.5.3 Bagging of Personal Protective Equipment/Work Duty Uniforms

- A. Disposable gloves and eye shield/face mask shall be worn by the member bagging the contaminated items.
- B. Place all contaminated non-disposable personal protective equipment or work duty uniforms in a double sealed clear plastic bag with a biohazard label attached. The bag shall be marked with the member's name, assigned unit, and nature of contamination.

8.5.4 Contaminated Articles

- A. Place contaminated disposable articles that are not intended for re-use into red biohazard bags.

8.5.5 Officers and members are reminded to review and consult with the CFR Manual for any additional information or questions in regards to contamination by bodily fluids and blood borne pathogens.

8.6 Contaminated Gear - Hazardous Materials Incidents

8.6.1 A member of Special Operations Command will identify apparatus, equipment and clothing to be decontaminated. All clothing, personal items, apparatus, tools and equipment will remain at the site pending this determination.

SOC cleans equipment and gear and issues loaner bunker gear. SOC doesn't issue replacement equipment.

On receipt of members' original clothing, Company Commanders will contact their assigned Division to arrange return of loaner gear.

*The Officers of the units who require loaned gear due to a Hazardous Materials incident shall notify SOC Decon Unit and their assigned Division. The Division messenger for those affected units will pick-up the required loaner gear from SOC and deliver the appropriate loaner gear to the affected units. SOC will pick-up the contaminated equipment and gear. After decontamination, the assigned Division messenger will pick-up and return clean equipment and bunker gear.

** Officers and members are reminded to be guided by the procedures outlined in Hazardous Materials 7.

9. SAFEGUARDING OF DEPARTMENT PROPERTY

- 9.1. In order to prevent the possibility of bringing fireground contaminants or bloodborne pathogens into the living areas of the firehouse, members are prohibited from wearing or bringing their firefighting protective ensemble or ensemble elements into any such areas. Living areas are kitchens, sitting rooms, television rooms, housewatch areas, offices, bunkrooms , gyms areas and other such areas where firefighting protective ensembles are not routinely stored or worn for protective purposes. The firefighter protective ensemble includes bunker coat and pants, helmet, gloves and the protective hood.
- 9.2. In order to comply with the OSHA Bloodborne Pathogen Standard (CFR 29, Sect. 1910.1030), while in quarters the firefighter protective ensemble shall only be kept at the designated storage area on the clothing rack, at the designated area on or near the apparatus for rapid donning by on-duty members or in a separate area designated for such storage. Firefighting protective ensembles shall not be stored in personal lockers.
- 9.3. The Department has provided gear bags for the use of members transporting their firefighting protective ensemble. Under OSHA Standards for Hazardous Materials and Bloodborne Pathogens, when members are required to transport any of the elements comprising the firefighting protective ensemble, such items must be transported in the gear bag to prevent hazardous materials and bloodborne pathogen exposure. Gear bags shall be utilized by all members to transport their firefighting protective ensemble. When transporting the firefighting protective ensemble in a private vehicle, such items shall be placed in a gear bag before being placed in the passenger compartment or the trunk of the vehicle. Furthermore, the firefighting protective ensemble shall be kept within the gear bag at all times when such items are stored in the living quarters of a home.
- 9.4. To prevent cross contamination due to sharing of gear bags, the following provisions are enacted:
 - 9.4.1 Prior to placement into the gear bag, the firefighting protective ensemble shall be placed into a plastic bag supplied by the Department.
 - 9.4.2 The plastic bag containing the firefighting protective ensemble shall then be securely closed before being placed into the gear bag.
- 9.5 Once a member has completed transporting the firefighting protective ensemble, the plastic bag that served as a protective liner shall be disposed of in the regular trash unless it is heavily soiled with blood or body fluids. In this event, the plastic bag would be disposed of as per section 8.5.4 of this chapter.

9.5.1 Grossly contaminated gear bags shall not be cleaned by members. If the gear bag becomes slightly contaminated, the member shall clean the bag following guidelines in the CFR-D Manual, Chapter 3, Section 15.

9.6 All members shall comply with the following:

9.6.1 Members are responsible to use the gear bag with the plastic liner anytime they transport their firefighting protective ensemble

9.6.2 Members are responsible to return gear bags to assigned unit immediately after completing the transportation of the bunker gear.

9.6.3 Gear bags are the property of the Department and are for official use only. Gear bags shall not be used for any purpose other than transporting the firefighting protective ensemble.

SECTION TWO

UNSAFE ACTS

This bulletin lists unsafe acts which can and have caused serious injuries to our members.

The purposes of this bulletin are:

1. Point out specific instances of unsafe acts for corrective action.
2. Emphasize the importance of safety.
3. Enable members to anticipate, and eliminate, actions that may cause injuries at operations.

EXAMPLES OF UNSAFE ACTS

1. GENERAL

- 1.1. Poor maintenance of, or failure, to use protective clothing and equipment: - Torn or frayed clothing does not provide adequate protection and may snag and cause loss of balance and injury. Failure to utilize protective clothing and equipment provides no protection.
- 1.2. Wearing of jewelry: The safest procedure is to remove all jewelry at start of tour.

Finger rings: Gloves will not protect against crushing injuries and rings will compound problems.

Gloves are not worn in quarters and serious injuries have occurred to members performing necessary maintenance work on tools, apparatus and equipment. Rings can snag on protrusions and cut into flesh.

Earrings: Ears are exposed at fires and metal will act as a heat sink. This act was demonstrated in this department when members received face burns from exposed metal rivets on mask facepiece in the 1960's. Subsequently this was corrected. In addition it is possible for earrings to snag during donning of mask leading to tearing (avulsion) of the skin.

- 1.3. Jumping on or off moving apparatus.
- 1.4. Standing on hose to anchor it while apparatus is used to make stretch.
- 1.5. Improper placing of tools and equipment in operations area increases hazard of tripping.
- 1.6. Operating directly below area where hose, tools and other equipment are being used, raised or lowered.

- 1.7. Operating close to edge of roof, particularly with back to edge of roof.
- 1.8. Member positions himself between hoseline and edge of roof. Burst line or sudden movement of line could cause member to fall over edge of roof.
- 1.9. Operating line on icy roof without being secured by a rope around the waist tied to a substantial object.
- 1.10. Failure to use hose tags or other means of identifying hose lines. Injuries caused by chauffeur starting water in line not fully positioned, or shutting down water in operating line working in a key position.
- 1.11. Careless discharge of extinguisher on other members.
- 1.12. Caps on extinguishers not checked to insure tight fit.
- 1.13. Using axe with badly worn or mushroomed head to strike other metal tools, resulting in flying steel chips and injuries.
- 1.14. When positioning pumper for drafting water, members get between pumper and edge of pier while apparatus is moving.
- 1.15. Struggling with a whipping hose line, instead of shutting down the supply.
- 1.16. Improper lifting of tools, equipment and persons. Spine not in line with direction of lift or pull.
- 1.17. Working in poorly lit areas unnecessarily; under utilization of portable lighting.

2. LADDER OPERATIONS

- 2.1. Life belt improperly donned with hook facing in wrong direction. Could lead to difficulty in hooking on and increase fall hazard.
- 2.2. Positioning tower ladder outriggers without utilizing additional member on opposite side from control panel.
- 2.3. Operating on a ladder without a lifebelt or failing to use a leg lock.
- 2.4. Mounting an aerial ladder turntable with hose over shoulder. Snag could cause member to fall to street.
- 2.5. Moving on or off aerial ladder at roof with hose over shoulder. Snag could cause member to fall to street.
- 2.6. Ordering water started in line before line is secured or in position, when operating from a ladder.
- 2.7. Straddling a hoseline while operating from a ladder. Possible injury if hose bursts.

- 2.8. Ascending or descending a ladder that is not butted, or secured at the top.
- 2.9. Eye injuries can be caused when members are looking up while pulling down ceilings with a tool. Look down before pulling down.

3. HOISTING OR LOWERING LADDERS

- 3.1. Climbing raised ladder to bring rope between taped rungs without ladder being butted.
- 3.2. When lowering, failure to use guide line when necessary. Ladder moved into vertical position by members working too close to edge of roof.
- 3.3. Failure to keep all persons away from area beneath ladder being hoisted or lowered.

4. LADDER PIPE OPERATIONS

- 4.1. Men working on top of apparatus, in dangerous positions during placement of ladder pipe.
- 4.2. Members climbing on ladder while fly is being extended.
- 4.3. Chauffeur moves ladder before tillerman has completed securing ladder pipe to ladder and has moved to a safe position. Unexpected movement of ladder could cause tillerman to lose balance and fall to street.
- 4.4. Failure to observe good lifting practices when moving pipe into position on top of ladder.

5. HEAVY STREAM OPERATIONS

- 5.1. Multiversal or other large caliber stream device left unattended or unsecured during operations.
- 5.2. Movement of multiversal or large caliber stream device attempted while stream is still operating.
- 5.3. Hands or fingers inserted into clipper valve in attempt to stop leaking water, with lines charged, resulting in cut fingers or hands.
- 5.4. Members unprepared for nozzle reaction when water is started, resulting in loss of balance and loss of line. Officer and chauffeur must maintain communication.
- 5.5. Standing directly in front of capped outlets while high pressures are being developed during operations. Defective or loose fitting caps could blow off and strike men.
- 5.6. Failure to maintain a clear area in the immediate vicinity of hose tests to avoid injury to members and passersby.

- 5.7. Starting water prematurely. Persons not clear of the area may be struck by the heavy caliber stream or injured by the smoke and heat pushed at them by the stream.
- 5.8. Excessive hose improperly stretched into operations area, increasing tripping hazard.

6. FOAM AND FOG OPERATIONS

- 6.1. Fog lines advanced too rapidly, before fire is completely extinguished, exposing members to re-flash hazard.
- 6.2. Equipment moved too close to fire before it is ready to be used. Wind change or flare-up may result in loss of equipment and injury to members.
- 6.3. Solid stream directed into burning liquids before foam is flowing. Splash or possible boil-over may cause burns.
- 6.4. Advancing fog lines without providing ventilation in advance of the line for the release of the heat and super-heated smoke. May result in burns to the men on the line.
- 6.5. Failure to use extra care in advancing fog lines. Some positions of fog nozzle interfere with vision.
- 6.6. Failure to maintain adequate flow especially with automatic tips.

7. HOSE LINE TO ROOF VIA OUTSIDE OF BUILDING

- 7.1. Improper hauling of hose onto roof. Rope and hose walked onto roof rather than pulled. Members may walk off roof or into roof openings when poor visibility exists from smoke or darkness.
- 7.2. Failure to provide illumination on roof when necessary.
- 7.3. Rope used to secure line on roof placed at improper level and across line of travel, causing members to walk into or trip over rope.

8. MANEUVERING PORTABLE LADDERS – BRIDGING

- 8.1. Improper stance by members during operations. Back not kept straight and in line so as to properly support weight, causing back injuries.
- 8.2. Raised ladders coming into contact with overhead wires or other obstructions, or moved into dangerous angles by failing to watch tip, allowing ladder to get out of control and fall.
- 8.3. Failing to keep body in line with weight thrust when raising or lowering ladder.
- 8.4. Hands and feet placed in line of movement of extension fly ladder. May result in injury if control is lost or halyard should break and fly section drop.

- 8.5. Rope trailing from extension ladder during carrying operation exposing members to tripping hazard. Unsecured halyard may allow fly section movement if rung locks slip or fail.
- 8.6. Failure to give preliminary command "Ready" or "Prepare To" so as to alert members to the next command.

9. KNOTS

- 9.1. Knots tied improperly, or too loosely, or wrong knots used, allowing persons or objects to slip out.

10. LIFE BELT

- 10.1. Improper donning.
- 10.2. Improperly attaching life saving rope to life belt hook.

11. MASK OPERATIONS

- 11.1. Failing to check clearance behind member before swinging Scott Air Pak over shoulder.
- 11.2. Improper testing of masks due to not understanding the reasons for tests.
- 11.3. Lack of knowledge of emergency measures to be taken when mask does not function properly.
- 11.4. Operating alone, or leaving a partner alone, in a smoke filled area.
- 11.5. Gauges not checked for proper amount of air before use. Air may have leaked out since roll call check or cylinder not replaced after use since last check.

12. UNSAFE ACTS BY ENGINE COMPANY CHAUFFEURS

- 12.1. Failure to check tightness of cap on unused outlet before opening hydrant.
- 12.2. Starting water in line before members are prepared, causing line to whip and injure members.
- 12.3. Failure to take proper position for receipt of orders and observation of operations.
- 12.4. Using excessive pressure, making nozzle difficult to operate, or causing hose to burst.
- 12.5. Using improper stage position (volume vs. pressure) leading to much jockeying of controls and erratic operation of hose lines.
- 12.6. Connections not made up tightly resulting in separation of lengths.
- 12.7. Moving suction into and out of water by using apparatus, instead of hoisting or lowering by rope during drafting operations.

- 12.8. Failure to prevent cars from going over hose lines may leave members in precarious position without water momentarily.
- 12.9. Failure to use hose tags and subsequent possibility of shutting down wrong line, leaving members in a precarious position without water.
- 12.10. Failure to set relief valves to prevent excessive pressure which results in burst hose and/or too much nozzle pressure.

13. MISCELLANEOUS

- 13.1. Ladder company personnel trimming cornice, sidewalls, window frames, etc. from bucket of tower ladder, and dropping debris to street below prior to verifying that the area is clear of personnel.

BY ORDER OF THE FIRE COMMISSIONER AND THE CHIEF OF DEPARTMENT

SECTION THREE

HYDRATION & RE-HYDRATION

1. GUIDELINES FOR NUTRITION AND HYDRATION

1. Maintaining an adequate level of hydration throughout the workday is of the utmost importance. At a moments notice, members may be called to engage in very strenuous activity in a hot environment. Maintaining hydration throughout the tour is the only way to ward off dehydration later. Pre-hydrating begins the day before a tour. Normally, water is appropriate for hydration. Members should drink water everyday, but water can quench thirst without providing needed carbohydrates and electrolytes. When activities are of moderate to high intensity, sports drinks should be considered for re-hydration and caloric and electrolyte replacement.

2. Members should follow accepted guidelines for hydration and nutrition. Beverages, foods and substances that should be avoided include the following:
 - Carbonated, high-fructose-content and high-sugar drinks

 - Foods with high fat and/or high protein content

 - Alcohol consumption prior to duty

 - Excessive fluids

 - All tobacco products

 - Protein supplements

 - Stimulants, appetite suppressants, decongestants

 - Excessive consumption of caffeinated beverages

 - Energy drinks that contain various stimulants including caffeine

3. Five gallon water jugs carried on all apparatus shall be checked and refilled with fresh water at each roll call.
4. Members shall consume fluids to satisfy thirst during rehabilitation and be encouraged to continue hydrating after the incident.
5. Nausea and loss of thirst can be an early sign of dehydration and heat stress. Therefore all members should demonstrate the ability to consume some fluids. If members cannot demonstrate the ability to take in some fluid, they should be medically evaluated.
6. Dehydration has several detrimental effects on the body, including:
 - Impairs the body's ability to maintain core temperature
 - Decreases strength
 - Increases onset of fatigue
 - Loss of coordination
 - Decreases blood volume, which increases cardiovascular strain

SECTION FOUR

1. WATERFRONT OPERATIONS WHILE WEARING BUNKER GEAR

- 1.1 Tests were conducted to determine the amount of buoyancy a member (Fire or EMS) wearing bunker gear would have if the member accidentally fell into the water. The testing included falling from heights between 1 ft. and 10 ft.
- 1.2 Testing was done in fresh and salt water with and without an SCBA. Each test was started with a member wearing a full set of bunker gear, including personal harness, PSS kit, flashlight, and hand tools.

2. OBSERVATIONS

- 2.1 Results of the testing have shown that members wearing Bunker Gear, with or without an SCBA, **quickly become submersed.**
- 2.2 The higher the fall the less opportunity there may be to remain at the surface.
- 2.3 **BUNKER GEAR DOES NOT FLOAT.**

3. OPERATIONS

- 3.1 Prior to operating on or around water, Marine units must be notified.
- 3.2 Members operating at waterfront operations, piers or bulkheads should exercise extreme caution. Personal flotation devices, where available, should be used. Safety lines should be used, particularly if no flotation devices are available.
- 3.3 Each company's Water Safety Kit should be brought to the point of operation. Safety lines should be readied for use and attached to members operating in, over and around water. At least one 20 ft straight ladder should be dedicated for the purpose of member removal should the need arise.

4. CONCLUSION

- 4.1 In the event you fall into the water, do not attempt to swim - call for help, try to remain calm and slowly tread water. Thrashing about will reduce the amount of time you may be able to keep yourself at the surface.
- 4.2 **REMEMBER - REMAIN CALM, DON'T PANIC, CALL FOR HELP!**



ROPE

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with the most commonly used knots and hitches used by the FDNY• To familiarize members with the FDNY's complement of ropes, life belts and harnesses and the proper use of same• To familiarize members with the FDNY's procedures of using the lifesaving rope
CONTENTS:	<ul style="list-style-type: none">• Explanations of knots and hitches• Descriptions and explanation of various lowering evolutions using the lifesaving rope with both the life belt and the personal harness
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Training Bulletins; Rope 1-8 and all data sheets• Evolutions 23, 24, 25, 27, 28,29, 30, 31, 31A, 31B, 31C, 32

Rope Contents

Section	Title	Page
1.	Knots and Hitches	1
	Half Hitch / Clove Hitch	2
	Slip-Over Clove Hitch / Bowline	3
	Becket Bend	4
	Rolling Hitch	5
	Bowline on Bight	6
	Slippery Hitch	7
	Substantial Object Knot	8
	Figure Eight Knot (Stopper)	12
	Butterfly Knot	13
	Water Knot (Nylon Webbing)	15
2.	Knots And Hitches for Equipment	17
	Axe and Halligan	17
	Hook and Can	18
	Pull Down Hook	19
3.	Life Saving Rope Care and Maintenance	20
4.	Back Pack Carrying Case for the LSR	26
5.	Anti-Chafing Device	31
6.	Search Rope	35
7.	Atlas Life Belt	40
8.	Personal Harness	44
9.	Lower a Member	54
10.	Single Slide	80
11.	Personal Safety System	108

Rope is one of the oldest tools used by the fire department. It is valuable in applications such as performing rescues, hauling of tools, and various general uses. The ability to tie proper knots is crucial to insure safety during rope maneuvers.

KNOTS AND HITCHES

NOMENCLATURE

Hitch	A temporary method of securing an object, fastened so that it can be readily undone, i.e., Half Hitch.
Bend	The tying of the ends of two ropes to make a continuous rope, i.e., Becket Bend.
Knot	The tying of the parts of one or more ropes so that they will not slip, i.e., Bowline.
Bight	Formed by making a loop in the rope.
Working End	The part of the rope which is used in tying the knot.
Standing Part	The long unused portion of the rope.

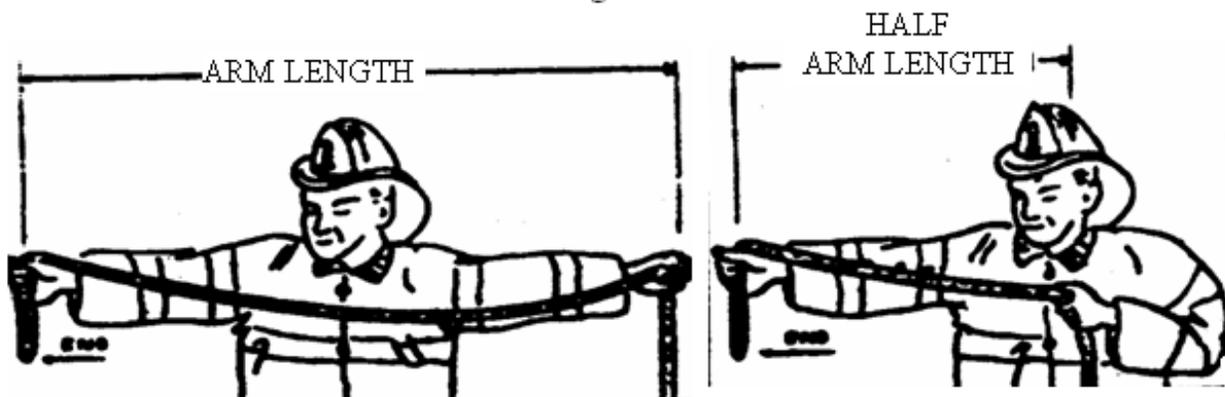
REQUIRED LENGTH OF ROPE FOR MEASURED KNOTS

Bowline on a Bight	-	1½ arm lengths
Rolling Hitch	-	1½ arm lengths
Bowline	-	1½ arm lengths with a 1 ft. end

MEASUREMENT

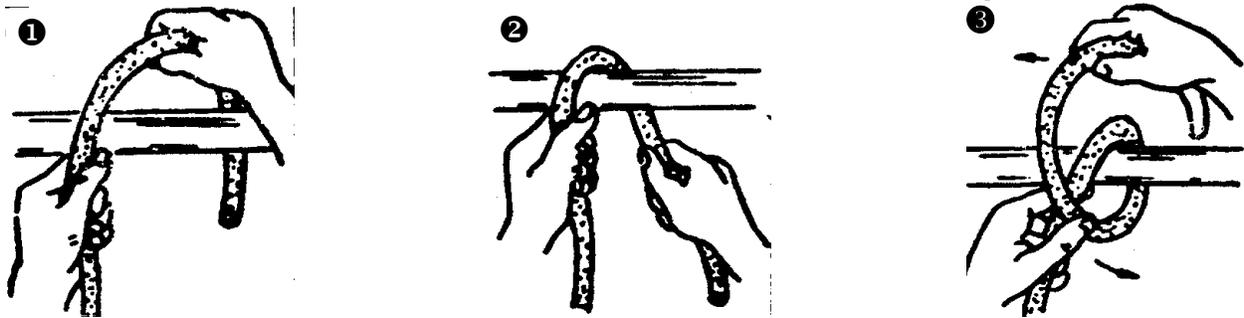
Measurement of rope required to form the various knots and hitches is made by stretching the arms out and holding the rope between the hands. The full distance measured is one arm length. A half arm length is measured by holding the rope in the left hand at the center of the chest and stretching the rope to the right. Note that approximately 6" is allowed to dangle from the right hand.

Figure 1



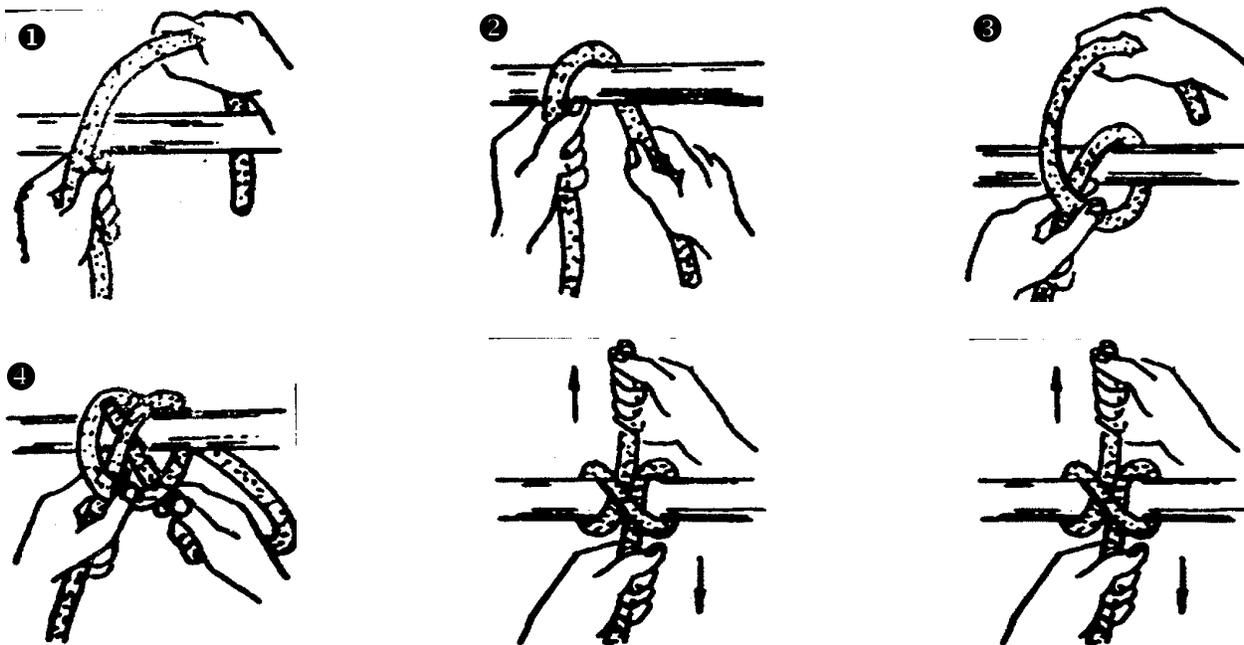
Knots and hitches are shown tied loosely to demonstrate the proper method. In practice, all knots and hitches shall be made up securely.

HALF HITCH



The half hitch is used when hoisting or lowering tools and equipment. It is also used as a binder to secure knots.

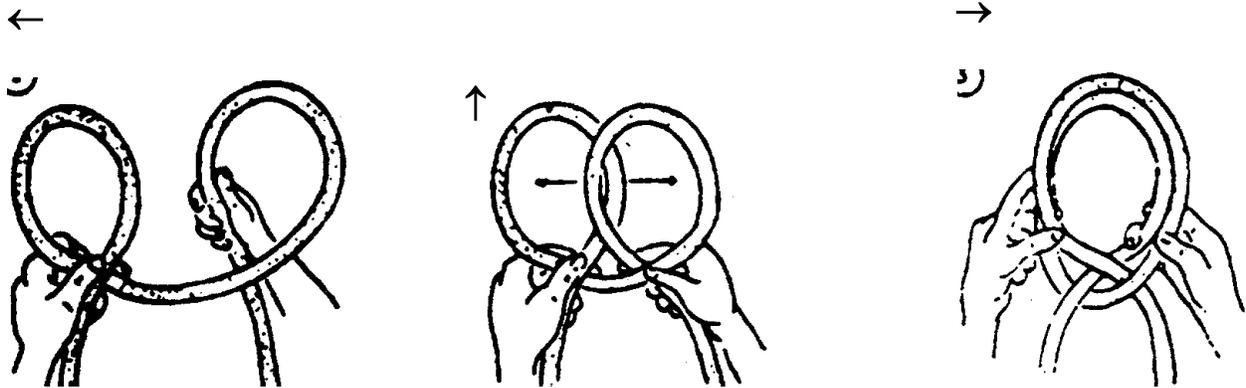
CLOVE HITCH



The clove hitch is formed by making two half hitches. It is used in the hoisting and lowering of tools and equipment, in the hoisting of hose lines, when drafting water and various other operations. Unless otherwise specified, a binder shall **always** be tied in conjunction with a clove hitch, except where it is tied away from the working end of the rope.

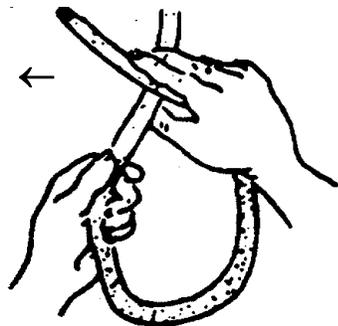
When making a clove hitch for the hoisting of tools and equipment, the pull on the rope may be from the upper or lower hitch depending on how the hitch was started or if the slip-over hitch was used.

SLIP-OVER CLOVE HITCH

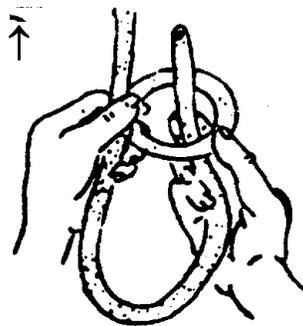


The slip-over clove hitch is made by forming two half hitches in the hand. It may be used to advantage by slipping the completed clove hitch over the end of the object, as in hoisting the hook, halligan tool or extinguisher .

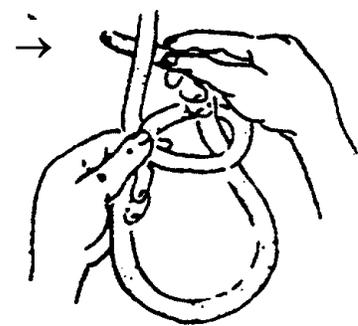
THE BOWLINE KNOT



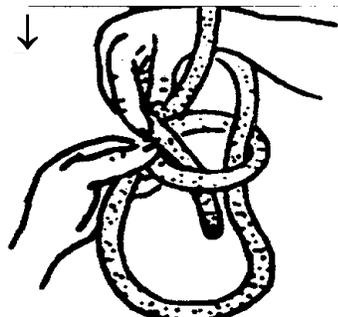
With rope held in this position, press down with fingers and up with thumb of right hand and forming loop in rope.



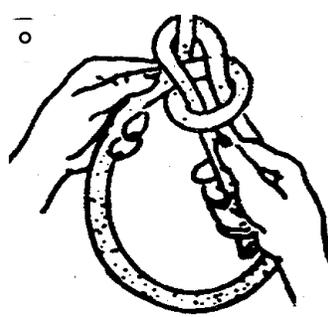
loop is held in position with left hand until knot is completed.



End of rope brought up through loop with right hand, taken around in back of rope held in left hand.



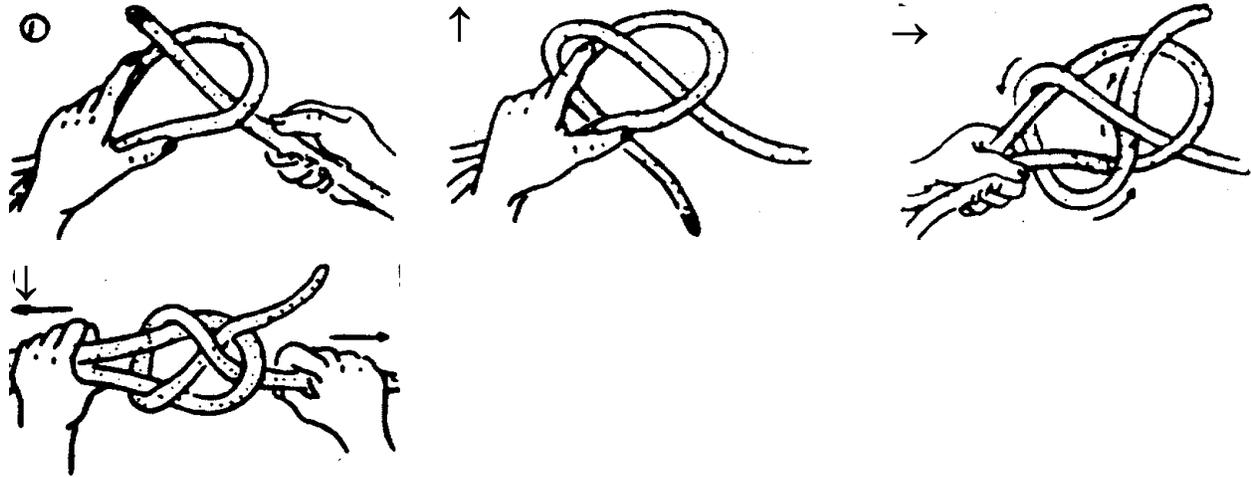
Continue to bring rope around until end is placed down into loop held with left hand.



Take hold of rope end coming down through loop with right hand and pull tight to complete knot.

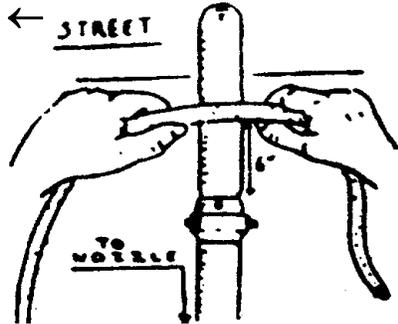
The bowline knot will not slip nor tighten under tension and is easily untied. It is used in hoisting and lowering ladders (20' and over). The bowline is useful where a loop is needed that will not slip.

BECKET BEND

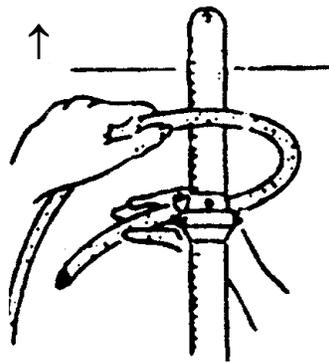


The becket bend is used to join the ends of two ropes. When hoisting the portable deluge nozzle to heights exceeding 60 feet, the becket bend is used to join the two utility ropes.

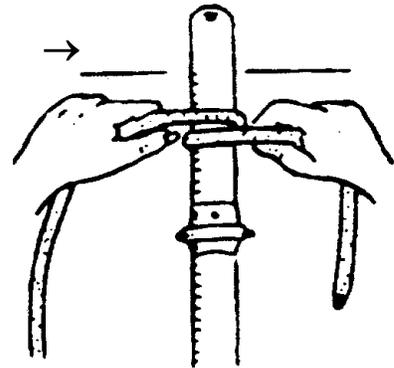
ROLLING HITCH



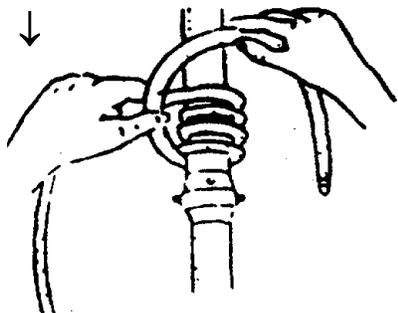
Hose butt is brought on to roof; 1 1/2 arm lengths of rope are measured; rope is held in left hand; knot is tied with right hand.



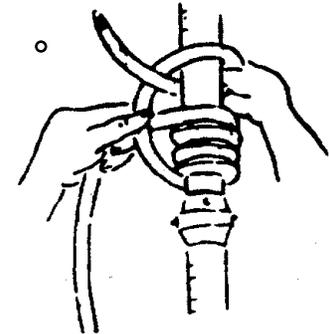
Rope is brought around and over hose below butt.



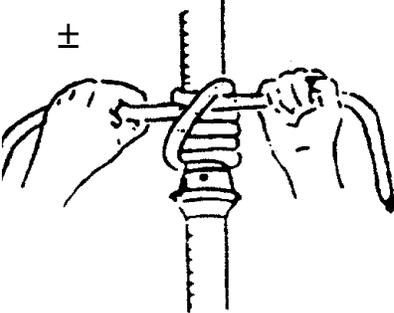
Continue turns around hose.



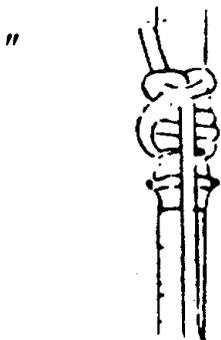
Until four turns have been made.



Bring rope end over the four turns and around hose with a half hitch.



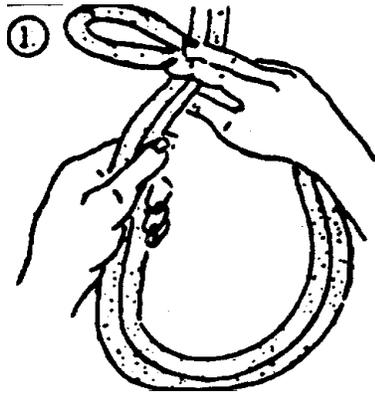
Slide the turns of rope close to hose butt and pull ends tight.



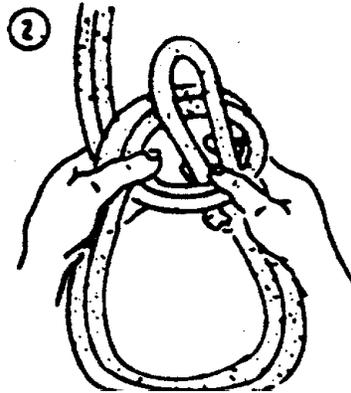
Ease hose butt over roof.
Take rope back on roof and tie to a secure object.

The rolling hitch is used to secure a hose line which has been hoisted via the outside of a building. It is tied directly beneath the couplings just below the edge of the roof or window. The free end of the rope is taken back on roof and secured to some substantial object. The rolling hitch relieves the couplings of the weight of the hose.

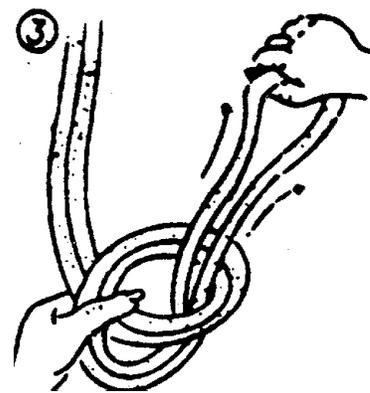
THE BOWLINE ON A BIGHT



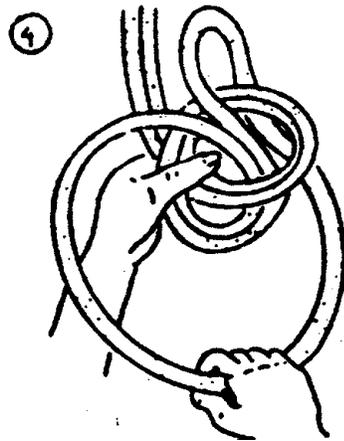
① Measure 1 1/2 arm lengths; loop rope back on itself. Hold doubled rope in left hand about 4' from looped end. Place loop across doubled rope above left hand.



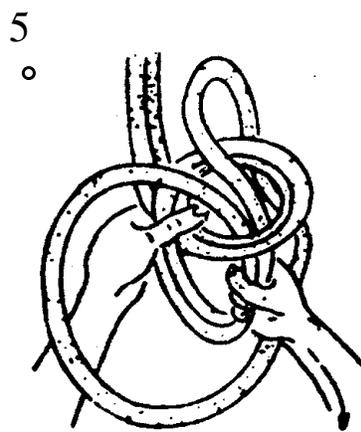
② Form a small loop with left hand by turning the rope forward and up over the doubled rope held in right hand.



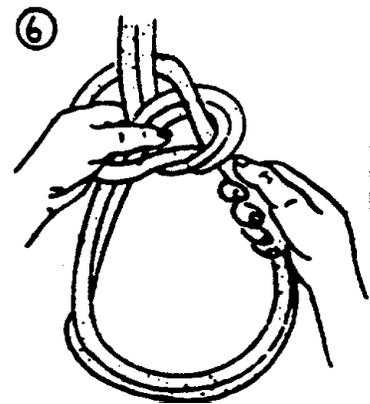
③ Pull the doubled end completely through the loop.



④ Fold the large loop behind the small loop.



⑤ Pull the doubled rope down through small loop.

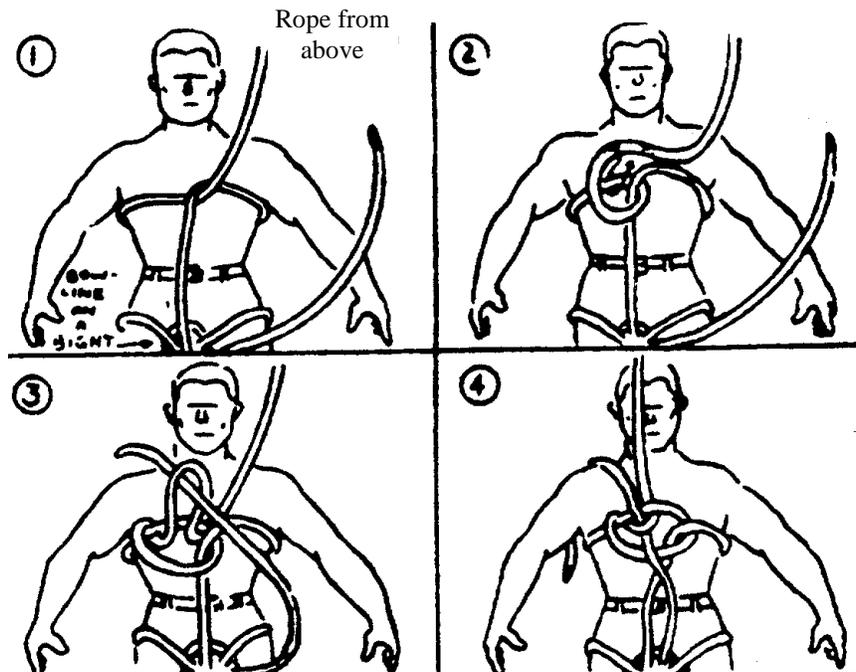


⑥ Make up knot securely.

The bowline on a bight is a very important knot. It is commonly used to lower a firefighter to rescue persons trapped at windows which are not readily accessible to ladders. Other rescue purposes include the lifting of persons from excavations, sewers, etc., and the lowering of persons from places where safer escape routes are not available. The bight forms a cradle to support the firefighter and the bowline prevents the rope from tightening or slipping. The bowline on a bight is used in conjunction with a half hitch and a slippery hitch tied about the chest.

Note: The 4' referred to under illustration 1 is approximate. Allowances must be made according to size of the person to be lowered.

SLIPPERY HITCH



This knot is used in conjunction with the Bowline On A Bight when hoisting or lowering a person. It is tied around the upper chest to give stability and eliminate binding on the chest that would be caused by an ordinary half hitch.

SUBSTANTIAL OBJECT KNOT OR

CLOVE HITCH AND BINDER ON THE TAUT PART OF THE ROPE

The **Substantial Object Knot**, also known as a **Clove Hitch And Binder On The Taut Part Of The Rope**, is used to tie off to an anchor point during the Lowering A Member, Rescue Pick-Up and Single Slide Evolutions. It is tied by making three half hitches over the top of the rope.

Figure 1



Pull a double strand of rope around your substantial object. Fig. 1

Figure 2



Have 4 feet of rope from the point where the ropes cross. Fig. 2,3

Figure 3



Cross the working end in your right hand over the rope in your left hand forming a letter 'D'. Fig. 4

Figure 4



Figure 5



Figure 6



Reach into the 'D' with your right hand, grab the working end and pull it through the hole creating a half hitch. Fig. 5 and Fig. 6

Figure 7



Figure 8



Tighten by pulling forward with your right hand ONLY. Fig. 7

Figure 9



Figure 10



Make two more half hitches in the same manner. Fig. 8 , Fig. 9 and Fig.10

Figure 11



Tighten and set the knot. Fig. 11 A properly tied knot will have enough rope left to tie one more half hitch. Fig 11 and Fig. 12

Figure 12



A finished knot. Fig. 12

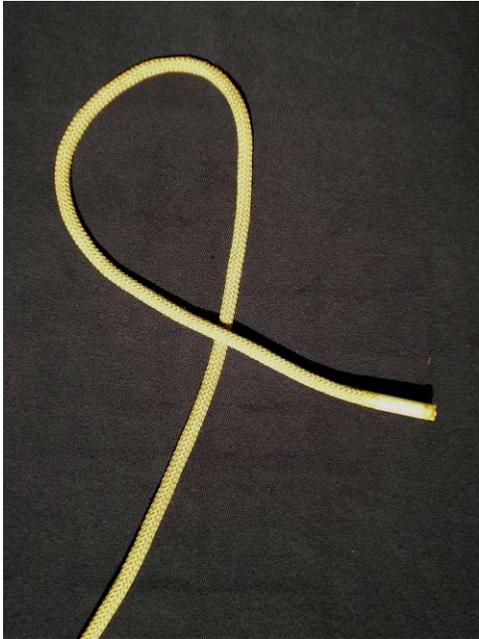
Figure 13



A loose knot for illustration purposes only. Fig 13

FIGURE 8 OR STOPPER KNOT

The Figure 8 knot is tied at the end of a rope and keeps the rope from slipping out.



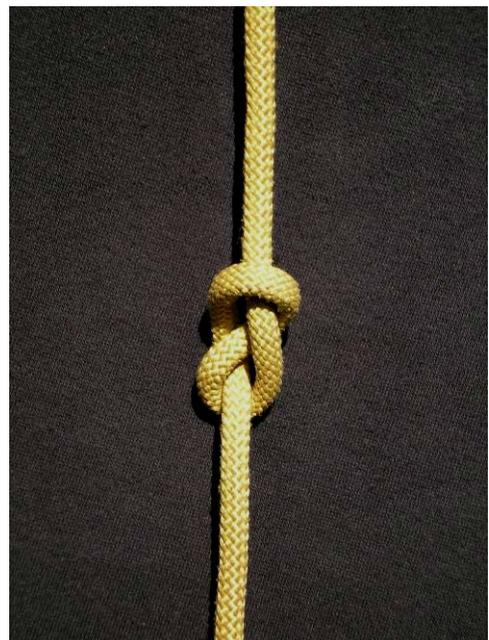
Make a loop



Bring the end around the standing part



Put the end through the loop



Dress and set the knot

BUTTERFLY KNOT

The Butterfly Knot is used to make a loop in the middle of a rope. It can be used as a tie-off point or to make a three directional pull.

Figure 1



Figure 2



Figure 3



Starting from the back of your left hand, make 3 loose loops around your hand.

Fig. 1, Fig. 2 and Fig. 3

Take the middle loop and pull it under the left loop to your palm.

Fig. 3 and Fig. 4

Figure 4



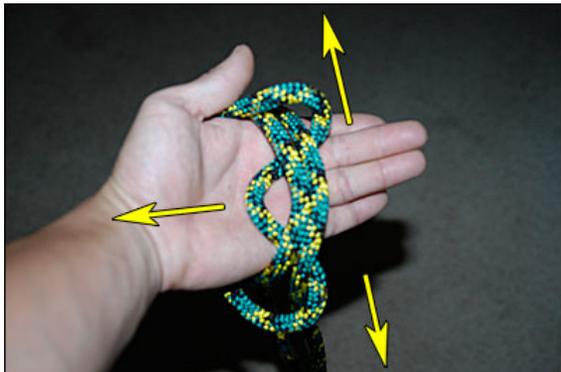
Now pass the loop in your palm over the other two loops. Fig. 4 and Fig. 5

Figure 5



The loop that went over from your palm now goes back under the same two loops back towards your palm.
Fig. 5.

Figure 6



Pull the rope thru and take all the loops off of your hand. Fig. 6

Figure 7



Tighten and set the knot.
Fig. 7

WATER KNOT WITH 1" NYLON TUBULAR WEBBING

1. SPECIFICATIONS

- 1" nylon tubular webbing in 20' lengths
- Breaking Strength 4000 lbs
- Knotted breaking strength 3000 lbs

2. PREPARATION FOR USE

- 2.1 Before the webbing can be used in the field it must be made into a continuous loop by using a water knot (see Illustration).

3. PURPOSE

- 3.1 To be used to assist in the removal of an unconscious member or civilian from a hazardous environment.
- 3.2 Spinal immobilization may not be possible due to the need for immediate removal of the member from an imminently dangerous situation.
- 3.3 To enhance simple maneuvers through the use of knots attached to an individual firefighter's body or SCBA. This will improve leverage and allow additional individuals to assist in the removal. In the event that a firefighter should become unconscious during an incident, members in close proximity will be able to quickly conduct a removal.
- 3.4 Webbing shall only be used for **dragging** victims; no vertical lifts should be attempted.

4. DISTRIBUTION

- 4.1 Each Officer and member will be issued a length of webbing, which will become part of the member's personal equipment.

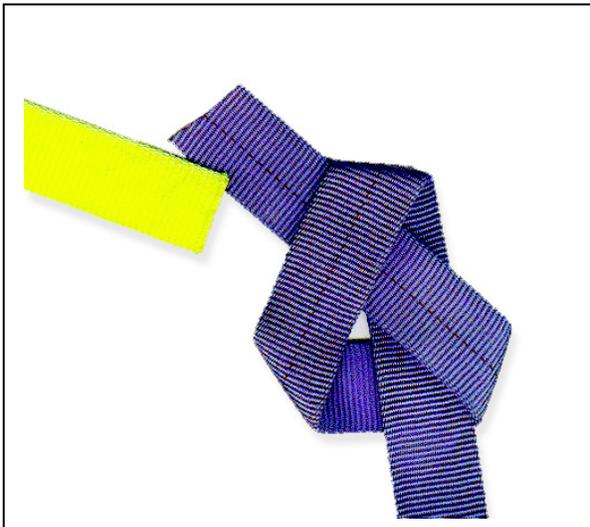
5. REPLACEMENT

- 5.1 To requisition replacement lengths of webbing the Officer on Duty should forward an RT-2 to the tool room.

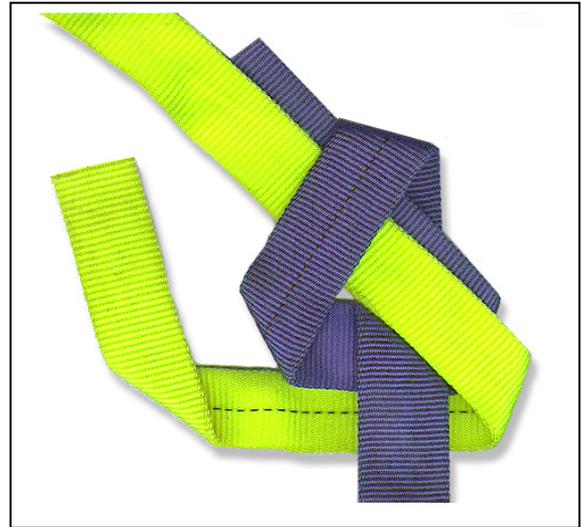
6. CARE AND MAINTENANCE

- 6.1 The webbing can be cleaned with mild soap and water. It should be allowed to dry naturally, avoiding direct sunlight.
- 6.2 The webbing should be inspected monthly and after each use.

ILLUSTRATION



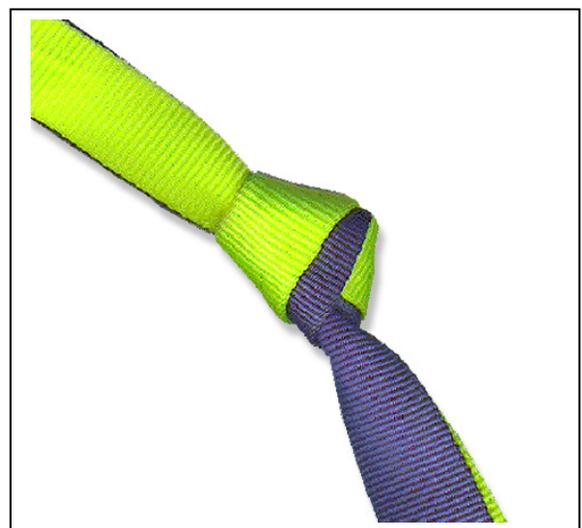
1



2



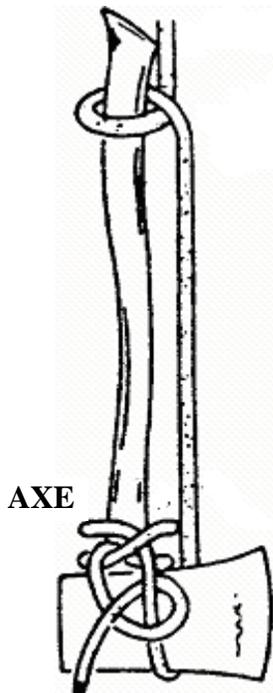
3



4

KNOTS AND HITCHES USED TO HOIST AND LOWER

TOOLS AND EQUIPMENT



AXE

← Rope from above

HALF HITCH
(approx. 5" below end
of handle)

Tie a clove hitch and binder on handle close to blade. Bring working end of rope around blade and up to handle end. Tie a half hitch on handle. The axe is hoisted and lowered in vertical position with handle up.

CLOVE HITCH
& BINDER
(close to head of axe)



HALLIGAN
TOOL

Rope from above

← HALF HITCH
(placed under adz end)

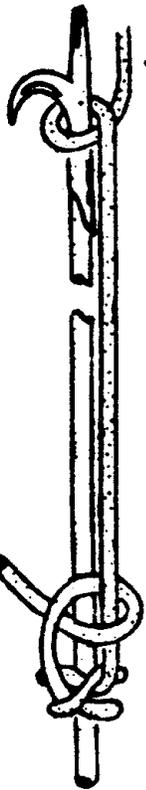
Tie a clove hitch and binder on halligan tool close to fork. Bring working end of rope through fork and up to adz end. Tie half hitch under adz end.

Halligan tool is hoisted and lowered in vertical position with hook up.

Note: Lock breaker with fork end is hoisted in same manner.

CLOVE HITCH
& BINDER
(close to head of fork)

Rope from
above



HALF HITCH

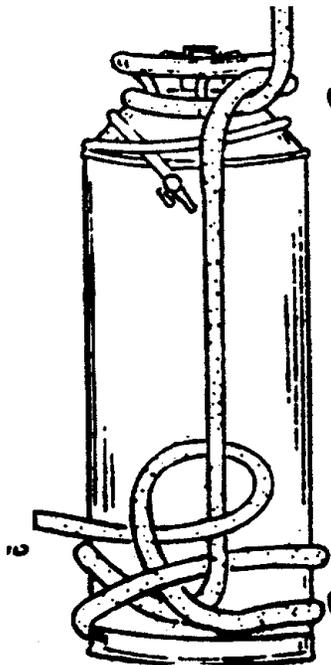
Tie a clove hitch and binder on handle. Bring working end of rope up and tie a half hitch under hook. The hook is hoisted and lowered with the hook end up.

Note: Lock breaker with chisel end is hoisted and lowered in same manner, adz end up. Lock breaker with fork end is hoisted in same manner as halligan tool.

HOOK

CLOVE HITCH
& BINDER
(approx. 6" from
end of handle)

Rope from
above



HALF HITCH
(under cap)

Tie a clove hitch and binder on lower part of extinguisher. Bring working end of rope up and tie a half hitch under cap. Extinguisher is hoisted and lowered in upright position.

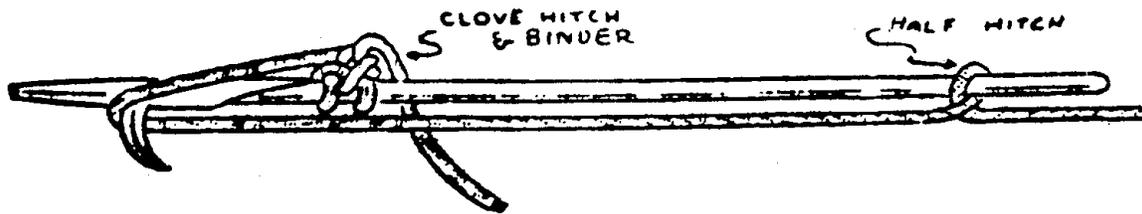
Foam extinguisher is hoisted and lowered in same manner.

CO₂, Pressurized Water and Dry Powder extinguishers are hoisted and lowered in same manner. Half hitch is tied under handle and discharge hose.

CLOVE HITCH
& BINDER
(approx. 3"
from bottom)

EXTINGUISHER

PULL-DOWN HOOK



Tie a clove hitch and binder on handle close to metal. Bring working end of rope around top of hook and back to handle end. Tie a half hitch around handle about 12" from the end. The hook is placed in position on the object to be pulled; a strain is kept on the rope and the men move back to the working position.

Hooks are tied in this manner for pulling down partitions, fences, copings, etc., enabling members to work in safe areas away from falling objects.

CARE AND MAINTENANCE OF THE 9/16”

NYLON LIFE SAVING ROPE

1. INTRODUCTION

- 1.1 Nylon rope is stronger than manila rope of the same size. A breaking strength test was conducted on our 9/16" nylon life saving rope. The rope broke at 10, 240 pounds.
- 1.2 Acceptance of the rope requires that it have a minimum breaking strength of 9000 pounds. In addition, our rope must survive a drop test. This test consists of tying a 600 pound weight to the end of the rope, and dropping the weight from a platform ten feet, seven inches high. There must be two feet of slack in the rope. The rope must survive five such drops.
- 1.3 Our new life saving rope not only survived the drop test it also survived an additional breaking strength test. The section of the rope subjected to the drop test was laboratory tested and broke at 9800 pounds. The life saving rope has a high breaking strength quality.
- 1.4 In order to retain this strength, the rope must be properly maintained.
- 1.5 Members should be aware that the actual length of our Life Saving Rope may be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

2. MAINTENANCE

- 2.1 First and foremost, the life saving rope shall be used only for life saving purposes, and always with the anti-chafing device. Use of this rope for any other purpose is strictly prohibited.
- 2.2 A life saving rope subjected to the weight of two people shall be placed out of service forthwith and replacement requested.

- 2.3 Immediately after a life saving rope has been subjected to the weight of one person the rope shall be carefully examined for any signs of damage or abrasion before being placed back in service. Proper journal entries shall be made by the company officer of the results of such examination. An entry shall also be made in red on the Life Saving Rope Record Card (RP-100). The officer, after supervising the examination of the rope, shall notify the Division of Safety by telephone of the incident.
- 2.4 The life saving rope can lose from 10% to 15% of its strength when wet. This loss of strength occurs when the rope is submerged in water at room temperature for twenty four hours. Whenever a rope becomes wet it shall be allowed to dry naturally before being repacked and stored on the apparatus. The rope regains its strength when it dries.
- 2.5 Ice particles within the strands of a rope can damage the inner fibers. Therefore, a frozen life saving rope shall be placed out of service.
- 2.6 Dirt on the surface and imbedded in rope acts as an abrasive to the strands and fibers. If a life saving rope becomes dirty, it shall be washed with mild soap and water. It should be allowed to dry naturally before being repacked and stored on the apparatus.
- 2.7 The detrimental effect of rust on nylon rope cannot be overemphasized. The life saving rope should be stored where it will not come in contact with rust. If a rust stain is found on the life saving rope, it should be immediately removed with soap and water. A persistent rust stain is a definite indication of fiber damage and a reduction in the strength of the rope. It should be placed out of service and replacement requested.
- 2.8 Nylon rope is susceptible to damage from acids and their fumes. Formic acid, hydrochloric acid, sulfuric acid, nitric acid and phenol are highly destructive to nylon rope. If the rope comes in contact with acids or their fumes, it shall be placed out of service and replacement requested.
- 2.9 Prolonged exposure to sunlight (ultra-violet rays) or fluorescent light is injurious to nylon rope. Therefore, the life saving rope shall be stored where the effects of sunlight and fluorescent light are kept to a minimum.
- 2.10 Nylon rope when exposed to heat over 300°F will progressively lose strength, and will melt at 482°F. Rope that has been exposed to highly heated surfaces cannot be considered safe and shall be placed out of service and replacement requested.
- 2.11 The life saving rope must be stored in the driest compartment on the apparatus and the carrying case must be stored in the upright position. Due to heat transmission, the rope shall never be stored on engine covers or in compartments adjacent to the engine compartment.

- 2.12 When a rope is repeatedly twisted in one direction, a kink will develop. Kinks pulled through a restricted space will seriously damage a rope. A kink should be removed from a rope by rotating the rope counter to the direction of the kink. (See Fig. 1). Every effort shall be made to prevent a rope from kinking during its use.

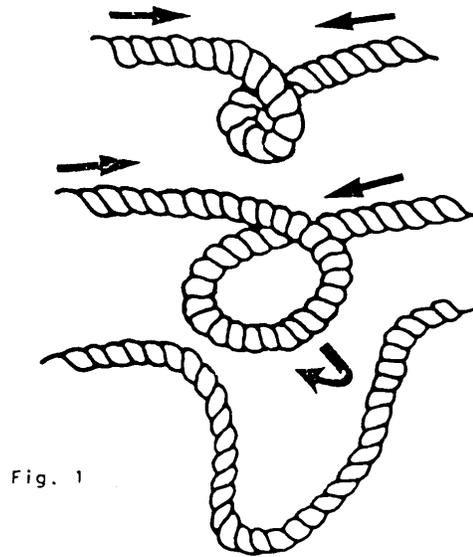


Fig. 1

Figure 1

- 2.13 Strand hockles develop when force is used to remove a kink in rope. A hockle is very difficult to remove. A hockle reduces the strength of a rope by 40% to 50%. Should a hockle occur in the life saving rope, the rope should be placed out of service and replacement requested. (Fig. 2)

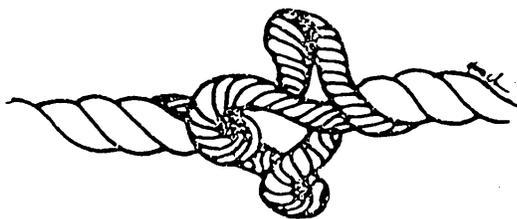


Figure 2

- 2.14 All units (except Engine Companies) shall inspect and repack the Life Saving Rope every Monday on the 9x6 tour. Engine Companies shall inspect and repack on Tuesdays. Record the inspection on the Life Saving Rope Card (RP-100).
- 2.15 Inspection shall cover the entire length of the rope. Look for cut fibers, abrasion, rust, wetness or anything that might indicate possible degradation of the rope.
- 2.16 This inspection should not be conducted on the apparatus floor due to the possibility of the rope coming in contact with material that might be harmful to it. Since the apparatus floor is concrete, it is a prime means of causing abrasion to the life saving rope. Abrasion is one of the primary causes of a rope losing its strength.
- 2.17 When any doubt exists regarding the serviceability of a life saving rope it shall be placed out of service.

3. CONCLUSION

- 3.1 The 9/16" nylon life saving rope is stronger than any rope available today that will satisfy our needs. Given proper care and maintenance, it will provide us with a reliable life saving tool.

1. DESCRIPTION OF THE LIFE SAVING ROPE

1.1	F.D.N.Y. Designation	Life Saving Rope, Nylon
1.2	Material Used	Continuous filament of Nylon 707
1.3	Weight	14 ½ pounds
1.4	Diameter	9/16 inches
1.5	Length	150 feet

Note: Members should be aware that the actual length of our Life Saving Rope may be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

1.6	Capabilities:	Breaking strength, minimum 9000 lbs. Working load, 600 lbs. (See Section 4.1.4)
-----	---------------	--

The Life Saving Rope is stored in, carried in, and deployed from the Back Pack carrying case. See next section for the description of the Back Pack carrying case.

2. INTENDED USE

- 2.1 To lower a firefighter or another person from a roof or upper floor to a place of safety below.
- 2.2 To lower a firefighter from a roof or upper floor to enable him to remove another firefighter or person from an untenable position.
- 2.3 To allow a firefighter trapped in an untenable position to remove himself to safety by means of a single slide.

3. OPERATIONS

- 3.1 Number of turns required when using the Atlas Life Belt.
 - 3.1.1 Lowering of 1 person and/or use of the Single Slide 4 turns
 - 3.1.2 Lowering of 2 people 4 turns

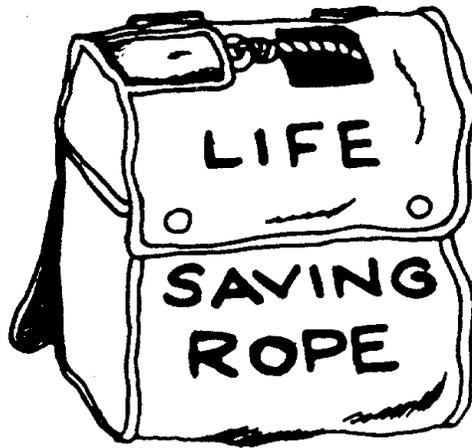
4. NOTES:

- 4.1 This life saving rope shall be used only for rescue operations. It shall not be used for drill purposes.
 - 4.1.1 If the life saving rope is subjected to the weight of two people, it shall be placed out of service and replaced.
 - 4.1.2 Immediately after a life saving rope has been subjected to the weight of one person the rope shall be carefully examined for any signs of damage or abrasions before being placed back in service. Proper journal entries shall be made by the company officer of the results of such examination. An entry shall also be made, in red, on the Life Saving Rope Record Card (RP-100). The officer, after supervising the examination of the rope, shall notify the Division of Safety by telephone of the incident. Ropes that are damaged or show signs of wear are to be put out of service and replaced.
 - 4.1.3 Deleted
 - 4.1.4 Nylon rope can lose from 10% to 15% of its strength when wet. This strength loss occurs when a rope is submerged in water at room temperature for twenty four hours. It regains its strength when it dries.
 - 4.1.5 Care shall be taken to avoid wetting the life saving rope. A wet rope shall be allowed to dry naturally before being repacked in the back pack carrying case.
 - 4.1.6 A history of every life saving rope shall be maintained on the Life Saving Rope Record Card.

1. DESCRIPTION OF THE CARRYING CASE FOR THE L.S.R.

1.1	F.D.N.Y. Designation	Carrying Case (Fig. 1)
1.2	Material Used.	Vinyl Reinforced Nylon with Nylon Webbing Straps
1.3	Weight	Approximately 1½ lbs.
1.4	Dimensions	14" x 14" x 6"
1.5	Color	White with Red Lettering

FIGURE 1



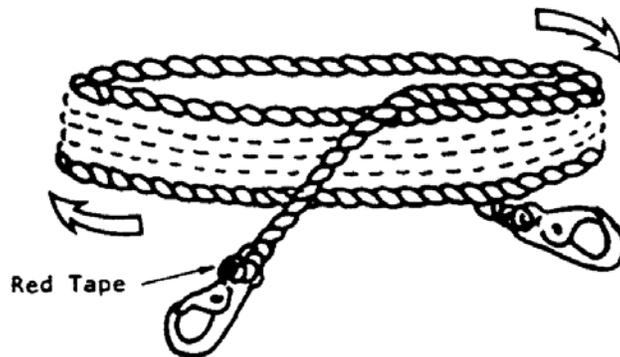
2. INTENDED USE

- 2.1 To store, carry and deploy the life saving rope, with the anti-chafing device attached.
- 2.2 This case provides for instantaneous use of the life saving rope in lowering and sliding operations by eliminating the need to flake out the rope before use.

3. PACKING OF THE LIFE SAVING ROPE IN THE BACK PACK CARRYING CASE

3.1 The entire rope is coiled **CLOCKWISE**. The diameter of the coil should be approximately 4 feet. (Fig. 2).

FIGURE 2

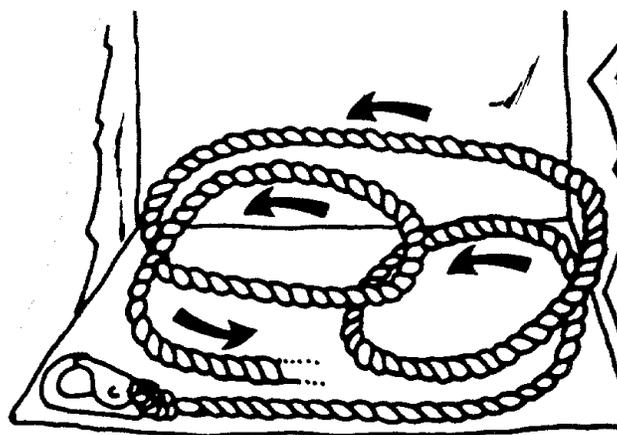


3.2 Stand the open carrying case on the floor, to the left of the coiled rope.

3.3 Place the hook of the life saving rope in the left front corner of the back pack carrying case. Move to the right, making a **COUNTERCLOCKWISE** circle just over one half the width of the bottom of the case. (Fig. 3).

3.4 Moving to the left, make another circle slightly overlapping the first circle. (Fig. 3).

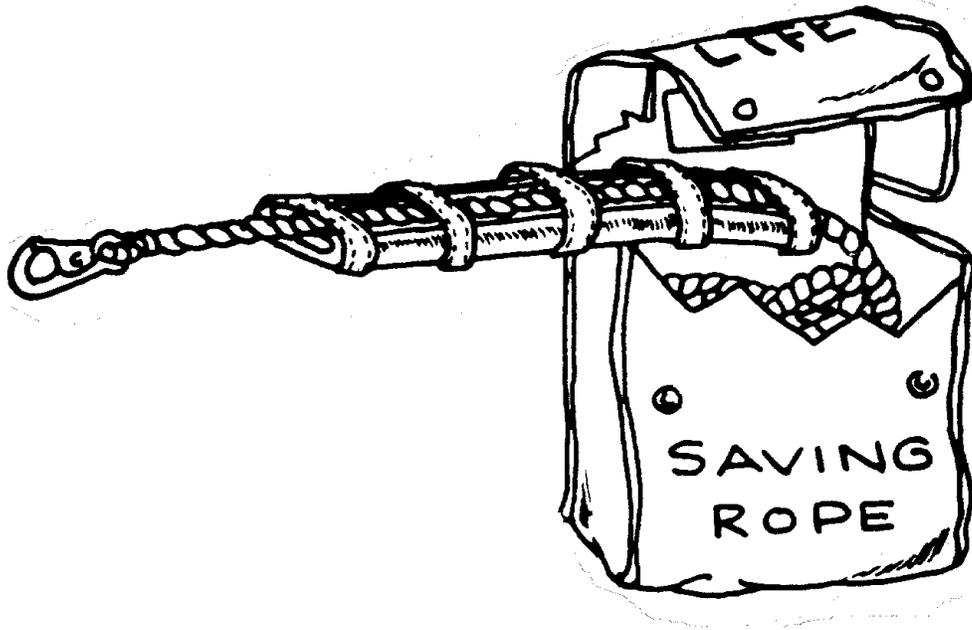
Figure 3



3.5 Continue in this manner until the entire rope is coiled in the case.

- 3.6 Remove 3 feet of rope from the carrying case and place the anti-chafing device on this section of the life saving rope. (Fig. 4).
- 3.7 Grasp the hook of the life saving rope and pull 1½ arms length of rope through the anti-chafing device. Tie a bowline on a bight on this section of the rope.

FIGURE 4



- 3.8 Move the anti-chafing device along the rope to the bowline-on-a-bight. (Fig. 5).

FIGURE 5

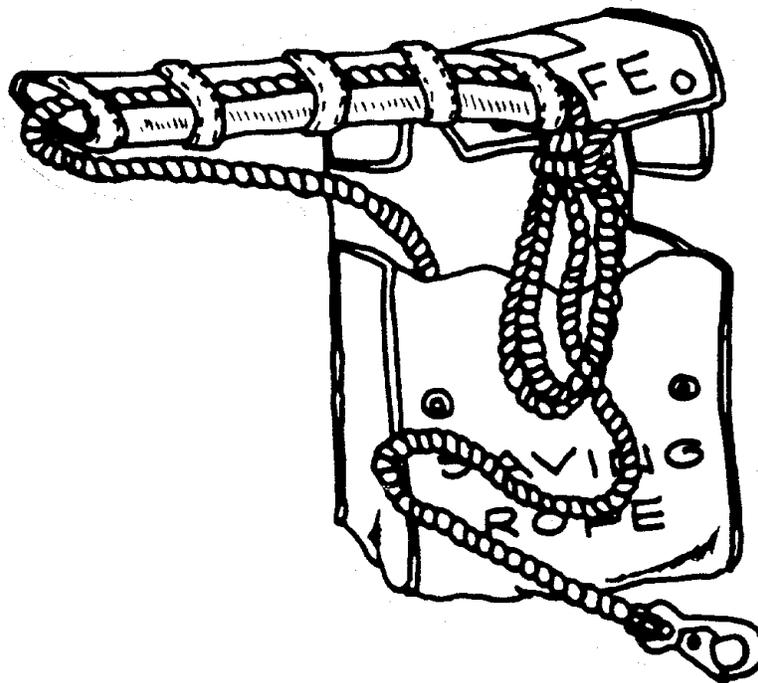
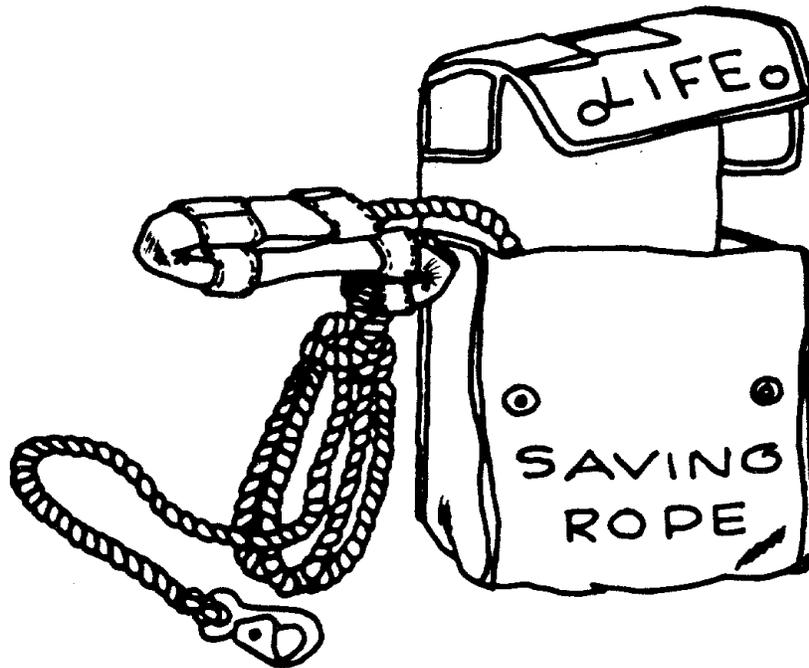


FIGURE 6



3.9 Fold the anti-chafing device as shown in Fig. 6, and place the bowline-on-a-bight and the anti-chafing device in the back pack carrying case as shown in Fig. 7.

FIGURE 7

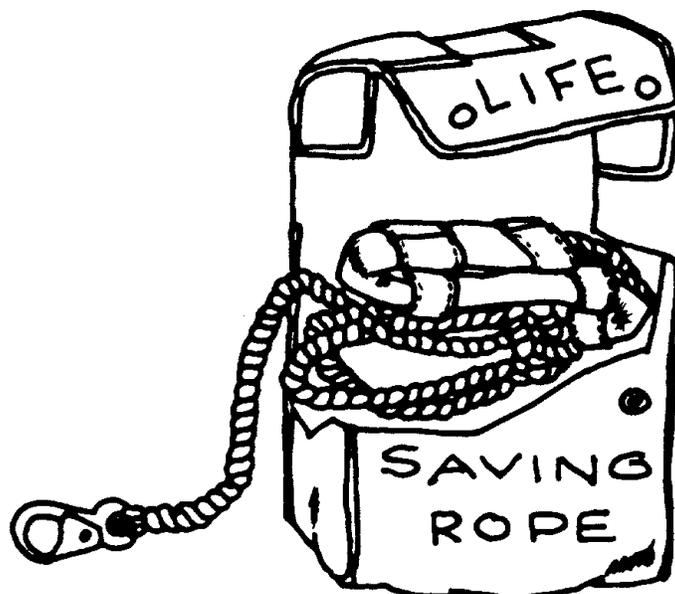
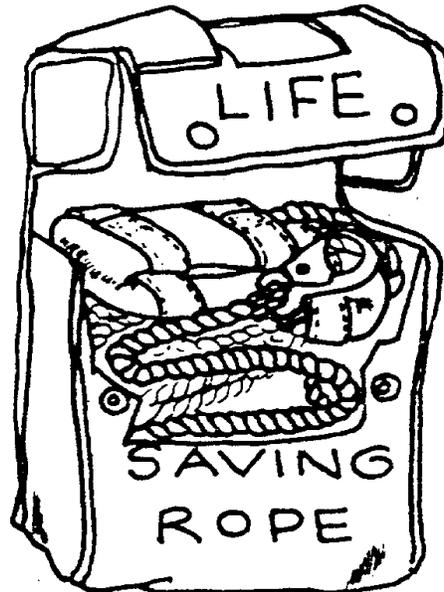
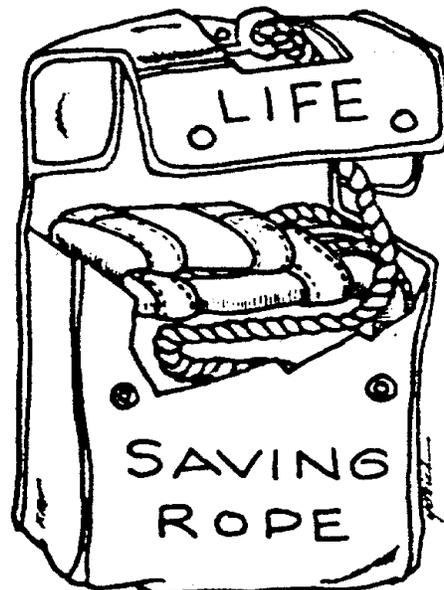


FIGURE 8



3.10 Carefully fold the remaining rope in front of the anti-chafing device. (Fig. 8)

FIGURE 9



3.11 While closing the flap of the carrying case, pass the hook of the life saving rope through the window of the flap and place it in the pocket on top of the flap of the back pack carrying case. (Fig. 9).

Anti-Chaffing Device

DESCRIPTION

4. F.D.N.Y. Designation Life Saving Rope Anti-Chafing Device
There are currently three types of Anti-Chafing devices that may be encountered in the field. All devices serve the same function and will afford protection when used with the Life-Saving rope. Anti-Chafing devices will be replaced through attrition.
- 4.1 Material Three ply canvas
- 4.2 Type 1 (Figure 1A)
- a. Size - 5" wide x 24" long.
 - b. There are four 2½" x 4" x 3/16" splints sewn between the bottom and middle layers of canvas to prevent movement of the device and to provide further protection for the life saving rope.
 - c. Five strips of webbing maintain the shape of the device and provide for easy examination for wear after each use.
- 4.2.1 Type 2 & 3 (Figure 1B & 1C)
- a. Size - 4" wide (when folded) x 24" long.
 - b. The full width of the device is 10 inches. There is a 1 inch strip of velcro sewn on to the long edges of the device. When the device is folded, the two pieces of Velcro come together creating a sleeve to provide a safety guide to protect the rope.
 - c. There is a rubber coating on the underside of Type 3 when folded.
- 4.2.2 The end of each device is flexible to permit overlapping at the roof edge. (Figure 2)

Figure 1

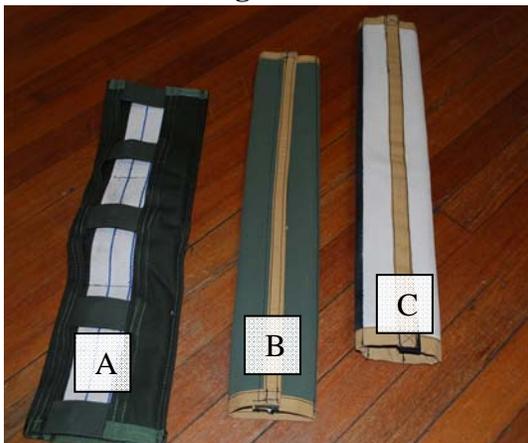


Figure 2



4.3 PLACING THE ANTI-CHAFING DEVICE ON THE LIFE SAVING ROPE

- 4.3.1 After the life saving rope has been packed in the carrying case, remove 3 feet of rope and pass the rope through the canvas sleeve from either end of the device. (Figure 3)

Figure 3



- 4.3.2 Grasp the hook of the life saving rope and pull 1½ arms length of rope through the anti-chafing device. Tie a bowline on a bight on this section of the rope, and place the rope and anti-chafing device in the carrying case as described in Section 3 of Rope 1 Data Sheet 1.

4.4 USE AND PLACEMENT

- 4.4.1 When used in a lowering or single slide operation, the anti-chafing device is placed so that the flexible end overlaps the roof or the parapet wall toward the street. (Figure 2)

4.5 CARE AND MAINTENANCE

- 4.5.1 Check the anti-chafing device for dryness and undue wear each time the life saving rope is repacked.
- 4.5.2 The anti-chafing device shall be air dried when necessary.
- 4.5.3 Immediate replacement for the anti-chafing device is imperative since the life saving rope cannot be used without it.

- 4.5.4 The life saving rope shall be completely repacked weekly. The rope shall be repacked from the opposite end each time. One hook shall be marked with red tape for identification. (Fig. 2).

Note: Do not replace the anti-chafing device until the entire rope has been packed in the carrying case. This will allow any twists in the rope to work themselves out during the packing procedure.

4.6 CARE AND MAINTENANCE

- 4.6.1 Each time the life saving rope is repacked, the back pack carrying case shall be checked for cleanliness and dryness.
- 4.6.2 The back pack carrying case can be cleaned by sponging with mild soap and water. It is essential that the back pack carrying case be thoroughly dry before repacking the life saving rope.
- 4.6.3 Replacement back pack carrying cases shall be requested from the Technical Services Division

5. DEPLOYMENT OF ROPE

- 5.1 For Single Slides (Do not unsnap the flap)

5.1.2 The snap hook, anti-chafing device and the bowline-on-a-bight are removed from the case through the window in the flap. Sufficient rope is pulled through the window before securing to a substantial object.

5.1.3 Follow procedures outlined in the Evolutions.

- 5.2 For Lowering a Member

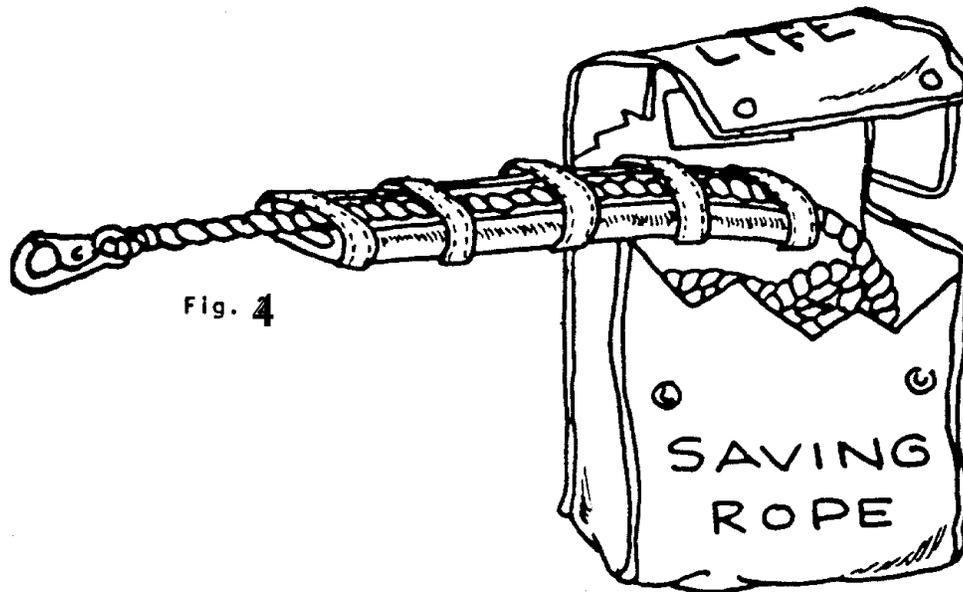
5.2.1 Unsnap the top flap, pull the snap hook back through the window, and remove the snap hook, anti-chafing device and bowline-on-a-bight from the case.

- 5.2.2 Follow procedures outlined in the Evolutions.

5.3 PLACING THE ANTI-CHAFING DEVICE ON THE LIFE SAVING ROPE

- 5.3.1 After the life saving rope has been packed in the back pack carrying case, remove 3 feet of rope and pass the rope between the canvas and the webbing from either end of the device (Fig. 4).

FIGURE 4



- 5.3.2 Grasp the hook of the life saving rope and pull 1½ arms length of rope through the anti-chafing device. Tie a bowline on a bight on this section of the rope, and place the rope and anti-chafing device in the back pack carrying case as described in the previous section.

5.4 USE AND PLACEMENT

- 5.4.1 When used in a lowering or single slide operation, the anti-chafing device is placed so that the flexible end overlaps the roof or the parapet wall toward the street (Fig. 1).

5.5 CARE AND MAINTENANCE

- 5.5.1 Check the anti-chafing device for dryness and undue wear each time the life saving rope is repacked.
- 5.5.2 The anti-chafing device shall be air dried when necessary.
- 5.5.3 Immediate replacement for the anti-chafing device is imperative since the life saving rope cannot be used without it.
- 5.5.4 Replacement anti-chafing devices shall be requested from the Technical Services Division.

SEARCH ROPE

1. INTRODUCTION

- 1.1 The search rope is to be used as a supervisory tool to maintain search team integrity under difficult circumstances. The failure to maintain search team integrity has led to serious injuries and fatalities to firefighters during operations. The search rope is also designed to provide members with finding a means of egress under heat and smoke conditions when searching for life or fire. The rope can also be used to assist in search, prevent duplication of areas searched and to locate units for assistance or relief.
- 1.2 Examples of when the search rope shall be deployed include, but are not limited to:
 - ◆ Large areas such as gymnasiums, ballrooms, convention centers, etc.
 - ◆ Complex areas such as schools, banks, office areas, commercial/industrial buildings, etc.
 - ◆ Below grade areas e.g., subways, tunnels, basements, cellars.
 - ◆ Areas where maze like conditions may be encountered.

Note: *Search rope shall be deployed in the above locations even in light to moderate heat and smoke conditions since conditions can deteriorate rapidly.*

2. DESCRIPTION

- 2.1 The Search Rope is made of a 7.5 mm diameter Kernmantle design. The rope is 200 feet long with a double-action snap hook at the working end and a single-action snap hook at the opposite end that secures the rope to the bottom of the bag. This will help to repack the rope in the correct direction.
- 2.2 The rope is packed in a yellow carrying bag marked with the company number.
- 2.3 Each search rope will have a company I.D. tag attached to the rope and to the bag. (Figure 1)



Figure 1



Figure 2

- 2.4 The adjustable carrying strap on the bag has been designed to keep the bag parallel to the ground. It allows the rope to pay out of the bag smoothly and helps the officer and members stay in constant contact with the rope. (Figure 2)

3. DIRECTIONAL / DISTANCE MARKERS

- 3.1 The search rope uses a series of plastic markers to identify both direction and distance.
- 3.2 The markers are a cone shaped high strength plastic material, and are approximately 1 ½" long. Their width is tapered from 1" to ½". The tapered cone shape is designed to provide members with the ability to determine which direction they are proceeding (Into or Out of the IDLH) while operating with a gloved hand. The narrow ½" end of the cone clearly identifies the direction of egress OUT of the IDLH. (Figure 3)

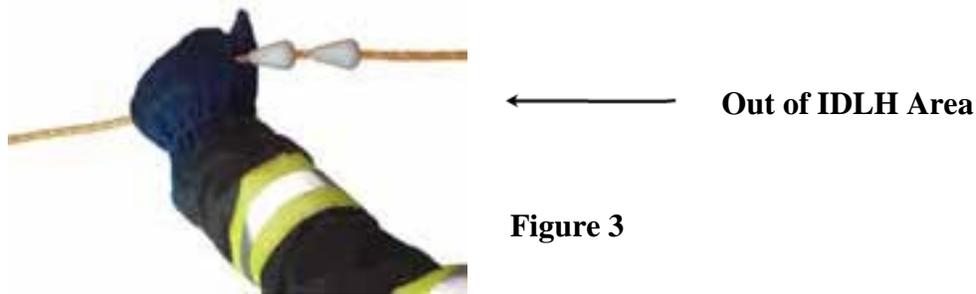


Figure 3

- 3.3 The distance between each set of directional/distance markers is 25 feet.
- 3.4 A single marker is set at 25 feet, two markers set at 50 feet, three markers set at 75 feet, four markers set at 100 feet, five markers set at 125 feet, six markers set at 150 feet and the last set of seven markers for 175 feet. (Figure 4)

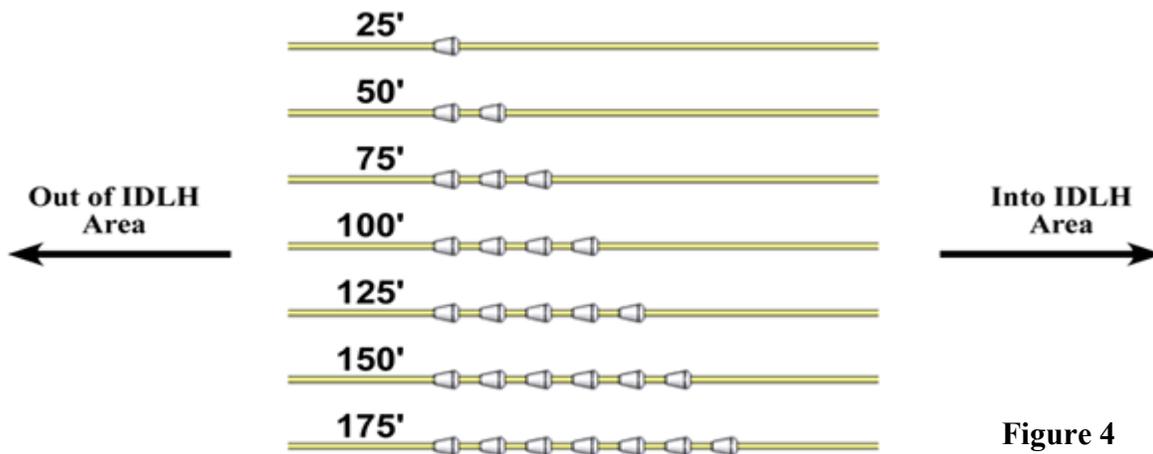


Figure 4

4. ADVANTAGES OF SEARCH ROPE DEPLOYMENT

- 4.1 Deployment of the search rope will allow the ladder company to begin a search of the immediate fire area more rapidly and assist the engine company in reaching the fire location.
- 4.2 Assists in searching more efficiently and safely for fire and/or victims in an Immediately Dangerous to Life and Health (IDLH) atmosphere.
- 4.3 Provides a point of reference to guide members in and out of an area.
- 4.4 Allows the FAST Unit to approximate the location of a member in distress.
- 4.5 Allows support members to quickly locate searching members needing assistance with difficult removals, additional tools or equipment, etc.

5. DEPLOYMENT

- 5.1 When a unit deploys the search rope they must notify the Incident Commander (IC) or Sector/Group Supervisor.
- 5.2 Pay out the working end of the rope through the round hole in the flap of the carrying bag.

- 5.3 Secure the double-action snap hook to a substantial non-movable object in a clear, safe environment (floor below fire, enclosed staircase, objects on sidewalk such as lampposts, mailboxes, street signs, etc). Remember an area that is clear at the beginning of an operation may not be clear when you return.
- 5.4 The bag is designed to be worn over the shoulder but may be carried in one hand.
- 5.5 The officer controlling the search pays out the rope while keeping it taut, maintaining a handhold on the rope or bag at all times.
- 5.6 The rope should be tied off at intervals to help keep it taut and off the floor. The rope shall be maintained approximately one to two feet above ground. This will keep it out of water and make the rope easier to find. When changing direction or grade, the rope shall be tied off. This allows the member to traverse the same ground when exiting.
- 5.7 Voice contact (without HT use) shall be maintained with all search team members.
- 5.8 If more than 200 feet of rope is needed, attach the double-action snap hook of a second search rope to the single-action snap hook of the first rope.
- 5.9 If a team's search is interrupted (e.g., low air, victim removal), tie off the line and leave the bag with the remainder of the rope. Another unit can continue the search using this rope.
- 5.10 If there is nothing to tie off to, take a few wraps around the bag with the rope and leave in place.

Note: *Amount of search rope deployed may not be an indication of member's location in a building. Due to the numerous turns and obstacles that may be encountered during a search, distance/directional markers may only indicate amount of rope deployed and not actual distance or location in a building. Example: in a maze-like layout, members may have deployed 100' of search rope and actually traveled only 30' from the point of deployment.*

6. OFFICER

- 6.1 The officer is responsible to coordinate the search.
- 6.2 The officer is responsible for overall search operations including but not limited to, informing members of search objective (searching for fire or life), special hazards, control, deployment and communications.

7. Operational Considerations

- ◆ Maintain the rope taut.
- ◆ Keep track of firefighters' locations.
- ◆ Use the Thermal Imaging Camera to account for and direct members during their search.
- ◆ Use the Thermal Imaging Camera to monitor fire conditions.
- ◆ Refrain from searching in areas distant from the search rope.

8. THE SEARCH TEAM

- 8.1 Under most conditions, the number of members assigned to the search rope team should be limited to three.

- 8.2 A unit (other than 1st alarm) receiving orders to search an area requiring a search rope shall maintain unit integrity and will perform this function with all members.
- ◆ The officer and two firefighters will operate as the first search team.
 - ◆ The remaining members shall remain at the tie off point to:
 - a. Standby as the back up team.
 - b. Monitor search team progress.
 - c. Monitor handie-talkie transmissions and when necessary relay any messages to or from the search team with the IC or Sector/Group Supervisor.
 - d. Monitor fire conditions and notify the search team of any changing conditions affecting their operation.
 - e. Be ready to assist the search team with recoveries or needed tools/equipment.
 - f. Monitor the team's on-air time.

9. RELIEF COMPANY

- 9.1 The relieving company should communicate directly with the initial search team regarding any hazards that the relief team may encounter and provide information on areas already searched.
- 9.2 If it becomes necessary to relieve a unit at a forward point of the search, the relieving company should enter the area to be searched with their right hand in contact with the rope (if possible). The company being relieved should exit the IDLH with their right hand in contact with the rope (if possible.) In this manner, companies entering and leaving the area will all be on opposite sides of the rope and will not interfere with one another.
- 9.3 Members relieving a company on a search rope must communicate with each other about the areas already searched to eliminate duplication of effort and to ensure areas that have not yet been covered are subsequently searched.
- 9.4 The company being relieved must (if possible) tie off the search rope and leave the bag at the point where the search was discontinued. The relief company should continue the search from the point where the bag was left.
- 9.5 Officers shall account for all members of their unit outside the IDLH when they have been relieved or have completed their assignment.

10. TACTICAL CONSIDERATIONS

- 10.1 Members must realize that search tactics will differ greatly when using the search rope, as opposed to searching without the rope.
- 10.2 When searching in maze like conditions or large open areas, there is a greater chance for members to become disoriented, separated and lost if the search rope is not used. There usually is not a means of egress in close proximity.
- 10.3 When using the search rope, a slower, more cautious and deliberate approach should be employed with emphasis on maintaining the safety and integrity of the search team.

- 10.4 When searching off the rope, members should advise the officer of the area searched, a description of the area searched, and results of search. This will help members visualize the area. The officer shall relay the results of the search to the IC or Sector/Group Supervisor.
- 10.5 Communications is the key to a good search. It is the responsibility of the search officer to maintain verbal contact (without HT use) with the searching members.
- 10.6 Companies conducting the search should utilize the fundamentals found in the Training Bulletin Search and other FDNY bulletins.

11. RESTRICTIONS

- 11.1 The Search Rope is to be used ONLY for search or guide purposes, not for lifting or lowering.
- 11.2 Members must be aware that if the rope is tied off at different locations, the length of distance traveled may be less than shown by the distance/directional markers.

12. TRAINING AND MAINTENANCE

- 12.1 Inspect the rope after each use.
- 12.2 Repack and inspect quarterly.
- 12.3 Companies shall conduct frequent drills using the rope. Various building configurations should be utilized if possible. Company Commanders shall develop a schedule for training, inspecting and repacking the search rope.
- 12.4 When the Search Rope becomes contaminated from fireground contaminants, the Search Rope shall be decontaminated in quarters using a sponge and water. A mild detergent may be used if necessary.

13. PACKING THE ROPE

- 13.1 Ensure the rope is dry before packing.
- 13.2 Lay the rope out on a clean dry surface, removing all kinks and coil clockwise beginning with the end of the rope that has the double-action snap hook.
- 13.3 Secure the single-action snap hook at the end of the rope to the “D” ring in the bottom of the bag. This “D” ring alerts the member when they are at the end of rope and prevents loss of contact with the rope.
- 13.4 Coil the rope into the case counterclockwise. Occasionally, press the coils down with on hand to prevent one coil from falling below the coil underneath. This keeps the rope from becoming knotted when deployed.
- 13.5 Pass the double-action hook through the hole in the cover and secure the cover closed. Pass nylon tab through the double-action hook and snap the nylon tab to the side of the bag. (Figure 5)



Figure 5

ATLAS NYLON LIFE BELT WITH RAPPEL HOOK & TRIPLE ACTION GATE

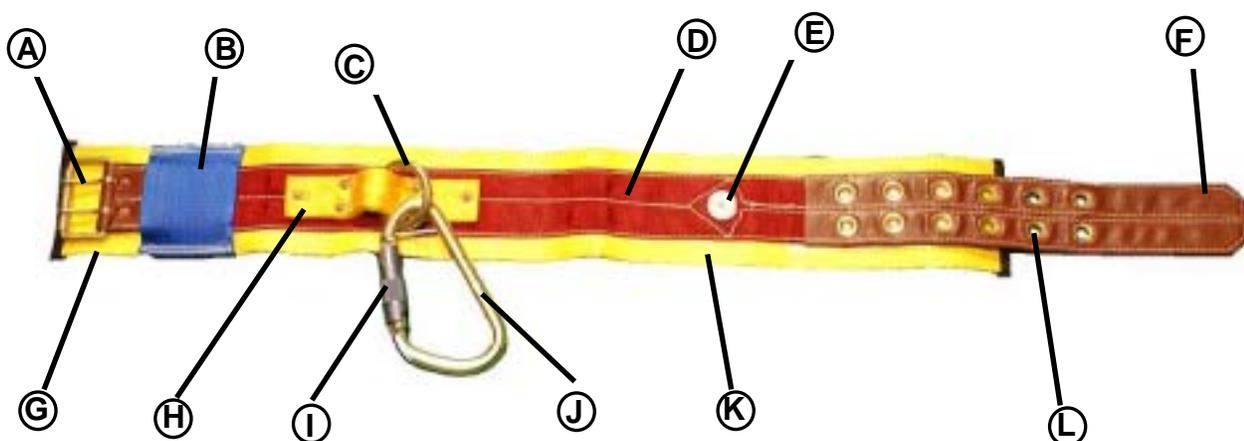
1. DESCRIPTION

1.1	F.D.N.Y. Designation	Atlas Nylon Life Belt
1.2	Weight	7 pounds
1.3	Sizes	A. Small, 34 – 44 B. Large, 42 – 54 C. X-Large, 46 – 58

2. COMPONENTS

(A)	BUCKLE	(G)	BUCKLE TONGUE
(B)	ENLARGED BILLET LOOP	(H)	HANDLE
(C)	"O" RING	(I)	TRIPLE ACTION GATE
(D)	WAIST STRAP	(J)	RAPPEL HOOK
(E)	I.D. #	(K)	BODY PAD
(F)	BILLET	(L)	GROMMETS

Figure 1



2. INTENDED USE

- 2.1 It shall be worn by the member lowering a firefighter or another person from a roof or upper floor to a place of safety. The bowline on a bight and the slippery hitch shall be tied on the individual being lowered.
- 2.2 It shall be worn by the member lowering another firefighter for a rescue pick-up using the knots described in 2.1 above.
- 2.3 It shall be worn by firefighters removing themselves from an untenable position by means of a single slide.
- 2.4 It shall be worn by members during portable and aerial ladder operations as directed.

Note: The life belt shall not be used to make a rescue pick-up via a single slide.

3. OPERATION

- 3.1 The life belt hook has a gate and a gate lock.
 - 3.1.1 To open the gate, pull the triple action gate downward, then rotate the gate a quarter turn to the left. (Figure 2)

Figure 2



- 3.1.2 The gate is squeezed and held open with the right hand while applying four (4) turns of rope onto the hook. (Figure 3)

Figure 3

The Gate is Squeezed and Held Open with the Right Hand



- 3.2 After applying four turns of rope around the hook, the gate closes automatically after its release. (Figure 4)

Figure 4



- 3.3 During use, the turns of rope must play out on the solid side of the hook and not the gated side.

- 3.4 Do not touch the hook with the bare hand after use, because considerable heat is generated from friction.
- 3.5 In all life saving rope operations, four (4) turns of rope are made around the solid part of the hook.
- 3.6 The life belt shall be stored with the life saving rope.

4. IDENTIFICATION:

- 4.1 Attached to the nylon belt is a metal tag with a three digit identification number.
- 4.2 Do not stamp any identification markings into the metal parts of the belt.
- 4.3 All units are issued a large belt. Additional sizes (small or X-large) may be obtained by forwarding a letterhead report stating the reason to R & D.
- 4.4 If the belt does not fit, replace it with the proper size. Do not alter the belt.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

THE PERSONAL HARNESS

1. INTRODUCTION

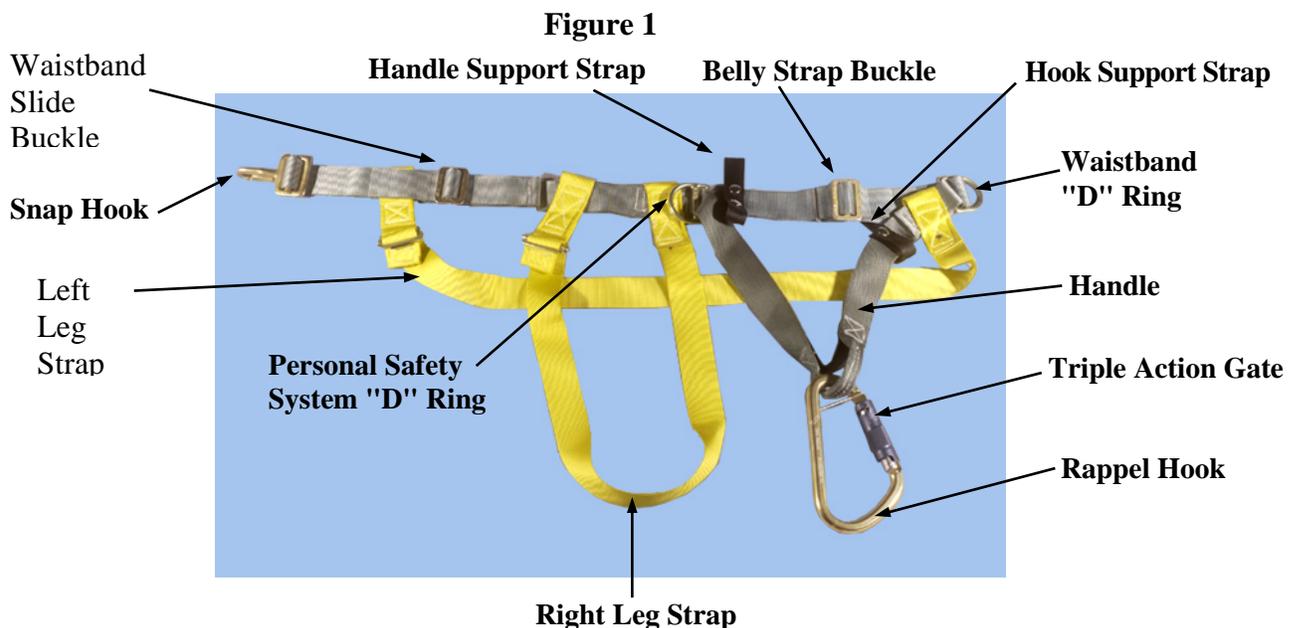
- 1.1 The personal harness will provide members with a quick and safe means for life saving rope rescues and emergency escapes as well as a safety belt for attachment to a tower, aerial or portable ladder.

Caution: It is extremely important that the Life Saving Rope turns be wrapped around the rappel hook in the proper manner. Training in the use of the personal harness is imperative. Do not slide during rope training without the use of the protective landing mat. The harness must always be attached to the bunker pants.

Note: Members MUST attach the harness snap hook to the waistband "D" ring EVERYTIME they don their bunker pants.

2. DESCRIPTION

- 2.1 The personal harness is made of nylon webbing and has a minimum breaking strength of 6,000 pounds. The harness comes in three sizes (Small, Medium, and Extra Large) and is adjustable to fit the various size requirements of individual firefighters. Each harness has a unique I.D. number stamped onto a metal tag permanently attached on the inside of the left leg strap. Small harnesses have a small 's' at the end of the serial number, and Extra Large harnesses have a small 'x' at the end of the serial number.



- 2.2 The rappel hook has a gate with a triple action lock.
- 2.2.1 Members must ensure the gate is in the closed and locked position prior to performing a slide or lowering operation. To check that the gate is locked, apply lateral pressure on the gate with left hand.
- 2.2.2 The rappel hook is positioned at the center of the waistband while in the stored position. The rappel hook and harness handle are held in the stored position by two straps: a hook support strap and a handle support strap. The handle support strap holds the harness handle to the waistband and the hook support strap holds the rappel hook in a position to the left side of the harness handle. See Figure 2

Figure 2



- 2.3 A "D" ring is incorporated to the right side of the harness handle (P.S.S. "D" ring) to provide a connection point to the Personal Safety System. The Personal Safety System "D" ring is permanently attached to the harness and a carabiner is used to connect the EXO descender to the "D" ring. The carabiner is used with the "D" ring so that a firefighter can easily detach from the system once an area of refuge has been reached. The storage bag holding the EXO descender, rope, and anchor hook is attached on the right side of the personal harness.

3. PRINCIPLES OF DONNING AND OPERATION

3.1 Waist Harness.

- 3.1.1 The proper position for the waistband of the harness is across the upper level of the hip as shown in Figure 2A.

Figure 2A



Proper Waistband Level

- 3.1.2 The waistband must fit snugly to prevent the harness from riding up to the area above the hip where there is no bone structure to support the weight of the body on the harness.
- 3.1.3 The waist strap has two adjustable slide buckles (Figure 3):
- a belly strap slide buckle to center the rappel hook and,
 - a waistband slide buckle for proper fit around the waist.

Figure 3



- 3.2 It is imperative that the harness be properly adjusted to prevent a member from inverting when using the Personal Safety System or rappel hook. Follow the steps below to insure that the harness is properly adjusted:
- 3.2.1 Lay out the harness with the waistband "D" ring to the left. Grasp the waistband "D" ring with the left hand, palm down.
- 3.2.2 With right hand, palm down, grasp the waistband at the midpoint between the right leg strap attachments. The remainder of the harness will hang free from the right hand.
- 3.2.3 Position the "D" ring at the member's left side. Align the vertical section of the "D" ring with the vertical seam of the bunker pants as shown in Figure 4A.

Figure 4A (Correct)

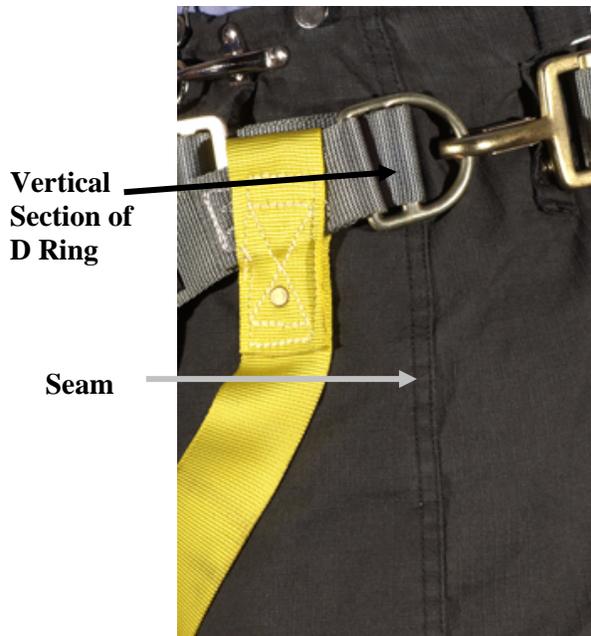
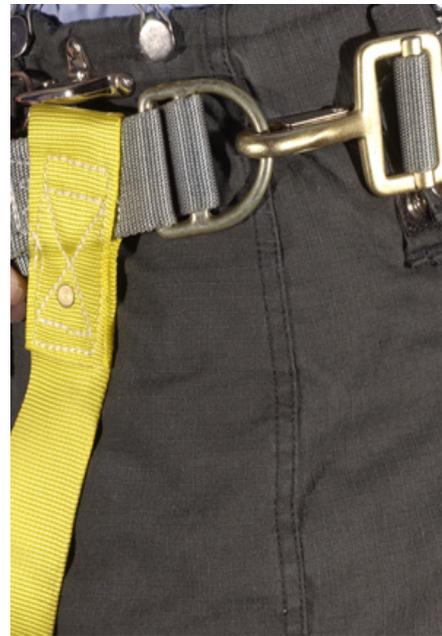
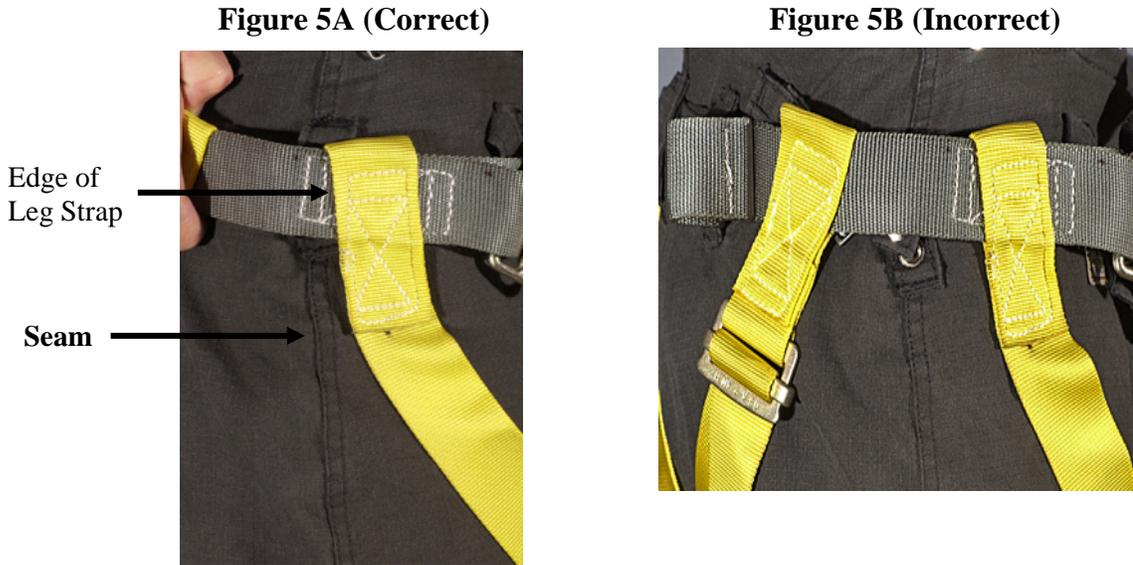


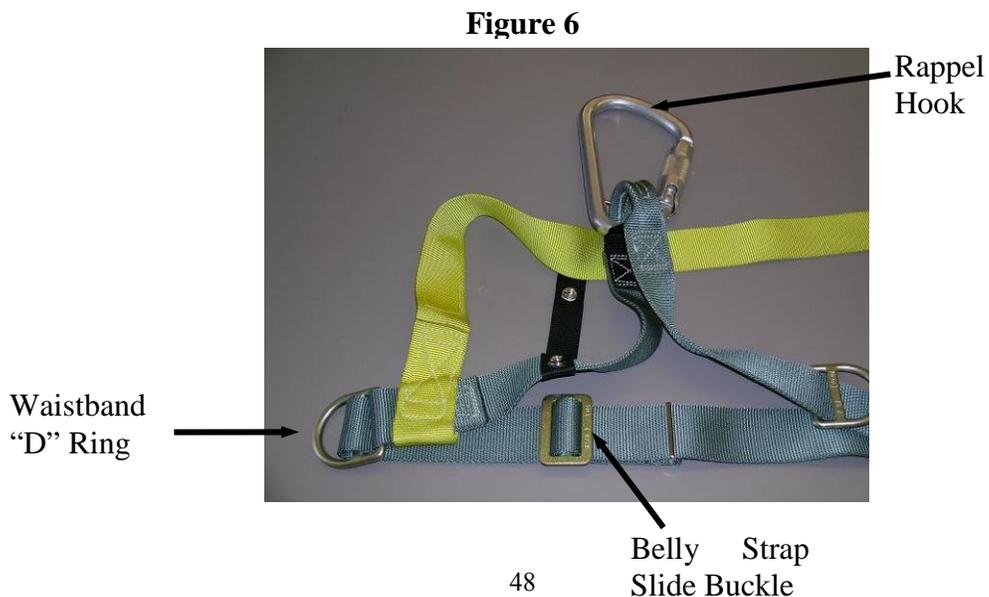
Figure 4B (Incorrect)



- 3.2.4 With the right hand, pull the waistband taut.
- 3.2.5 The right leg strap attachment must line up over the stitched seam of the bunker pants on the members right side as shown in Figure 5A.



- 3.2.6 When the waistband "D" ring and the right leg strap attachments do not align as described above, adjustment must be made as follows:
 - A. Lay the harness on a flat surface with the waistband "D" ring to the left (see Figure 6).
 - B. Lengthen or shorten the belly strap by feeding the upper layer of webbing through the belly slide buckle in the desired direction to align the waistband "D" Ring as shown in Figure 4A.
 - C. Recheck harness and repeat until the "D" ring and right leg strap align properly as shown in Figures 4A and 5A.



- 3.3 To complete the adjustment:
- A. Loosen leg straps.
 - B. Again, grasp the waistband "D" ring with the left hand palm down.
 - C. Grasp the snap hook with the right hand palm down.
- 3.4 The harness is now extended in front of the member and the right foot is placed over and into both leg straps (Yellow in color), as shown in Figure 7.

Figure 7



- 3.5 Pull the waistband upward on the outside of the right leg. The leg straps will be pulled up on the inside of the legs toward the crotch.
- 3.6 Bring the snap hook behind your back to your left side and attach the snap hook to the waistband "D" ring.

Note: Snap hook and waistband "D" ring will be on left side of body.

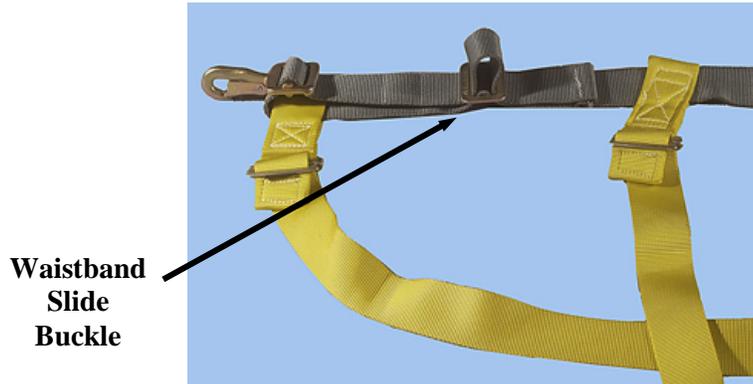
- 3.6.1 A proper fit of the waistband requires a slight degree of effort to connect the waistband "D" ring and snap hook.

Note: The belly strap slide buckle is used only to ensure the proper position of the harness handle and rappel hook.

The rear waistband slide buckle is used to insure a snug fit.

- 3.7 When the adjustment of the waist band is necessary to ensure a snug fit, lay the harness on a flat surface with the snap hook to the left (see Figure 8).
- 3.7.1 Lengthen or shorten the waistband by feeding the upper layer of webbing through the waistband slide buckle in the desired direction.
 - 3.7.2 Recheck harness and adjust until proper fit is obtained.

Figure 8



- 3.8 The leg straps should remain loose for a comfortable fit while the harness is worn prior to rappelling or lowering operations.
- 3.9 Prior to sliding operations, the leg straps must be made snug by reaching back and pulling down on the webbing of each leg strap until the tension of the straps are evenly distributed. Don't over-tighten the leg straps! If the leg straps are over-tightened, the waistband may be pulled down from its proper position.
- 3.10 When operations dictate the use of the rappel hook, the rappel hook support strap and the handle support strap shall be released and the rappel hook will deploy to the center of the harness handle. **In a situation that dictates the use of the Personal Safety System, only the handle support strap should be released.** The Personal Safety System will slide on the "D" ring to the center of the harness handle. The rappel hook support strap will keep the rappel hook from interfering with the operations of the Personal Safety System.
- 3.11 Operation of rappel hook gate with triple action lock.
- 3.11.1 Hold solid part of rappel hook in right hand (Figure 9). With left hand, pull down gate and take ¼ turn to left and push gate toward solid part of rappel hook in right hand. (See Figures 9, 9A, 9B, 9C)

Figure 9



Figure 9A



Pull Down

Figure 9B



One Quarter Turn To Left

Figure 9C



Push Gate Towards Solid Part of Hook

3.11.2 Rope is always applied by taking turns under and over the rappel hook away from the rappel hook and away from the body.

3.11.3 To close and lock gate, release from right hand. To ensure that the gate is closed and locked, apply lateral pressure with left hand.

4. INSPECTION

- 4.1 Harness shall be inspected by the member at the start of each tour, and after each use.
- 4.2 Inspect entire harness for cuts, abrasions, discoloration and loose or damaged stitching.
- 4.3 Check operation of rappel hook gate and triple action lock.
- 4.4 If any abnormality of harness or rappel hook exists place it out of service.
- 4.5 If persistent or unknown stains are discovered place the harness out of service.

- 4.6 **Do not** repair or modify the personal harness or rappel hook.
- 4.7 Whenever a personal harness is subjected to an impact load it shall be placed out of service. A member free falling three feet or more is considered a sufficient impact load to warrant placing the personal harness out of service.
- 4.8 When doubt exists regarding the serviceability of a personal harness, it shall be placed out of service.

5. MAINTENANCE

- 5.1 When the harness is wet, lay it out to air dry.
 - A. **Do not** lay it in sunlight.
 - B. Avoid placing nylon webbing in contact with metal as this may cause rust stains.
 - C. When it is dry, re-inspect the harness.
- 5.2 Lubrication is not necessary for rappel hook gate.
- 5.3 Remove dirt with sponge and water. A mild detergent may be used if necessary.
- 5.4 Decontaminating
 - 5.4.1 Personal harness may be spot cleaned following the procedures of CFR-D manual Chapter 3, Section 15.
 - 5.4.2 When a personal harness becomes grossly contaminated, it shall be placed out of service.

6. ACCOUNTABILITY

- 6.1 Maintenance of the harness is the responsibility of the member to whom it is issued.
- 6.2 The Company Commander must record the ID number of the harness with the name of the member to whom it is issued in the office record journal.
 - 6.2.1 The member is responsible for inscribing his or her name with an indelible marker on the inside of the harness belly strap.
- 6.3 The harness shall be issued to all members up to and including the rank of Battalion Chief. Upon promotion to Deputy Chief the harness is to be returned to the Research and Development Unit.
- 6.4 Upon retirement or termination of service of any member, the harness must be returned to the Research and Development Unit.
- 6.5 A lost property report (FS-112) is required for lost equipment.

LOWER A MEMBER VIA LIFE SAVING ROPE
AND LIFE BELT

1. EQUIPMENT:

- 1.1 One nylon life saving rope with attached anti-chafing device in a back pack carrying case.
- 1.2 One life belt.

2. OBJECTIVE:

- 2.1 To lower a Firefighter or another person from a roof or upper floor to a position of safety.
- 2.2 To lower a Firefighter from a roof or upper floor to enable the Firefighter to remove another person from an untenable position to one of safety.

3. PREPARATION FOR LOWERING

(This section applies to operations on roofs WITH or WITHOUT parapets)

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

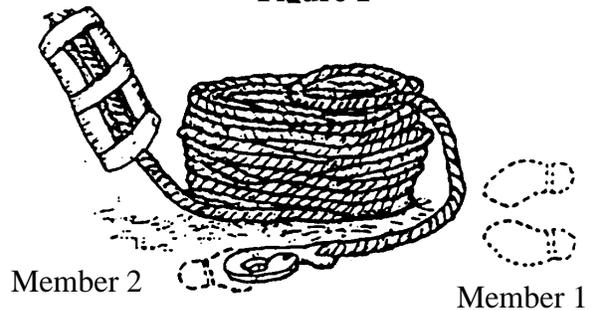
- 3.1 Don the life belt with the hook on the right side.
- 3.2 Facing the roof's edge, place the carrying case on the roof with the snaps facing the substantial object. The case must be placed midway between the roof's edge and a substantial object.
- 3.3 Facing the front of the case, open the top flap. Hand Member #2 the pre-tied bowline-on-a-bight. Allow the anti-chafing device to slide along the rope.
- 3.4 With both hands, grasp the sides of the case and hold the flap against the back of the case with your fingers.

Member # 1 (Lowering Member)

- 3.5 Invert the carrying case and lift it clear of the rope. Place the empty case to the side, clear of the operation.
- 3.6 Grasp the snap hook from the top of the coil and place it on the roof to the left, adjacent to the coiled rope. (Fig. 1)

Member # 2 (Member to be Lowered)

Figure 1



- 3.8 Pay out rope from the top of the coil to the substantial object and tie a clove hitch and binder on the taut part of the rope. (Fig. 2 and 3)

- 3.7 Maintain position of the hook adjacent to the coiled rope by placing one foot on the snap hook, as Member #1 pays out additional rope to the substantial object. (Fig. 2)

Figure 2



Figure 3



Member # 1 (Lowering Member)

- 3.9 Return to the coiled rope and pick up the snap hook that was maintained by member #2 and attach it hook down behind the pin on the solid side of the hook.
(Fig. 4). Snap portion of hook should face down.

Member # 2 (Member to be Lowered)



Figure 4

- 3.11 Tie the slippery hitch in the prescribed manner on Member #2 and slide the anti-chafing device up to the completed slippery hitch.
- 3.12 Walk toward the lowering point to remove all slack in the rope between the substantial object and yourself.
- 3.10 Step into the leg loops and hold the knot snugly against your stomach to assist Member #1 in tying the slippery hitch.
- 3.13 Hold the anti-chafing device in the right hand.

Figure 6A



Figure 6B

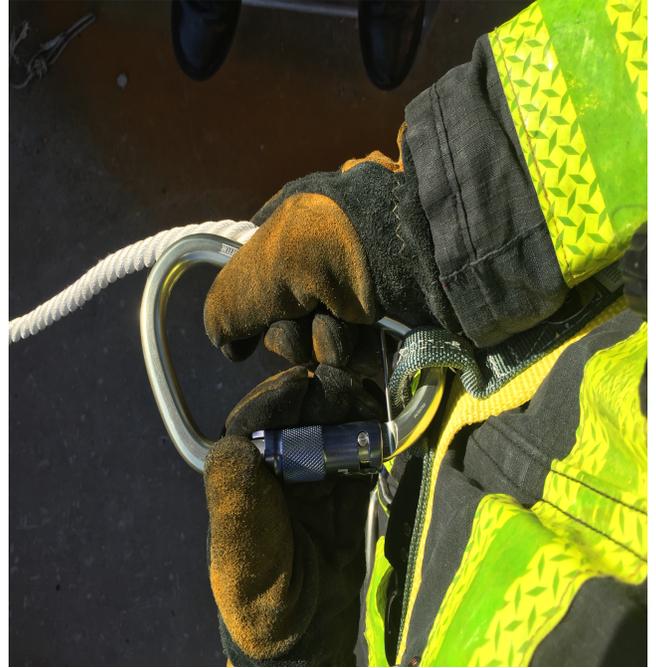


Figure 6C



Figure 6D



Member # 1 (Lowering Member)

- 3.14 Using the left hand, make four (4) turns under and over the life belt hook, with the rope leading to Member #2. (Fig. 7A).
- 3.15 Release the gate. Gate will close automatically. (Fig. 7B).
- 3.16 Push gate into notched portion of the gate (Fig. 7C). This completes locking the system.
- 3.17 Holding the life belt hook with the left hand, PALM DOWN, slide the right hand back along the rope to the right buttock (Fig. 7D). Allow enough rope to pay out through the right hand and through the life belt hook to permit Member #2 to approach parapet or roof's edge. At the same time, Member #1 moves forward as far as possible to take slack out of the rope between substantial object knot and snap hook on "O" ring. Member #1 now takes boxer stance for balance and comfort.

Figure 7A

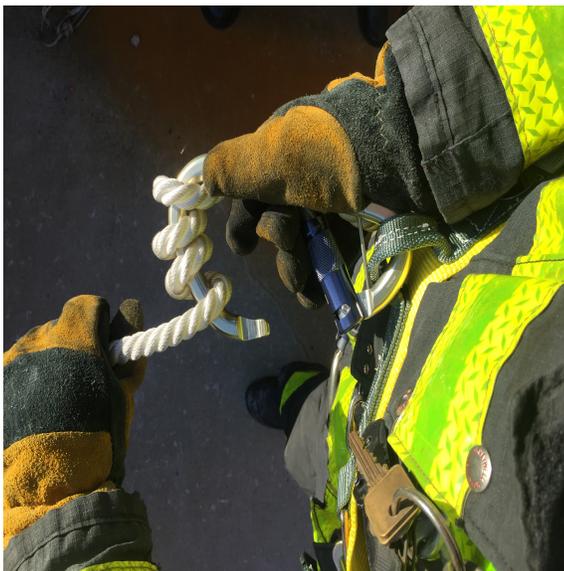


Figure 7B

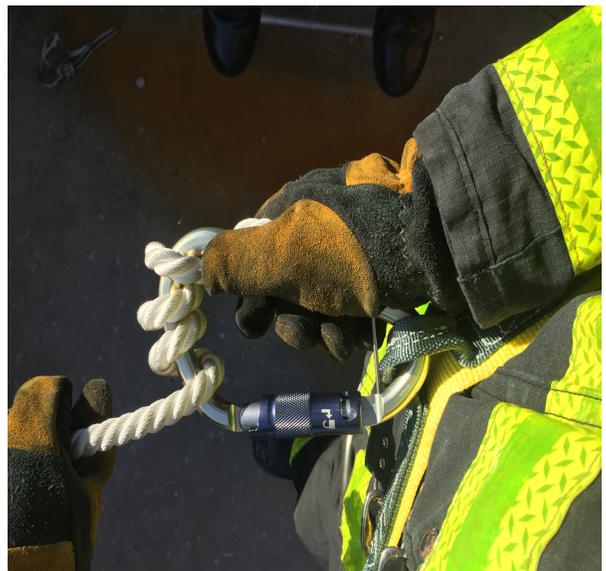


Figure 7C



Figure 7D



4. LOWERING OPERATION FROM A BUILDING WITH A PARAPET.

Member # 1 (Lowering Member)

- 4.3 Still holding the life belt hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at the right buttock. Give the command "DISMOUNT" to Member #2 to dismount the parapet (See Fig. 7E).

Member # 2 (Member to be Lowered)

- 4.1 Holding the anti-chafing device in the left hand, turn to the right and straddle the parapet with the right leg to the outside.
- 4.2 Allow enough slack in the rope to place the anti-chafing device flat on the parapet with approximately 5" of the device draped over the outer edge.

Figure 7E



Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

Figure 8



4.4 Both gloved hands grip the inner edge of the parapet with a hand on either side of the anti- chafing device. (Fig. 8).

Note: To maintain the position of the anti- chafing device, place the thumb of the right hand on top of the device while the fingers grasp the inner edge of the parapet.

4.5 Slide the buttocks to the outer edge of the parapet until the left knee is at the inner edge of the parapet and make sure that the rope is in the channel of the anti- chafing device.

4.6 Roll off the parapet into a vertical position and place feet approximately 12” apart against the wall, toes up, and give the command "DOWN" to be lowered.

4.7 At the command “DOWN”, lower member #2. Control the rope as it slides through your gloved right hand.

This completes the section on the lowering operation from a building WITH A PARAPET.

5. LOWERING OPERATION FROM A BUILDING WITHOUT A PARAPET

Member # 1 (Lowering Member)

Note: The instructions of Sections 3.1 through 3.20 and Section 4.7 apply here

(Sections 4.1 to 4.6 are for parapet operations and do not apply.)

Member # 2 (Member to be Lowered)

- 5.1 Holding the anti-chafing device in the left hand, walk to the roof's edge and sit with the legs over the edge, the rope and anti- chafing device to the left. (Fig. 9A).
- 5.2 Allowing enough slack in the rope, place the anti- chafing device flat on the roof's edge with approximately 5" of the device draped over the edge of the roof. (Fig. 9B).

Figure 9A



Figure 9B



Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

- 5.3 Still holding the life belt hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at the right buttock. Give the command "DISMOUNT" to member #2 to dismount the roof (See Fig. 7E).

Figure 9C



- 5.4 Place the left hand between the anti-chafing device and your left leg. Using the hand as a pivot, roll the body to the left, into a pushup position and make sure that the rope is in the channel of the anti- chafing device. (Fig. 9C).
- 5.5 Lower the body into a vertical position (Fig. 9D).

Note: As a vertical position is attained, the slack in the rope between the slippery hitch and the anti- chafing device will cause the member to drop slightly until the slack is eliminated.

Figure 9D



- 5.6 Place feet approximately 12" apart against the wall, toes up, and give the command "DOWN" to be lowered.
- 5.7 At the command "DOWN", lower Member #2. Control the rope as it slides through your gloved right hand.

6. MEMBER BEING LOWERED RESCUES A VICTIM AT A LOWER LEVEL

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

- 6.1 Continue being lowered until you reach the proper level to rescue the victim. Give the command "STOP" to halt the lowering. A Guide Member at roof can relay the command if necessary.
- 6.2 In order for the Guide Member or Member #1 to hear verbal commands, it will be necessary to look up toward the roof when giving these commands.
- 6.3 On the command "STOP", halt lowering operation by closing the right hand firmly on the rope. Await the completion of the pick-up.

Figure 10



- 6.4 Member #2: Instruct the victim to place both arms around your neck, both legs around your waist, and maintain a firm hold.
- 6.5 Member #2: Place your arms around the victim's upper torso, under the armpits, and lock hands behind the victim's back.(See Fig. 10).
- Note:** Signal to lower must be given verbally by the member being lowered. Member must look up in order to be heard by the Guide Member or Member #1.
- 6.6 Member #2: Continue descent until an area of safety is reached.

NOTES:

1. The nylon life saving rope shall be used for life saving purposes only. It shall not be used for any other purpose.
2. Communication is essential in all rope rescue operations. The Officer in Command at the fire or emergency shall be notified when any rope rescue operation is to be undertaken. This will enable the O.I.C. to arrange for any assistance needed at the location of the operation, e.g.; Guide Member at roof level and/or a member in the street for safety.
3. Before a rope rescue operation begins, check that there are no obstructions in line with the planned descent, such as signs, wire, etc.
4. Every effort shall be made to lower an individual between the line of windows. This will provide a smoother, easier descent and reduce exposure of the rope in case fire should show at a window.
5. Members must be alert to look for a reliable substantial object on the roof, such as bulkhead (Fig. 11A), aerial ladder (Fig. 11B), around a chimney or cut a hole, and tie the rope around an exposed beam. (Fig. 11C).

Note: Plumbing vent pipes, sheet metal housings for roof vents, T.V. masts, newel posts or banisters are not reliable substantial objects.
6. To increase the safety of any lowering operation, whether a parapet is present or not, will require that the lowering point be midway between the roof's edge and the substantial object. This is to prevent the Lowering Member being drawn beyond the roof's edge, after hooking up onto "O" ring. (See Sec. 3.9 and 3.20).

Figure 11A

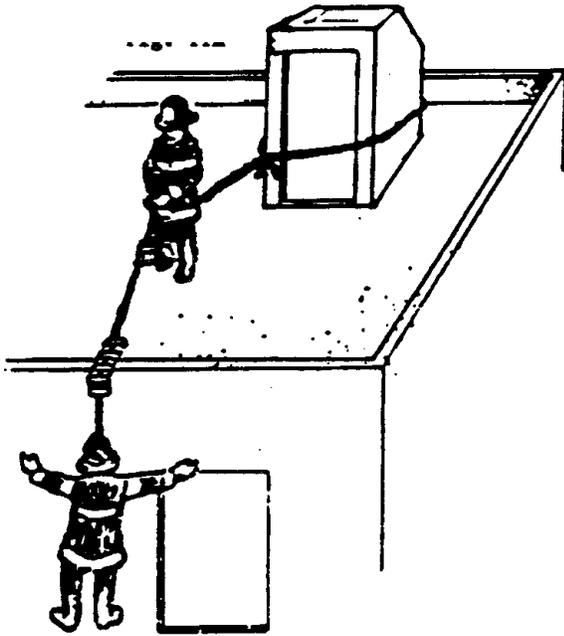


Figure 11B

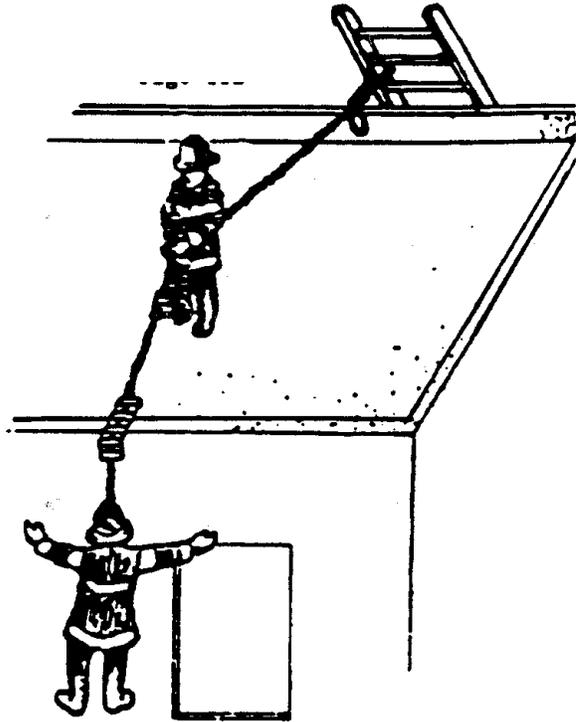
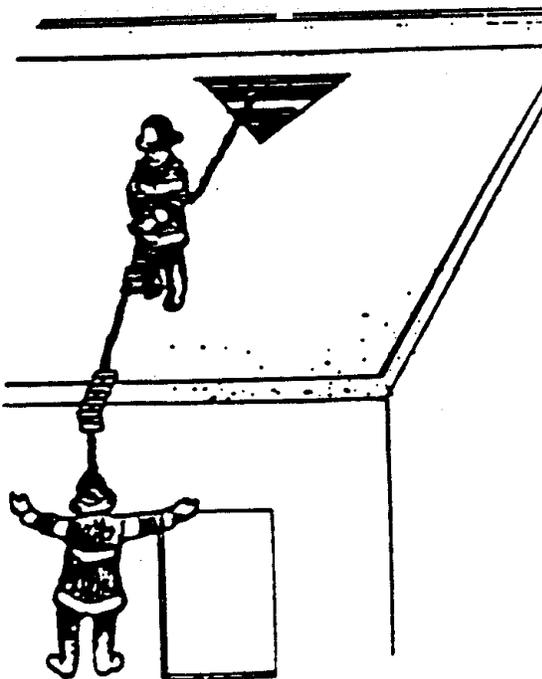


Figure 11C



7. When performing any lowering operation, the life saving rope, must be perpendicular as possible to the roof's edge at the point where the member descends.
 - 7.1 If the angle of the rope from the substantial object to the roof's edge is too acute, the weight of the person being lowered will cause the rope to slide along the roof edge. This should be avoided. (Fig. 12).
 - 7.2 Additionally, if the angle of the rope is too acute the Lowering Member will be pulled uncontrollably by the rope, and the line of descent will also be drastically affected as shown in (Fig. 12). This should be avoided.
8. When members are being lowered to perform a rescue pick-up, they must:
 - 8.1 Give the command "STOP" to halt the lowering operation while out of reach of the victim. This is to alert the guide member and/or the lowering member that the member being lowered is approaching the victim.
 - 8.2 Before this operation is completed in the safest possible manner, victims tend to jump onto their rescuers. In this situation a victim could easily fall to the ground.
 - 8.3 The rescuer will give instructions to the victim at this point in the strongest and most forceful language necessary in order to complete the operation successfully.
 - 8.4 Next, give the commands "DOWN, STOP, DOWN, STOP", as necessary, until member being lowered is shoulder to shoulder with the victim. Regardless of the victim's position in the window the rescuer will be in the best position to make the pick up.
 - 8.5 Rescuer pulls himself/herself to the victim by using the window frame. Never use the victim to help.
9. When a Guide Member is at roof level and visibility is good, hand signals can be used to control a lowering operation.
 - 9.1 Signals shall be as follows:

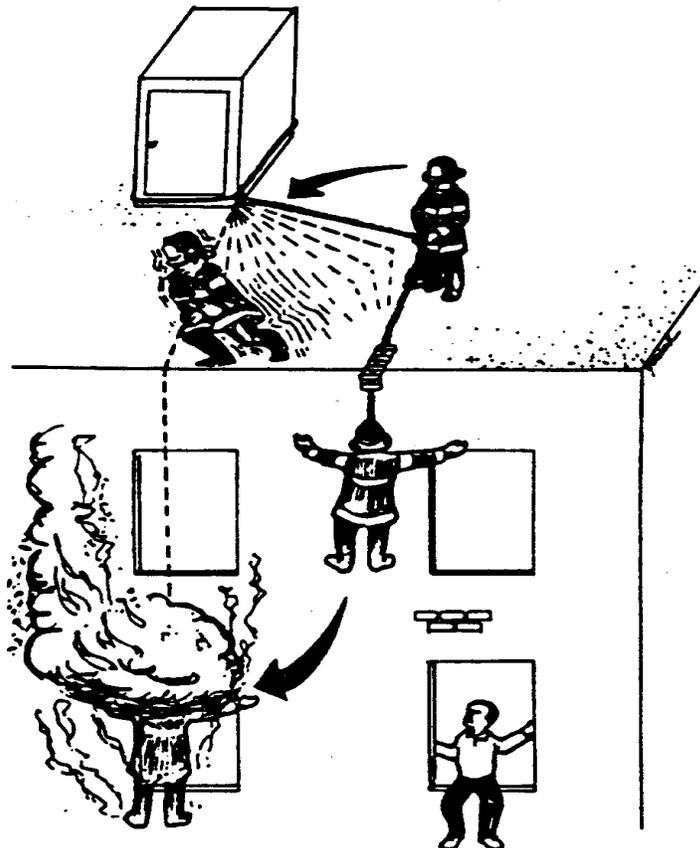
LOWER ----- Point downward with index fingers

STOP ----- Clenched fists

10. The fact that a member has been lowered to a window does not commit them to rope rescue. If conditions do not demand the removal of the victim, good judgment dictates that the member enter the area and take the necessary action to reassure, protect, and confine the victim until the danger has passed.
 - 10.1 If conditions demand removal, the member shall remain connected to the rope, which would serve as lifeline. However, before continuing a lowering operation, it is essential to remove all slack from the rope at roof level.
11. If a rope rescue is necessary, the goal is to reach a point of safety. A descent of one story may be all that is necessary.
12. When an unconscious victim is encountered and removing the victim requires the use of the rope, the bowline-on-a-bight and slippery hitch must be tied on the victim.
13. Members should be aware that the actual length of our life saving rope might be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk as much as 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

FIGURE 12

AVOID THIS



LOWERING A MEMBER WITH A LIFE SAVING ROPE
AND A PERSONAL HARNESS

CONTENTS

		PAGE NO.
PREPARATION	WITH AND WITHOUT PARAPET	72
LOWERING	BUILDING WITH A PARAPET	78
LOWERING	BUILDING WITHOUT A PARAPET	80
RESCUE	AT A LOWER LEVEL	82

1. EQUIPMENT:

- 1.1 One nylon life saving rope with attached anti- chafing device in a backpack carrying case. The pre-tied bowline-on-a-bight is not necessary for this operation. However the life saving rope must have this knot attached, therefore it must be untied at the start of this operation.
- 1.2 Two personal harnesses.

2. OBJECTIVE:

- 2.1 To lower a firefighter from a roof or upper floor to a position of safety.
- 2.2 To lower a firefighter from a roof or upper floor, in order to enable the firefighter to remove another person from an untenable position to one of safety.

3. PREPARATION FOR LOWERING:

This section applies to operations on roofs WITH and WITHOUT parapets.

- 3.1 Both members adjust their harness leg straps for proper fit. Both members open bottom snap of coat for access to hook, and release hook from support strap.

Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

- 3.2 Facing the roof's edge, place the carrying case on the roof with the snaps facing the substantial object. The case must be placed midway between the roof's edge and a substantial object.

- 3.3 Facing the front of the case, open the top flap. Hand member #2 the rope's snap hook. Allow the anti- chafing device to slide along the rope.

Note: If there is a bowline-on-a-bight knot, it must be untied by Member #2.

- 3.4 With both hands, grasp the sides of the case, holding the flap against the back of the case with the fingers.

- 3.5 Invert the carrying case and lift the case clear of the rope, using care not to disrupt the coil of the rope. Place the empty case to the side, clear of the operation.

- 3.6 Grasp the snap hook at the top of the coil and place it on the roof, to the left, adjacent to the coiled rope. (Fig. 1)

Figure 1



Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

- 3.8 Pay out rope from the top of the coil to the substantial object. Pull the rope taut and take a turn around the substantial object. Tie a clove hitch and binder on the taut part of the rope. (Figs. 2 and 3.)
- 3.7 Maintain position of the hook adjacent to the coiled rope by placing one foot on the snap hook, as member #1 pays out additional rope to the substantial object. (Fig. 2.)

Figure 2



Figure 3



Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

- 3.9
- 3.10 Return to the coiled rope and pick up the snap hook that has been kept in place by member #2's foot and attach it to the bottom part of the hook of your harness. (See Fig. 5.) This is the end of the rope that is tied to a substantial object.(See Fig. 2.). The snaphook should face down.
- 3.11 Make sure that the snap hook is attached in the prescribed manner to member #2 and slide the anti- chafing device up to the snap hook.
- 3.12 Walk toward the lowering point to remove all slack in the rope between the substantial object and you.

- 3.9 Pull the harness hook from beneath your bunker coat and attach the snap hook of the rope to the harness handle as shown in Fig. 4. This is the end of the rope with the anti- chafing device on it. Hold the anti- chafing device in your left hand.

Figure 4

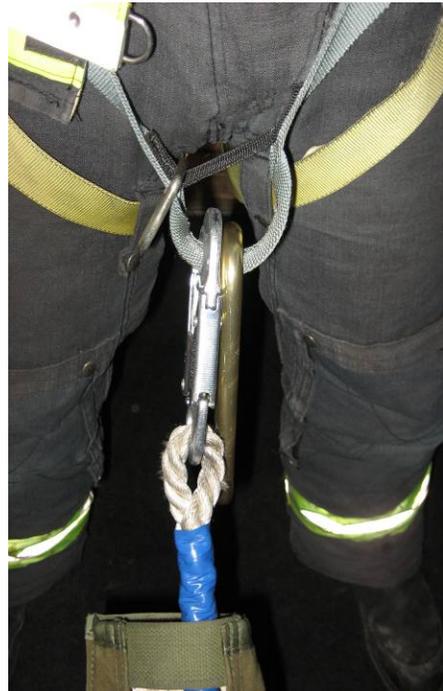


Figure 5



Member #1 (Lowering Member)

- 3.13 Facing member #2, grasp the section of rope leading to the anti- chafing device with your right hand and bring this hand back along the rope to your right hip.
- 3.14 Using this point on the rope, bring the rope forward and lay the solid part of the harness hook (gate to the left) on top of the rope. Grasp both the rope and the hook in the right hand.
- 3.15 Using the left hand, pull down the gate and take $\frac{1}{4}$ turn to the left.
- 3.16 With left hand, push gate over to solid side of hook. As gate reaches end of motion, grab hook, rope and gate together with right hand.
(Fig. 6.)

Figure 6



Member #1 (Lowering Member)

3.17 With your left hand, make four turns, under and over the harness hook with the rope leading to member #2.
(See Figs. 7A and 7B.)

Note: It is important to spiral the rope onto the hook properly.

3.18 Let the gate close and then grasp the harness hook at the gate with the left hand, PALM DOWN.

3.19 Slide your right hand back along the rope to your right buttock. Allow enough rope to pay out through the hook to permit member #2 to approach the parapet or roof's edge.

Figure 7A



Figure 7B



4. LOWERING OPERATION FROM A BUILDING WITH A PARAPET

Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

- 4.1 Holding the anti-chafing device in the left hand, turn to the right and straddle the parapet with the right leg to the outside.
- 4.2 Allow enough slack in the rope to place the anti- chafing device flat on the parapet with approximately 5" of the device draped over the outer edge. See Fig. 9 next page.
- NOTE:** Harness hook must clear outside of parapet.
- 4.3 Still holding the harness hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at your right buttock. Give the command "DISMOUNT" to Member #2 to dismount the parapet (see Fig. 8).

Figure 8



Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

- 4.4 Both gloved hands, grip the inner edge of the parapet, with a hand on either side of the anti- chafing device. (Fig. 9).
- Note:** To maintain the position of the anti- chafing device, place the thumb of the right hand on top of the device while the fingers grasp the inner edge of the parapet.
- 4.5 Slide your buttocks to the outer edge of the parapet until your left knee is at the inner edge of the parapet, and make sure that the rope is in the channel of the anti- chafing device.
- 4.6 Roll off the parapet into a vertical position and place feet approximately 12" apart against the wall, toes up and give the command "DOWN", to be lowered.
- Note:** Both hands remain on parapet until you are in a vertical position.
- 4.7 At the command "DOWN", lower member #2. Control the rope as it slides through your gloved right hand.

Figure 9

Note: If a third member is available he should be at the roof's edge for control and to relay commands.



5. LOWERING OPERATION FROM A BUILDING WITHOUT A PARAPET

Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

Note: The instructions of sections 3.1 through 3.19 apply here.

5.1 Holding the anti-chafing device in the left hand, walk to roof's edge and sit with your legs over the edge, the rope and anti-chafing device to your left. (Fig. 10).

Note: Under smoky or unsure conditions it may be better to crawl to the roof's edge.

5.2 Allow enough slack in the rope to place the anti-chafing device flat on the roof's edge with approximately 5" of the device draped over the edge of the roof. (Fig. 11).

Note: Harness hook is at the end of the anti-chafing device and must clear the edge of the roof.

Figure 10



Figure 11



Member #1 (Lowering Member)

- 5.3 Still holding the harness hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at your right buttock. Give the command "DISMOUNT" to Member #2 to dismount the roof (Fig. 8).

Figure 12



Member #2 (Member to be Lowered)

- 5.4 Place the left hand between the anti-chafing device and your left leg. Using the hand as a pivot, roll the body to the left, into a pushup position and make sure the rope is in the channel of the anti-chafing device. (Fig.11 & 12)
- 5.5 Lower the body into a vertical position (Fig. 13).

Note: As the vertical position is attained, the slack in the rope between the harness handle and the anti-chafing device will cause the member to drop slightly until the slack is eliminated.

Figure 13



- 5.6 Place feet approximately 12" apart against the wall, toes up, and give the command "DOWN" to be lowered.
- 5.7 At the command "DOWN", lower member #2. Control the rope as it slides through your gloved right hand.

Note: If a third member is available that member should be at the roof's edge for control and to relay commands.

6. MEMBER BEING LOWERED RESCUES A VICTIM AT LOWER LEVEL

Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

Figure 14



- 6.1 Continue being lowered until you reach the proper level to rescue the victim. Give the command "STOP" to halt the lowering. A Guide Member at roof level can relay the command if necessary.

Note: Descent should not be in line with windows.

- 6.2 In order for the Guide Member or Member #1 to hear your verbal commands, it will be necessary for you to look up toward the roof when giving them.

- 6.3 On the command "Stop", halt lowering operation by closing the right hand firmly on the rope. Await the completion of the pick-up.

Figure 15



- 6.4 Instruct the victim to place both arms around your neck, both legs around your waist, and maintain a firm hold (see Fig. 14).

- 6.5 Place your arms around the victim's upper torso, under the armpits, and lock your hands behind the victim's back. (see Fig. 15).

Note: Signal to lower must be given verbally by the member being lowered. Member must look up in order to be heard by the Guide Member or Member #1.

- 6.6 Continue descent until an area of safety is reached

Note: Full firefighting protective clothing must be worn during this operation.

**SINGLE SLIDE FROM BUILDING WITH / WITHOUT A
PARAPET USING LIFE SAVING ROPE AND ATLAS
LIFE BELT WITH RAPPEL HOOK & TRIPLE
ACTION GATE**

CONTENTS

		PAGE NO.
PREPARATION	WITH AND WITHOUT PARAPET	81
SLIDING	BUILDING WITH A PARAPET	84
SLIDING	BUILDING WITHOUT A PARAPET	86

1. EQUIPMENT

- 1.1 One nylon life saving rope attached anti-chaffing device in the carrying case. The pre-tied bowline-on-a-bight is not necessary for this operation. However, the rope shall be carried with this knot attached.
- 1.2 One life belt.

2. OBJECTIVE

- 2.1 To enable a firefighter to remove themselves from an untenable position above grade.

NOTE: This slide may only be used as a last resort when circumstances are such that alternative methods of removing oneself are denied.

THE SINGLE SLIDE SHALL NOT BE USED TO MAKE RESCUE PICKUP.

3. PREPARATION FOR SINGLE SLIDE

- 3.1 Place the carrying case on the roof near the substantial object you plan to use.
- 3.2 Remove the snap hook from the pocket of the case. Grasp the anti-chaffing device and pull it through the window of the case. Be sure the bowline-on-a-bight is also pulled through.
- 3.3 Secure the life saving rope by taking a turn around a substantial object and tie a clove hitch and binder on the taut part of the rope.

NOTE: Use sufficient rope between the bowline-on-a-bight and the anti-chaffing device and make a bend in the rope to make knot.

- 3.4 Grasp the anti-chaffing device with one hand and pick up the carrying case with the other hand.
- 3.5 Walk to the planned point of descent, sliding the anti-chaffing device along the rope and deploy the rope by tossing the carrying case to the street.
- 3.6 Locate the point to grasp the rope and the hook.
 - 3.6.1 For a Roof with a Parapet - Place the anti-chaffing device on the parapet. Standing to the right of the rope, place the left elbow on the outer edge of the parapet and reach down and grasp the rope with the left hand.
 - 3.6.2 For a Roof without a Parapet - Place the anti-chaffing device on the roof near the edge. Standing to the right of the rope, kneel down and grasp the rope at the roof's edge with the left hand.
- 3.7 Turn to the left. The slider's back will now be to the point of descent.
- 3.8 With the right hand, lay the solid part of the life belt hook (gate to the left) on top of the rope at the point of the left hand. Grasp the rope and hook together in the right hand.

3.9 The following procedures are in sequence:

3.9.1 Pull down the gate (Figure 1A) with left hand. Take a ¼ turn to the left (Figure 1B). This will unlock the gate.



Figure 1A



Figure 1B

3.9.2 With left hand, push gate over to solid side of hook (Figure 1C). As gate reaches solid part of hook, grab hook, rope, and gate together with right hand. (Figure 1D)



Figure 1C



Figure 1D

NOTE: Member is now ready to proceed to take four (4) turns around the hook.

- 3.10 Using the left hand, make four (4) turns under and over the life belt hook (Figure 2A)
- 3.11 Release gate to locked position. Gate will lock by itself (Figure 2B).



Figure 2A



Figure 2B

SINGLE SLIDE FROM A BUILDING WITH A PARAPET

4. DISMOUNTING THE PARAPET

- 4.1 Slide the right hand back along the rope approximately six (6") inches and grasp the rope firmly.
- 4.2 Pick up and slide the anti-chaffing device up to the hook with the left hand, turn to the right and straddle the parapet with the right leg to the outside.
- 4.3 Position the anti-chaffing device on the parapet allowing enough slack in the rope between the hook and the anti-chaffing device to lie flat with approximately five (5") inches draped over the outer edge.
- 4.4 Place the left arm over the anti-chaffing device and rope and grasp the inner edge of the parapet with the left hand. (Figure 3)

NOTE: To maintain the position of the anti-chaffing device, the heel of the left hand is placed on the device.
- 4.5 Check the slack on the rope to assure that the hook of the life belt will clear the outer edge of the parapet and that the anti-chaffing device is not being lifted from its proper position.
- 4.6 Move the gloved right hand along the rope while stretching the right arm out a full arm's distance. (Figure 3) Grasp the rope firmly at this point.
- 4.7 Slide the buttocks to the outer edge of the parapet until the left knee is at the inner edge of the parapet. With the right arm rigid press the inside of the right fist firmly against the wall. The rope is between the fist and the wall. (Figure 3)
- 4.8 Using the rigid right arm for leverage, lean out over the parapet and make sure that the rope is in the channel of the anti-chaffing device. Also, the hook of the life belt must clear the outer edge of the parapet.
- 4.9 Swing the body off the parapet into a vertical position then bring the right hand, gripping the rope, to the right buttock and maintain a firm grip on the rope.
- 4.10 Place feet against the wall, toes up, approximately twelve (12") inches apart.
- 4.11 Bring the left hand from the parapet and clear clothing, Handi-Talkie wire, etc., from the area of the hook.
- 4.12 When ready to slide, grasp the hook of the life belt to the gate, with the left hand, **PALM DOWN**.

5. SLIDING

- 5.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.
- 5.2 Look down to avoid any obstructions not noted or present when the rope was deployed. Continue slide to area of safety.



Figure 3

This completes the section on the sliding operation from a building WITH a parapet.

SINGLE SLIDE FROM A BUILDING WITHOUT A PARAPET

6. DISMOUNTING THE ROOF

- 6.1 Grasp the anti-chaffing device with the left hand. Slide the right hand along the rope to the right buttock, grasp the rope firmly and turn to the right, facing the roof's edge. Walk to the roof's edge paying out slack through the hook.
- 6.2 Sit at the roof's edge, legs over edge, with the rope and anti-chaffing device to the left. Maintain a firm grip on the rope with the right hand at the right buttock.
- 6.3 Position the anti-chaffing device at the roof's edge allowing enough slack in the rope, between the hook and the anti-chaffing device, to permit the device to lie flat with approximately five (5") inches draped over the edge.
- 6.4 To maintain the position of the anti-chaffing device, place the heel of the left hand on the device. Now, slide the body forward so that only the buttocks are on the roof. (Figure 4)



Figure 4

- 6.5 Maintaining the position of the right hand (Figure 4), roll to the left while pushing off smartly with the left hand, keeping the body clear of the roof's edge. A drop of approximately one and one half (1½ ') feet will be experienced.
- 6.6 Now in a vertical position, place the feet against wall, toes up, approximately twelve (12") inches apart.
- 6.7 Using the left hand, clear clothing, Handie-Talkie wire, etc., from the area of the hook.
- 6.8 When ready to slide, grasp the hook of the life belt at the gate, with the left hand, PALM DOWN.

7. SLIDING

- 7.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.
- 7.2 Look down to avoid any obstructions not noted or present when the rope was deployed. Continue slide to area of safety.

This completes the section on the sliding operation from a building WITHOUT a parapet.

NOTES

- 1. The imaginary line from the substantial object to the planned point of descent should be as close to perpendicular as possible to the roof's edge. This will avoid an acute angle of the rope, which will result in the rope sliding along the roof's edge when the weight is placed on the rope.
- 2. The substantial object must be carefully selected. There are many objects of questionable integrity which should never be used; e.g., soil pipe vents, TV antenna masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges.
 - 2.1 When using a vertical object, such as a chimney, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point.
- 3. After making the required turns around the hook of the life belt, do not release the right hand from the rope for any reason. Should you slip or fall from the parapet or roof while preparing to dismount, you will still have control and will not "free fall."
- 4. Members should be aware that the actual length of our life saving rope may be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk as much as 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

THIS PAGE WAS LEFT BLANK INTENTIONALLY

SINGLE SLIDE FROM A BUILDING WITH A PARAPET USING THE LIFE SAVING ROPE AND PERSONAL HARNESS

1. EQUIPMENT:

- 1.1 One nylon life saving rope with attached anti-chaffing device in a back pack carrying case. The pre-tied bowline-on-a-bight is not necessary for this operation. However, the rope shall be carried with this knot attached.
- 1.2 Personal harness.

2. OBJECTIVE:

- 2.1 Used by firefighters to remove themselves from an untenable position to one of safety.

NOTE: This slide may only be used as a last resort when circumstances are such that alternative methods of removing oneself are denied. The single slide shall not be used to make a rescue pickup.

3. PREPARATION:

- 3.1 Adjust harness leg straps for proper fit. Open bottom snap of coat for access to hook. Release hook from harness hook strap.

4. OPERATION:

- 4.1 Place the back pack carrying case on the roof near a substantial object you plan to use.
- 4.2 Remove the snap hook from the pocket of the case. Grasp the anti-chaffing device and pull it through the window of the case.
- 4.3 Secure the life saving rope by taking a turn around the substantial object and tie a clove hitch and binder on the taut part of the rope.
- 4.4 Grasp the anti-chaffing device with one hand and pick-up the carrying case with the other hand.
- 4.5 Walk to the parapet at the planned point of descent, sliding the anti-chaffing device along the rope, and deploy the rope by tossing the carrying case to the street.

- 4.6 Place the anti-chaffing device on the parapet. Standing to the right of the rope, place the left elbow on the outer edge of the parapet and reach down and grasp the rope with the left hand.
- 4.7 Turn to the left. The slider's back will now be to the parapet.
- 4.8 With the right hand, lay the solid part of the harness hook ("gate" to the left) on top of the rope at the point of the left hand. Grasp the rope and hook together in the right hand. (Fig. 1)
- 4.9 The following procedures are in sequence;
 - 4.9.1 With left hand, pull down the gate (Fig. 1A).
 - 4.9.2 With left hand, turn gate ¼ turn to the left (Fig. 1B).
 - 4.9.3 With left hand, push gate across toward solid side of the hook (Fig. 1C). As gate reaches end of motion, grab hook, rope and gate in right hand (Fig. 1D).

NOTE: Member is now ready to proceed to take four (4) turns of the rope around the hook.

Figure 1



Figure 1B



Figure 1A



Figure 1C



Figure 1D



- 4.10 Using the left hand, make four (4) turns of the rope under and over the harness hook. (Fig. 2A)
- 4.11 Release gate to closed position (Fig. 2B).

Figure 2A



Figure 2B



- 4.12 Slide the right hand back along the rope approximately six inches (6") and grasp the rope firmly.
- 4.13 Pick up and slide the anti-chaffing device up to the harness hook with the left hand, turn to the right and straddle the parapet with the right leg to the outside.
- 4.14 Position the anti-chaffing device on the parapet. The device lies flat with approximately five inches (5") draped over the outer edge. (Fig. 3)

NOTE: Harness hook should be at end of anti-chaffing device and clear the parapet.

5. DISMOUNTING THE PARAPET:

- 5.1 Place the left arm over the anti-chaffing device and rope and grasp the inner edge of the parapet with the left hand. (Fig. 3)

NOTE: To maintain the position of the anti-chaffing device, the heel of the left hand is placed on the device.

- 5.2 Check the slack in the rope to assure that the hook of the harness belt has cleared the outer edge of the parapet and that the anti-chaffing device is not being lifted from its proper position.
- 5.3 Move the gloved right hand along the rope while stretching the right arm out a full arm's distance. (Fig. 3). Grasp the rope firmly at this point.
- 5.4 Slide the buttocks to the outer edge of the parapet until the left knee is at the inner edge of the parapet. With the right arm rigid, press the inside of the right fist firmly against the wall. The rope is between the fist and the wall (Fig. 3).
- 5.5 Using the rigid right arm for leverage, lean out over the parapet and make sure the rope is in the channel of the anti-chaffing device. The hook of the harness belt must clear the outer edge of the parapet.
- 5.6 Swing the body off the parapet into a vertical position then brings the right hand, gripping the rope, to the right buttock and maintains a firm grip on the rope.
- 5.7 Place feet against the wall, toes up, approximately twelve inches (12") apart.
- 5.8 Bring the left hand from the parapet and clear clothing, Handie-Talkie wire, etc., from the area of the hook.
- 5.9 When ready to slide, grasp the hook of the life belt at the gate, with the left hand, **PALM DOWN**.

Figure 3



6. SLIDING:

- 6.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.
- 6.2 Look down to avoid any obstructions not noted or not present when the rope was deployed. Continue slide to area of safety.
- 6.3 The line of descent should be between the rows of windows.

SINGLE SLIDE FROM A BUILDING WITHOUT A PARAPET USING THE LIFE SAVING ROPE AND THE PERSONAL HARNESS

1. EQUIPMENT:

- 1.1 One nylon life saving rope with attached anti-chaffing device in a back pack carrying case. The pre-tied bowline-on-a-bight is not necessary for this operation.
- 1.2 One personal harness.

2. OBJECTIVE:

- 2.1 Used by firefighters to remove themselves from an untenable position to one of safety.

NOTE: This slide may only be used as a last resort when circumstances are such that alternative methods of removing oneself are denied. The single slide shall not be used to make a rescue pickup.

3. PREPARATION:

- 3.1 Adjust harness leg straps for proper fit. Open bottom snap of coat for access to hook. Release hook from harness hook strap.

4. OPERATION:

- 4.1 Place the back pack carrying case on the roof near a substantial object you plan to use.
- 4.2 Remove the snap hook from the pocket of the case. Grasp the anti-chaffing device and pull it through the window of the case.
- 4.3 Secure the life saving rope by taking a turn around the substantial object and tie a clove hitch and a binder on the taut part of the rope.
- 4.4 Grasp the anti-chaffing device with one hand and pick up the carrying case with the other hand.
- 4.5 Walk to the roof's edge at the planned point of descent, sliding the anti-chaffing device along the rope and deploy the rope by tossing the carrying case to the street.
(See Note #4, page 16)

- 4.6 Place the anti-chaffing device on the roof near the edge. Standing to the right of the rope, kneel down and grasp the rope at the roof's edge with the left hand.
- 4.7 Maintaining hold on rope, stand and step back a safe distance. Turn to the left. Slider's back will now be to the roof's edge.
- 4.8 With the right hand lay the solid part of the harness belt hook ("gate" to the left) on top of the rope at the point of the left hand. Grasp the rope and hook together in the right hand (Fig. 1).
- 4.9 The following procedures are in sequence.
 - 4.9.1 With left hand, pull down the gate (Fig. 1A).
 - 4.9.2 With left hand, turn gate ¼ turn to the left (Fig. 1B).
 - 4.9.3 With left hand, push gate across toward solid side of the hook (Fig. 1C). As gate reaches end of motion, grab hook, rope and gate in right hand (Fig. 1D).

NOTE: Member is now ready to proceed to take four (4) turns of the rope around the hook.

Figure 1



Figure 1A



Figure 1B



Figure 1C



Figure 1D



- 4.10 Using the left hand, make four (4) turns of the rope under and over the harness hook. (Fig. 2A).
- 4.11 Release "gate" to closed position. (Fig 2B).

Figure 2A

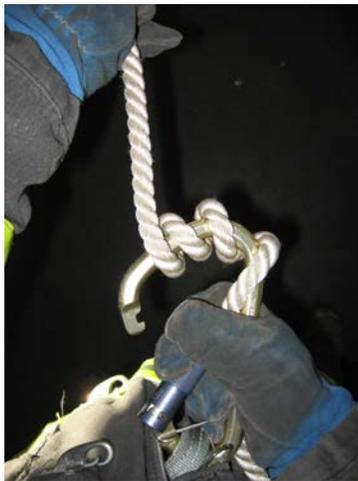


Figure 2B



- 4.12 Grasp the anti-chaffing device with the left hand. Slide anti-chaffing device up to personal harness hook, slide the right hand along the rope to the right buttock, grasp the rope firmly and turn to the right, facing the roof's edge. Walk to the roof's edge paying out slack through the hook. (See Note #4, Page 16)
- 4.13 Sit at the roof's edge, legs over edge, with the rope and anti-chaffing device to the left. Maintain a firm grip on the rope with the right hand at the right buttock. (Fig. 3)
- 4.14 Position the anti-chaffing device at the roof's edge allowing the device to lie flat with approximately five inches (5") draped over the edge. (Fig. 3)

NOTE: The personal harness hook should be at the end of the anti-chaffing device, and clear the roof's edge. (Fig. 3)

5. DISMOUNTING THE ROOF:

- 5.1 To maintain the position of the anti-chaffing device, place the heel of the left hand on the device. Now, slide the body forward so that only the buttocks are on the roof. (Fig. 3).

Figure 3



5.2 Maintaining the position of the right hand. (Fig. 3), roll to the left while pushing off smartly with the left hand, keeping the body clear of the roof's edge. A drop of approximately one and a half feet (1 1/2') will be experienced.

5.3 Now in a vertical position, place the feet against wall, toes up, approximately twelve inches (12") apart.

5.4 Using the left hand, clear clothing, Handie-Talkie wire, etc., from the area of the hook.

5.5 When ready to slide, grasp the hook of the harness at the "gate", with the left hand, PALM DOWN.

6. SLIDING:

- 6.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.
- 6.2 Look down to avoid any obstruction not noted or not present when the rope was deployed. Continue slide to area of safety.
- 6.3 The line of descent should be between the rows of windows.

NOTES:

1. The imaginary line from the substantial object to the planned point of descent should be as close to perpendicular as possible to the roof's edge. This will avoid an acute angle of the rope, which will result in the rope sliding along the roof's edge when the weight is placed on the rope.
2. The substantial object must be carefully selected. There are many objects of questionable integrity which should never be used; e.g., soil pipe vents, TV antenna masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges.
 - 2.1 When using a vertical object, such as a chimney, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point.
3. After making the required turns around the hook of the life belt, do not release the right hand from the rope for any reason. Should you slip or fall from the parapet or roof while preparing to dismount, you will still have control and will not "free fall".
4. Under smoky or unsure conditions, it is safer to crawl to the roof's edge.
5. Members should be aware that the actual length of our life saving rope may be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk as much as 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

THIS PAGE WAS LEFT INTENTIONALLY BLANK

IMPLEMENTATION OF EMERGENCY LIFE SAVING ROPE OPERATIONS

1. INTRODUCTION

- 1.1 This evolution will only be implemented under the direction of a Command Chief. Activation will be transmitted via signal 65-2 by voice alarm, Department radio, ATSP and MDT. This evolution will be implemented on a citywide basis when a large number of personal harnesses and/or personal safety systems have been placed out-of-service and immediate replacement is not available. The intention of this procedure is to provide a measure of safety to members operating without personal harnesses and/or personal safety systems. It will remain in effect until further orders. When the equipment has been replaced and all on-duty members have been properly equipped, the Command Chief will rescind the implementation of this evolution.

2. PROCEDURES

- 2.1 Members assigned the Roof position in the first and second ladder companies at structure fires involving non-fireproof buildings that are 3 stories in height or greater shall bring their Life Saving Rope to the roof of the building. Additionally, members assigned the Roof position in the first and second Ladder companies at fireproof residential-type structures including apartment houses, nursing homes, senior citizen housing, dormitories, etc., shall bring the Life Saving Rope to their position on the floor above.
- 2.2 The 1st Roof firefighter shall carry the Life Saving Rope to their position and then perform assigned duties on arrival at the roof level (or floor above in fireproof residential buildings).
- 2.3 The 2nd Roof firefighter shall carry the Life Saving Rope to their position. Immediately after reaching their position, identify possible substantial objects for use in tying off the Life Saving Rope and position the Life Saving Rope at that location for possible use. This member will also position the Life Saving Rope of the first ladder company at a substantial object, using a different one if available. This action will readily identify the location of a designated substantial object for Life Saving Rope deployment. After completing this initial duty, the 2nd Roof firefighter shall then perform assigned duties at the roof level (or floor above in fireproof residential buildings), remaining alert to any condition that might require immediate use.

NOTE: The Life Saving Rope shall **not** be removed from the carrying case except for actual rescue and removal operations.

- 2.4 These two Roof firefighters shall maintain their position at the roof level (or floor above in fireproof residential buildings) until the Incident Commander declares the operation “Probably Will Hold,” or the Incident Commander informs the members to either evacuate the roof or that their services on the roof are no longer required. When leaving the roof position, Roof firefighters shall take the Life Saving Ropes with them. The Incident Commander shall also announce on the handie-talkie that this roof level team is no longer in place when they are removed from the roof (or floor above in fireproof residential buildings). The Incident Commander must ensure that the duties (searches) previously performed by the Roof firefighters are assigned to other members or units.
- 2.5 Both Roof firefighters shall monitor the handie-talkie for deteriorating conditions that might require deployment of the Life Saving Rope, such as an interrupted or delayed application of water on the fire. This may require one or both members to move to a location remote from operating saws or other ambient noise.
- 2.6 The preferred method for removal of distressed members wearing a personal harness is for them to remove themselves from danger via a single slide utilizing a Life Saving Rope that has been deployed from above.
- 2.7 The preferred method for removal of distressed members not wearing a personal harness from danger is for the two roof members to perform Evolution 25, 26 or 27 to remove the distressed member from danger.

**IT MUST BE EMPHASIZED THAT THIS IS A LAST RESORT PROCEDURE.
THE SINGLE SLIDE SHALL NOT BE USED TO MAKE RESCUE PICKUP.**

3. COMMUNICATIONS

- 3.1 Members operating inside buildings should be alert to changing conditions to alert the roof level team of any possible need for deployment of the Life Saving Rope (remember the inherent time delay for Life Saving Rope deployment). Be as specific as possible when indicating the location where the rope is needed.

4. DISTRESSED MEMBER ACTIONS

- A. Transmit a MAYDAY on the handie-talkie when realizing **possible** need.
- B. Identify Unit and position.
- C. Specify location for rope deployment.
- D. While awaiting the LSR from above, fully clear the window of all obstructions.

5. SUBSTANTIAL OBJECT

- 5.1 The substantial object must be carefully selected. There are many objects of questionable integrity that should never be used; e.g., soil pipe vents, TV antenna masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges. When using

a vertical object, such as a chimney or dumbwaiter bulkhead, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point.

EMERGENCY LIFE SAVING ROPE OPERATIONS

SINGLE SLIDE FROM WINDOW USING LIFE SAVING ROPE DEPLOYED FROM ABOVE

1. EQUIPMENT:

- 1.1. One nylon life saving rope.
- 1.2. Personal harnesses.

2. OBJECTIVE:

- 2.1. To enable a firefighter to remove themselves from an untenable position above grade.

THE SINGLE SLIDE SHALL NOT BE USED TO MAKE RESCUE PICKUP.

3. PREPARATION FOR SINGLE SLIDE

3.1. COMMUNICATIONS

Members operating inside buildings should be alert to changing conditions to alert the roof level team of any possible need for deployment of the Life Saving Rope (remember the inherent time delay for Life Saving Rope deployment). Be as specific as possible when indicating the location where the rope is needed.

3.2. DISTRESSED MEMBER ACTIONS

- A. Transmit a MAYDAY on the handie-talkie when realizing **possible** need
- B. Identify Unit and position
- C. Specify location for rope deployment
- D. While awaiting the LSR from above, fully clear the window of all obstructions

3.3. SUBSTANTIAL OBJECT

The substantial object must be carefully selected. There are many objects of questionable integrity that should never be used: e.g., soil pipe vents, TV antenna masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges. When using a vertical object, such as a chimney or a dumbwaiter bulkhead, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point

4. ATTACH LIFE SAVING ROPE TO HARNESS DEPLOYED FROM ABOVE WHILE CROUCHING OR KNEELING AT WINDOW

4.1 Crouched or kneeling below the window, facing out grasp the personal harness hook with your left hand on the gate side, and pull it free from its retention strap. Maintain control of the hook in left hand.



Figure 1

4.2 Reach out with the right hand and grasp the rope at a point below the edge of the windowsill.

4.3 With your left hand holding the "gate" to the left, place the solid part of the hook on top of the rope in the right hand. (Figure 1)



Figure 2

4.4 Open the gate of the hook and hold it open with the right hand. (Figure 2)

4.5 Using the left hand, grasp the rope coming from above and pull approximately 12" of slack forward through the right hand as it is holding the rope and hook. This is to ensure there is adequate slack to take the turns onto the hook.

4.6 Make four (4) turns of the rope under and over the harness hook. (Figure 3)



Figure 3

4.7 Release "gate" to closed and locked position. Member must maintain control of the rope at all times in his right hand to prevent free fall and to control descent.

NOTE: The rope coming from above must be positioned at the top of the hook, and the rope going back out the window to below must be positioned at the bottom of the hook. The rope is held against the hook in the right hand prior to taking the 4 turns. The right hand must never lose contact with the rope from this point on.

5. EXITING THE WINDOW FEET FIRST

- 5.1 Facing the window put the right leg outside the window and straddle the window sill.
- 5.2 Make sure harness hook clears the outer edge of the windowsill, and ensure that the rope from above is positioned on the left side of your head as you exit the window. The rope should be between you and the building.
- 5.3 With left hand, grasp inner edge of windowsill and move the gloved right hand along the rope while stretching the right arm out at full arm's distance. Grasp the rope firmly at this point.
- 5.4 Slide the buttocks to the outer edge of the windowsill until the left knee is at the inner edge of the windowsill. With the right arm rigid, press the inside of the right fist firmly against the wall. The rope is between the fist and the wall.
- 5.5 Using the right arm for leverage, lean further out over windowsill.
- 5.6 Swing the body over the windowsill into a vertical position, then bring the right hand, gripping the rope, to the right buttock and maintain a firm grip on the rope.
- 5.7 Feet against the wall, toes up, 12" apart. Your left hand should be on the gate of the hook (palm down), and the right hand should be positioned against the right buttock for a controlled descent.
- 5.8 The gloved right hand must be in position against the right buttock at all times.
- 5.9 Look down to avoid obstructions.



NOTE: There will be a drop while exiting the window due to the accumulated slack in the rope from hooking up below the windowsill.

6. EXITING THE WINDOW ROLL OUT - HEADFIRST

- 6.1 Lean out head first, staying low in the window, close to the sill, with the right arm rigidly extended holding the rope.
- 6.2 Make sure the rope is on the left side of your head as you roll out the window. The rope should be between you and the building.
- 6.3 Press the inside of the right fist firmly against the wall so that rope is between the fist and the wall.
- 6.4 Roll out head first, maintaining the right arm's rigid position.
- 6.5 The left hand is on the inner edge of the windowsill while exiting to provide balance and stability.
- 6.6 Once you've rolled out of the window, your left hand should be on the gate of the hook (palm down), and the right hand should be positioned against the right buttock for a controlled descent.

NOTE: There will be a drop while exiting the window due to the accumulated slack in the rope from hooking up below the windowsill.

PERSONAL SAFETY SYSTEM (PSS)

1. DESCRIPTION

- 1.1 F.D.N.Y. Designation Personal Safety System (PSS)
- 1.2 Components Anchor Hook, 50' Kernmantle Rope with Sewn Eye, EXO Descender with triple action carabiner and Storage Bag.
- 1.3 Hook Material Dropped Forged Alloy Steel. (Figure 1)
- 1.4 EXO Descender Equipped with an operating handle used to control descent. Self locking cam prevents member from an uncontrolled descent when operating handle is released. (Figure 2)
- 1.5 Hook: Load Capacity 5000 pounds at tip, 10,000 pounds at saddle.
- 1.6 Rope: Material Technora Sheath, Technora Core
- 1.7 Rope: Diameter 7.5 mm (19/64")
- 1.8 Rope: Length 50 Feet
- 1.9 Rope Tensile Strength Meets NFPA standard of 3034 pounds
- 1.10 System: Work Load Meets NFPA Std. - 10:1 safety factor based on 300 pounds
- 1.11 System: Markings Tracking number assigned by R & D.
- 1.12 System: Characteristics Technora Rope with the Anchor Hook attached at the Sewn Eye. The rope passes through the EXO, over the bent flange and through the "U" shaped rope guide. There is a Figure "8" stopper knot tied at the end of the rope.

ANCHOR HOOK WITH SEWN EYE

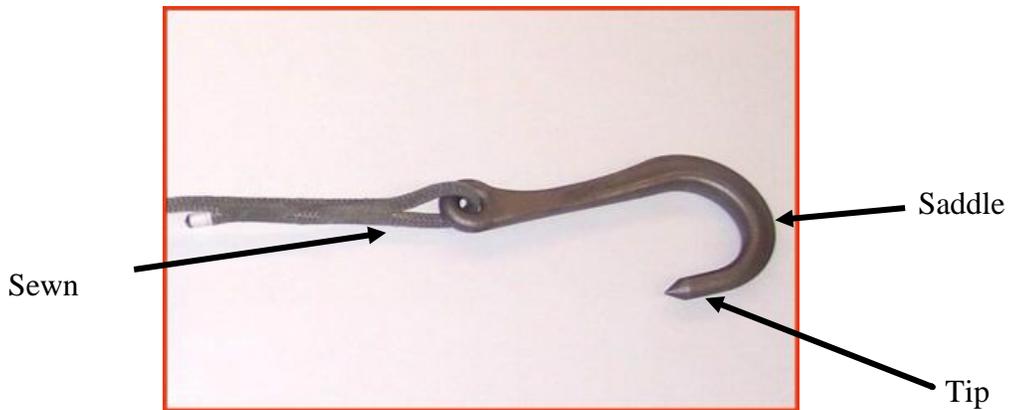


Figure 1

PETZL EXO WITH LOCKING CARABINER

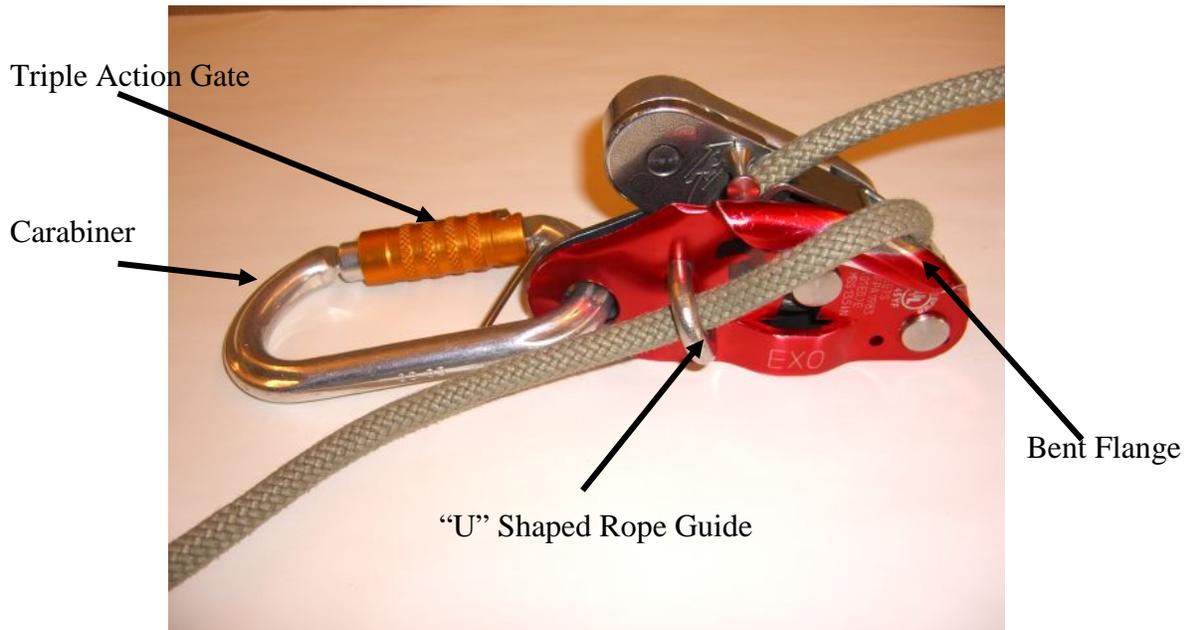


Figure 2

2. INTENDED USE

- 2.1 Used only by members to remove **THEMSELVES** from an untenable position above grade to a place of safety. **The PSS is a ONE TIME use system** and is only to be used as a last resort.
- 2.2 After use, the PSS will be placed out of service.

PSS STORAGE BAG WITH EXO AND ANCHOR HOOK WITH SEWN EYE

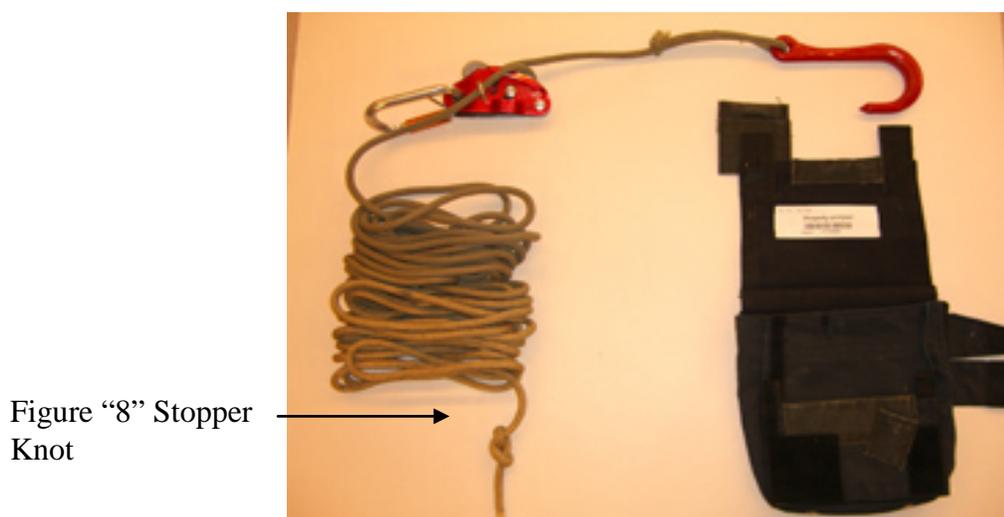


Figure 3

STORAGE BAG WITH TEAR AWAY FLAP

DESCRIPTION

In addition to the Tear Away Flap (TAF), PSS systems equipped with the TAF have the following new features (See Figures 4 and 5):

- The exterior of the flap is provided with orange and silver reflective 3M material.
- An Alignment Positioning Snap (APS) is provided to secure the flap to the bag.

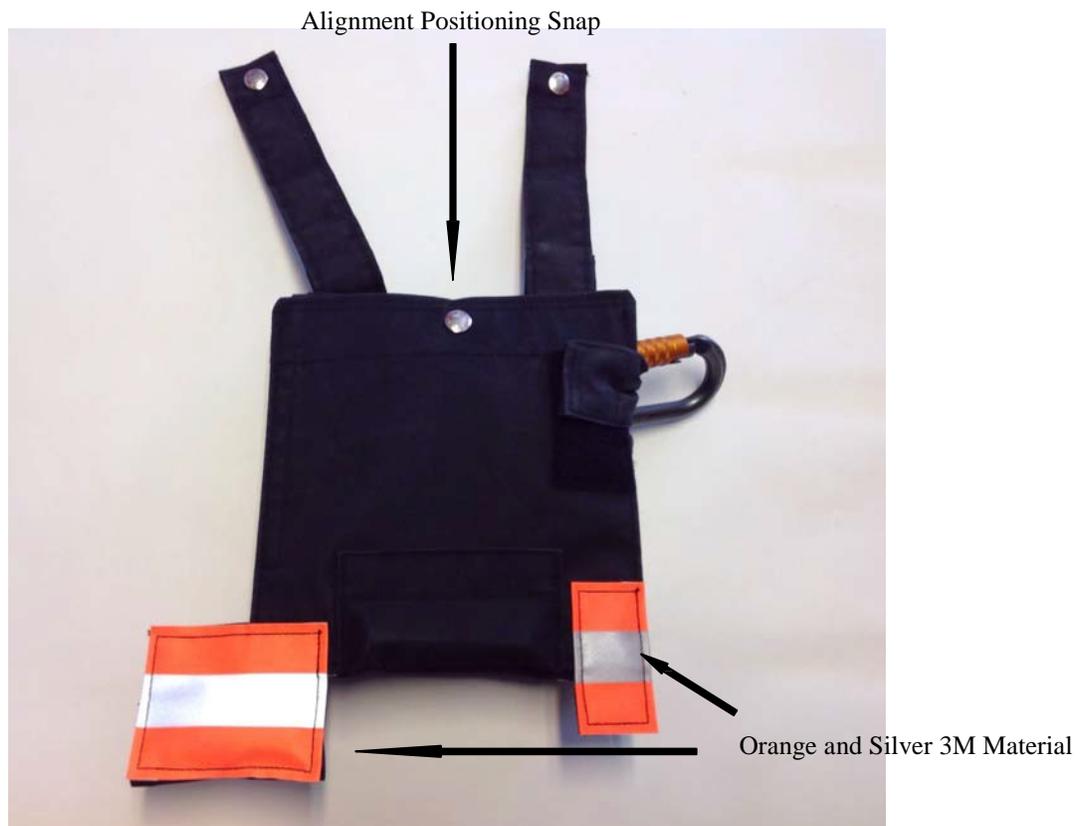
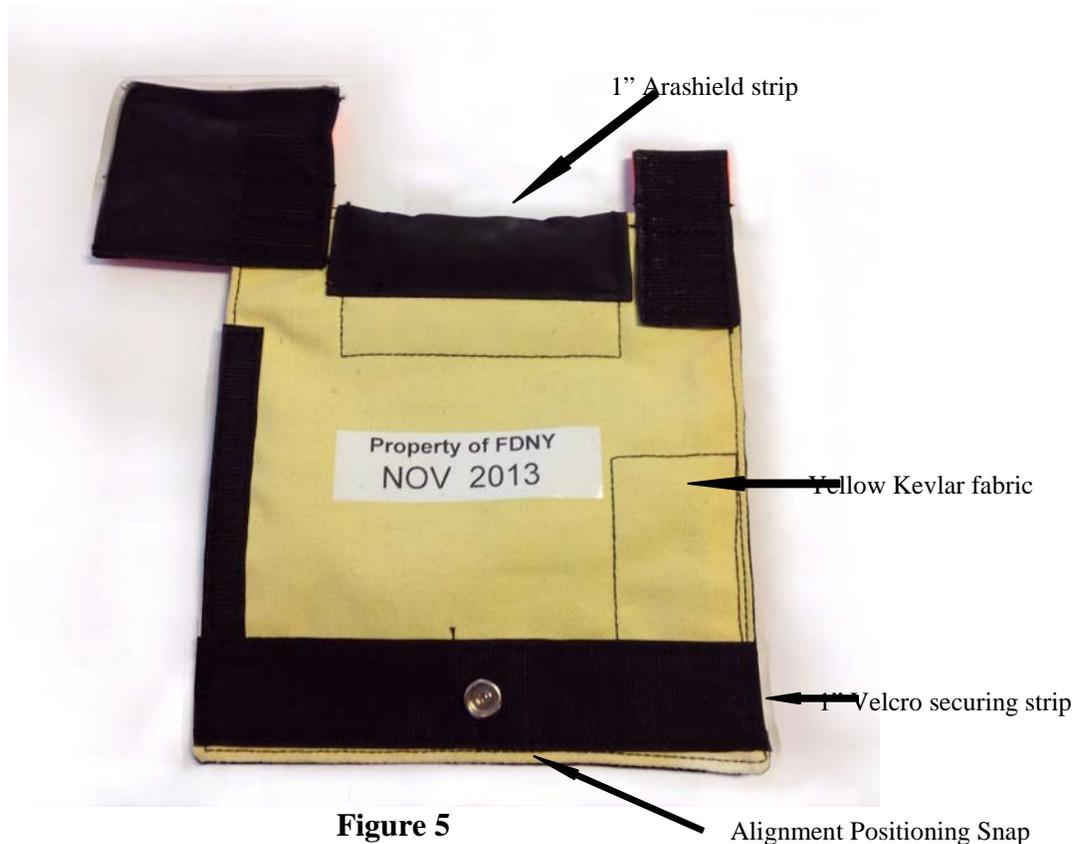


Figure 4

- The top of the storage bag has a ¾” strip of Velcro and snap to attach the TAF.
- The TAF is provided with a 1” strip of Velcro and snap to secure it to the storage bag.
- The bottom of the TAF is provided with a 1” strip of Arashield to assist in grabbing and removing the flap during deployment.
- The interior of the flap is covered with yellow Kevlar.



ATTACHING THE TAF TO THE STORAGE BAG

- Align the ¾ inch Velcro strip at the top of the storage pouch with the 1 inch Velcro strip at the top of the TAF (See Figure 6).
- Secure the two components together with the alignment positioning snap.
- Close the TAF over the front of the storage bag and secure the bottom with the two Velcro tabs. To ensure a proper attachment, the TAF should be square to the edges of the storage bag when it is closed.

Note: If the TAF cannot be securely attached to the storage bag follow the existing PSS replacement procedures.



Figure 6

IMPLEMENTATION

The PSS with the TAF is designed to replace the original PSS bag.

- Procedures for deploying the PSS with the TAF do not change from those found in current FDNY documents, with one exception:
 - When deploying, grab the flap, rip it straight up, and pull it completely off to expose the hook.
- Procedures for packing and inspecting the PSS with the TAF do not change from those found in current FDNY documents, with the following addition:
 - During daily and semi- annual inspections, members should ensure that the Velcro and the APS have not been damaged and are functioning properly.
- All other procedures concerning the use, inspection, replacement, etc... of the PSS system remain unchanged.

3. ATTACHING THE PERSONAL SAFETY SYSTEM BAG TO THE PERSONAL HARNESS

- 3.1 Visually inspect the components of the bag to ensure they are properly packaged as per Training Bulletin Rope 4 Data Sheet 1.
- 3.2 Lay the packed PSS bag out on a clean surface with Arashield attachment straps facing up. Ensure that all Arashield bag attachment straps and small velcro securing tabs are in the open position.
- 3.3 With the interior side of the waist band facing up, drape the harness over the PSS bag. Ensure the rear of the right leg loop of the personal harness is positioned between the two Arashield bag attachment straps. (Figure 7)
- 3.4 Starting with the strap that is between the leg loop, wrap the small Velcro securing tab tightly around the harness waist band.
- 3.5 Secure large Arashield strap around the waist band and the small Velcro securing tab. Fasten the snap. (Figures 7A & 7B)
- 3.6 Repeat above fastening procedure with the rear strap. Securing small Velcro tab and Arashield strap just behind the rear of the right leg loop.
- 3.7 Secure the right leg loop retaining strap by fastening the snap.

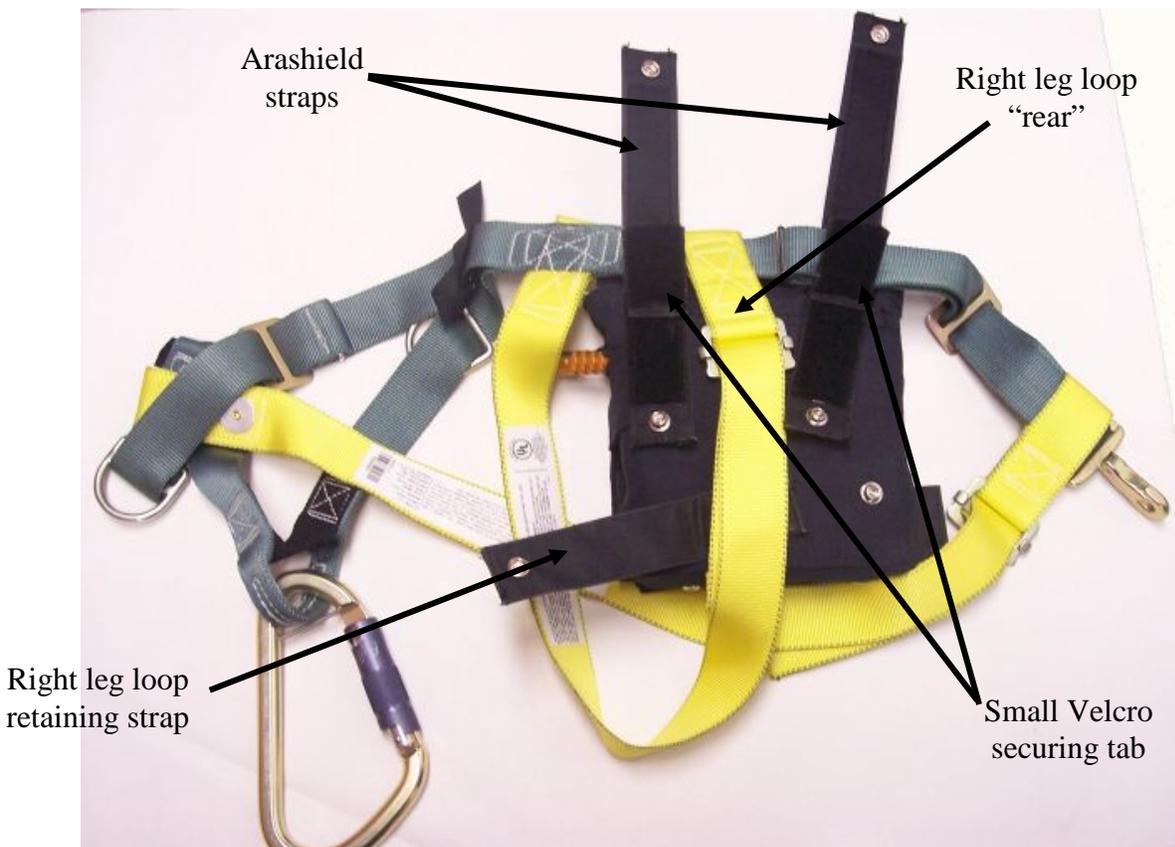


Figure 7



Figure 7A



Figure 7B

4. CONNECTING CARABINER TO PSS D RING

- 4.1 After mounting the bag to the waist band of the harness, the carabiner must be attached to the PSS “D.”
- 4.2 Slide the PSS “D” ring back to the point where the harness handle is attached to the waist band. Ensure the harness handle lays flat against the waist band of the personal harness.
- 4.3 Open Triple Action Gate in the following manner:
 - 4.3.1 Grasp the triple action gate with the right hand.
 - 4.3.2 Slide the gate forward as far as possible.
 - 4.3.3 Take one quarter turn to the left.
 - 4.3.4 Push gate over to the spine of the carabiner.
- 4.4 Grasp the PSS “D” ring with the left hand.
- 4.5 Place open carabiner into the center of the PSS “D” ring and allow gate to close around the **BOTTOM** portion of the “D” Ring. (Figure 8)



Figure 8

- 4.6 Ensure the gate has closed and locked securely by applying lateral pressure on the gate towards the spine of the carabiner.
- 4.7 When the harness and the PSS are properly donned, the gate should be facing down and away from the body. (Figure 9)



Figure 9

5. INSPECTION

- 5.1 The PSS shall be inspected at the following times:
 - 5.1.1 At the start of each tour.
 - 5.1.2 Semi-annually.
- 5.2 The PSS shall be properly connected to the right side of the personal harness at all times, as illustrated in Figure 10.



Figure 10

- 5.3 At the start of each tour, the PSS shall be inspected for the following:
 - 5.3.1 Bag properly connected to the harness.
 - 5.3.2 Carabiner properly connected to the PSS “D” ring.
 - 5.3.3 If the bag (or any component of PSS) shows signs of heat exposure (discoloration, degradation, melting, charring, etc.) the entire system (PSS bag, rope, EXO, and harness) should be placed out of service as specified in section 6. (Figure 11)
 - 5.3.4 Bag properly closed and components secured inside.



Figure 11

5.4 Semi-Annual Inspection of PSS

5.4.1 PSS shall be repacked semi-annually as part of the Semi-Annual Safety Equipment Inspection, and as needed. (See Training Bulletin, Rope 4 Data Sheet 1 for repacking instruction).

5.4.2 The semi-annual inspection shall cover the entire PSS.

5.4.3 The entire length of the rope, including sewn eye, shall be checked for fraying, cut fibers, abrasions or other signs that might indicate possible degradation. If any defects are noted, the PSS is to be placed out of service.

Note: The inside liner of the rope bag is dyed black. Over time, the rope can be discolored in spots by contact with the liner indicated by dark shading to the rope. The discoloration of the rope due to the dye does not affect the load bearing capacities of the rope.

5.4.4 The anchor hook, EXO and carabiner shall be checked for any deformities or sharp edges. If any defects are noted the PSS is to be placed out of service.

5.4.5 Ensure that the figure "8" stopper knot is properly dressed at the end of the rope.

5.4.6 If any doubt exists about the serviceability of any component of the PSS, it shall be placed out of service.

5.4.7 Upon completion of required inspection and repacking, the company officer shall update the "PSS Checklist Application" on the Intranet and ensure the EXO and Harness serial number assigned to each member are correct.

NOTE: The sewn eye is only to be used with the issued hook. No other hardware or device should be placed into the sewn eye.

5.5 Post Operations Inspection of the PSS

5.5.1 After concluding operations, members shall inspect the outside of the bag for any signs of exposure to heat, defects and or contamination.

5.5.2 If contamination or defects are found, see Addendum 1.

5.5.3 If replacement is needed, follow steps in Section 6.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

THIS PAGE WAS INTENTIONALLY LEFT BLANK

PERSONAL SAFETY SYSTEM (PSS) REPACKING PROCEDURE

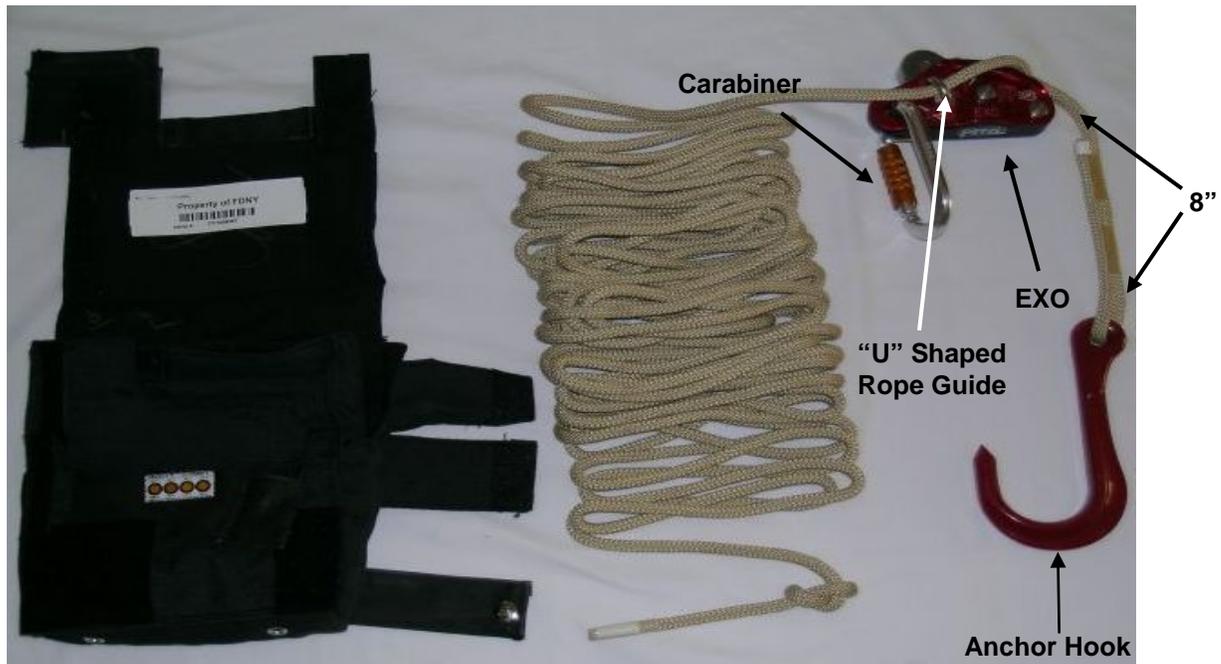


Figure 1

- The PSS is laid out on a clean flat work area. (Figure 1)
- The bag should be placed on its back with bag opening facing away from member.
- Place the figure 8 stopper knot on right edge of flap closure just above rope storage section.(Figure 2)
- Weave rope to opposite edge of flap and return to the right edge, folding the rope next to the previous row. Continue this process making five flat rows. (Figure 2)
- Slide five folds into rope storage section of bag. Repeat this process until approximately 18 inches of rope with hook and EXO remain.
- Be sure to maintain 8 inches of rope between eye of hook and EXO. (Figure 1)

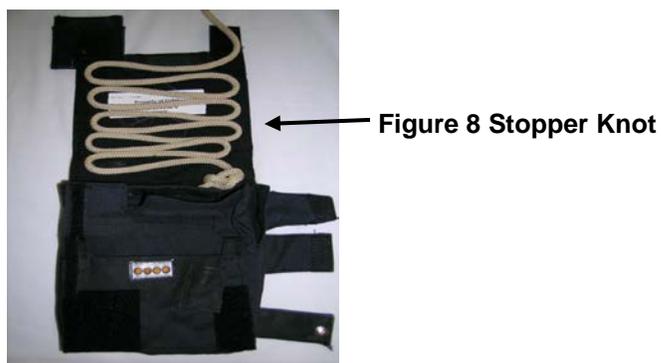


Figure 2

- Secure rope in lower compartment by closing the rope separation flap and fastening Velcro closure.
- The portion of rope coming from the rope storage area to the EXO should pass through the small cutout in the rope separation flap and rest on the side of EXO closest to the body if the bag were mounted on waist band of the personal harness.
- The rope shall have an eight inch loop between the “U” shaped rope guide and the EXO. (Figure 3)
- Place EXO flat side down on top of the rope separation flap with the handle of the EXO facing away from the body if the bag were mounted on the waist band of the personal harness.



8" Loop of
Rope

Figure 3

"U" Shaped
Rope Guide

- The end of rope connected to the hook/anchor then passes over the handle of the EXO.
- Fold the 8 inches of remaining rope behind back edge of Anchor/Hook and place hook and rope into the hook pocket. Place the tip into its keeper. (Figure 4)
- The carabiner will extend out of the cutout on the leading edge of the storage bag with the (gold colored) triple action lock gate facing away from the body if the bag were mounted on the waist band of the personal harness.
- Any excess rope between storage compartment and EXO should be packed into the lower rope compartment via the 2" cutout in the rope separation flap at this time.

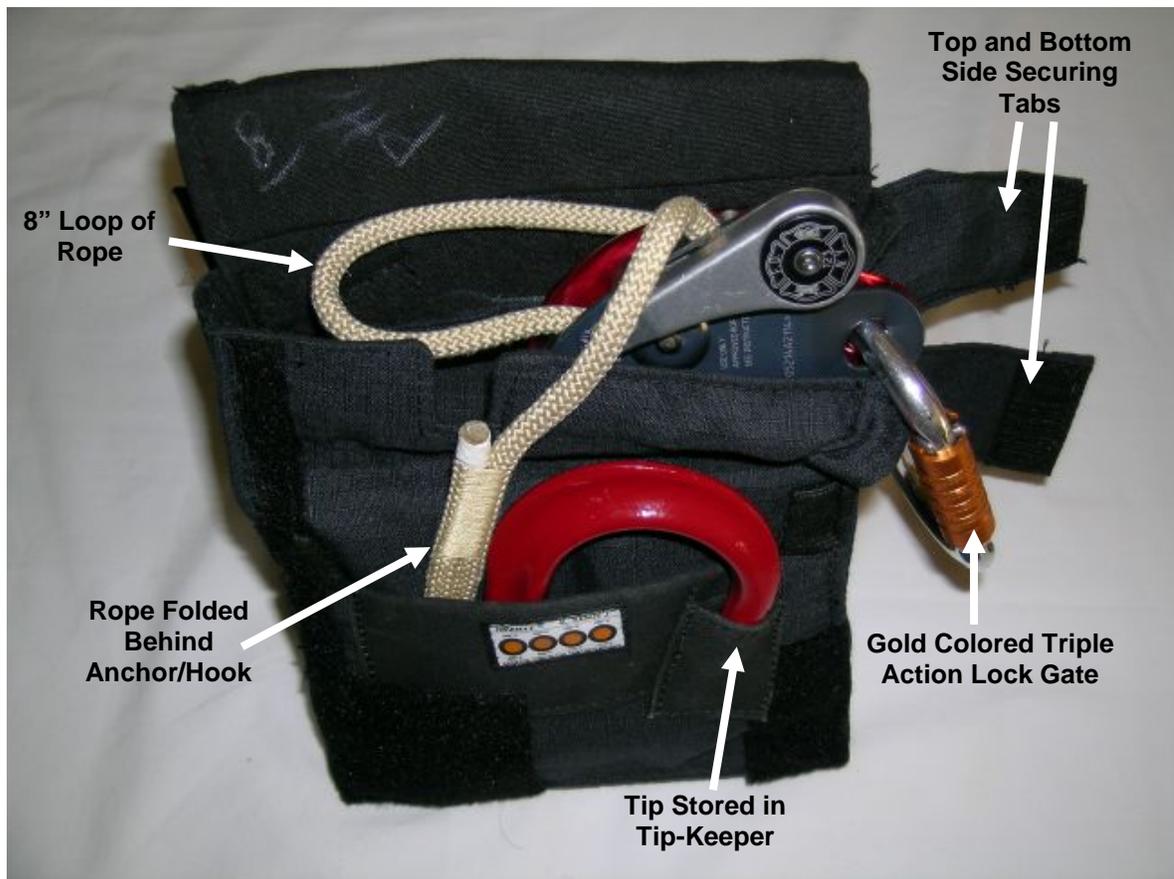


Figure 4

- Secure outer flap with Velcro closure.
- The two side securing tabs are now connected. The top tab runs through the Carabiner and the bottom tab runs underneath Carabiner. Secure both tabs with Velcro closure. (Figure 4)
- Storage Bag may now be connected to the personal harness.

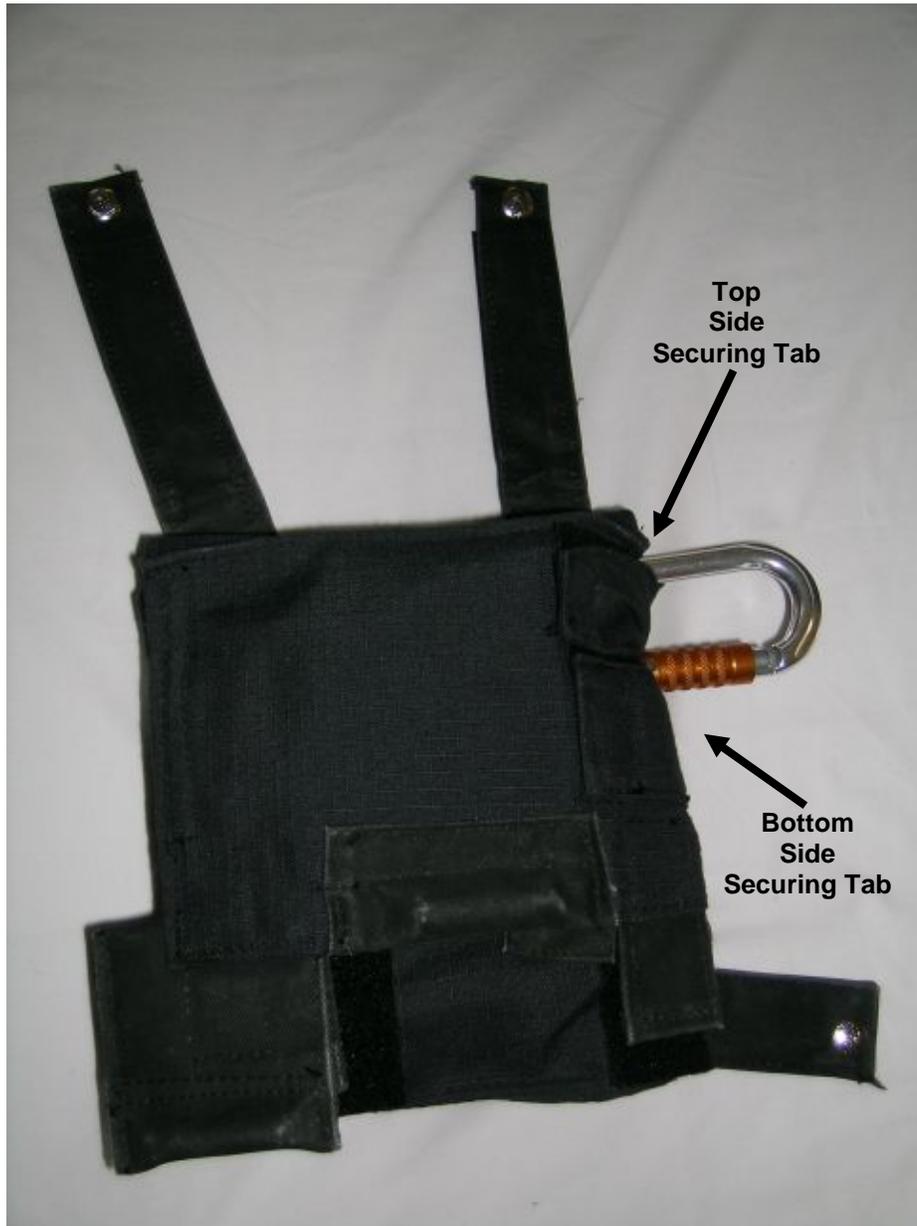


Figure 5

Exit Window Using PSS

1. EQUIPMENT

Personal Harness and Personal Safety System.

2. OBJECTIVE

To enable a firefighter to remove themselves from an untenable position above grade.

3. USING THE PERSONAL SAFETY SYSTEM

This system should **ONLY** be used after all other means of self-rescue have been exhausted.

When a member has decided to deploy the Personal Safety System, a **Mayday** transmission for a trapped member must be transmitted.

In addition to all other required information relayed for a trapped member, include that you are in the process of deploying the Personal Safety System.

When a point of safety is reached after using your Personal Safety System, the Incident Commander must be notified.

If conditions permit, tying off to a substantial object is the **preferred** method of anchoring the personal safety system.

Locate and clear a window suitable for exit.

Select a suitable substantial object, e.g. steam riser, radiator, two wall studs, door frame, etc.

3.1 ACCESSING THE SYSTEM FROM THE STORAGE BAG

Locate the storage bag with the right hand. Fully open the flap closure ensuring the two side securing tabs are released from the flap closure.

(Figure 1)



Figure 1

Grasp anchor hook with right hand sliding it up and out of storage bag. **(Figure 2)**



Figure 2

Grasp anchor hook with both hands in front of your body.

With both hands on the hook, pull forward sharply.

This motion will deploy the EXO from the storage bag, disengage the handle support strap and allow the PSS “D” ring to slide forward. **(Figure 3)**

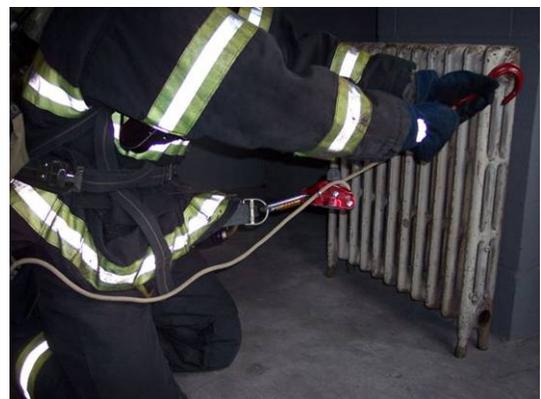


Figure 3

Once the harness handle is fully deployed, leave the hook in the left hand and slide the right hand down to the EXO.

Depress the cam with your right thumb and extend your left arm allowing the rope to pass through the EXO.

Maintain harness handle fully deployed by keeping right hand extended away from the body.

(Figure 4)



Figure 4

Note: Introduce enough rope between the hook and EXO to pass the rope around the substantial object and tie the anchor knot. Introducing more rope than what is necessary for the EXO to clear the window sill may cause the system to be shock loaded when exiting the window.

3.2 ANCHORING

Pass the hook around the substantial object. Allow enough slack to tie the anchor knot.

Tie the Anchor Knot.

With palms facing up, place the anchor hook on top of the rope. (Figure 5)

Make a half hitch with right hand.



Figure 5

Place the half hitch over point of anchor hook and pull taut. (Figure 6)



Figure 6

Make a second half hitch in the same manner as the first half hitch. (Figure 7)

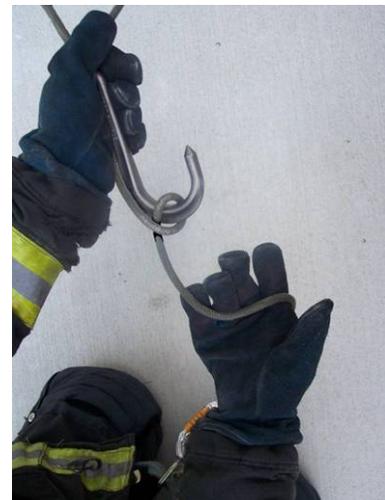


Figure 7

Place the second half hitch over the point of the anchor hook and pull taut. (Figure 8)



Figure 8

Completed Anchor Knot.
(Figure 9)



Figure 9

Examples of alternate methods of the anchor hook used on a remote anchor with saddle and tip.
(Figures 10 through 13)



Figure 10



Figure 11



Figure 12



Figure 13

Note: When using the anchor hook as pictured in figure 12 and 13, place the anchor hook as low as possible keeping tension. This will help prevent the anchor hook from coming off of the anchor point.

3.3 LOADING THE SYSTEM

Move backwards from anchor point until rope and EXO are under tension.

Lean back sharply using body weight to pull against anchor to:

Test the substantial object,

Insure full harness handle deployment with PSS “D” ring and EXO at top of harness handle,

Expose the EXO allowing for easy access by member.

4. PAYING OUT FROM ANCHOR POINT TO EXIT POINT

- 4.1 Facing anchor, grasp the EXO with left hand. With palm facing up, use heel of hand to depress cam, keeping all fingers away from rope (eliminating excess friction during payout). (Figure 14)

Note: You will not be able to slide the EXO along the rope unless cam is depressed.

With right hand, grasp the rope between the EXO and storage bag with palm facing down.

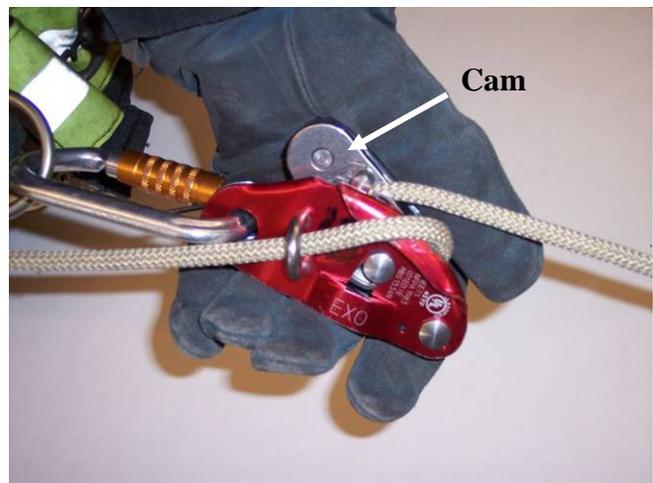


Figure 14

Turn slightly to the right. Right shoulder points to the exit window.

Keep rope in right hand while moving across room.

Continue pulling rope from the storage bag, maintaining a small amount of slack between right hand and the EXO to eliminate friction while moving towards window.

Note: Leading with your right hand will be the most effective way to exit room.

With EXO in left hand, maintain tension on rope between EXO and substantial object.
(Figure 15)



Figure 15

5. PREPARING TO EXIT WINDOW

Upon reaching the window, the EXO must be brought to a point beyond the outermost edge of the windowsill.

Extend the device in the left hand beyond the sill, maintaining slack with the right hand to allow the EXO to payout with less resistance. (Figure 16)

Note: It is absolutely necessary that the EXO be brought beyond the sill.



Figure 16

6. EXITING WINDOW

After EXO is beyond outermost edge of the sill, let go of the EXO.

With left hand, grasp inner edge of the interior wall, making sure hand is not under rope.

Right hand, still holding rope, should now pull rope taut.

Place right fist outside, against wall, below window sill. (Figure 17)

Note: Holding the EXO while exiting may prevent engagement of the locking cam and result in a free fall.



Figure 17

Maintain left hand position inside of window.

Roll forward in a head first manner until upper torso and right leg are outside of window. (Figure 18)

Note: This maneuver eliminates the need to straddle the window and keeps member in lower portion of the window below high heat.



Figure 18

Lock left leg on interior wall. (Figure 19)

Maintain position of left hand on the interior wall opposite the left leg.

Note: This maneuver allows for a controlled exit, positioning your body below the window and evenly loading the system.



Figure 19

Maintain grasp of rope with right hand.

Release left leg from interior wall.

Maintain left hand position to allow the body to pivot to an upright position. (Figure 20)

Release left hand from interior wall.

Note: Left hand must maintain its grasp on the interior wall until the body is in an upright position.



Figure 20

Place toes against the wall, with feet shoulder width apart.

(Figure 21)

While grasping rope with the right hand, slide hand out so rope is at a 90 degree angle to the EXO.

Bring left hand to left side of the EXO and access operating handle.

Slowly pull the operating handle towards you to disengage cam and begin descent.

Maintain position of the right hand at a 90 degree angle to the EXO during the descent.

Continue descending until reaching the ground or lower floor.

Disconnect carabiner from the PSS “D” ring and move to an area of safety.



Figure 21

Note: If conditions permit, member shall descend to ground level.

7. PROPER USE OF OPERATING HANDLE

Operating handle is controlled with the left hand.

To descend, pull operating handle towards the body.

Speed of descent will be controlled by the operating handle and the proper positioning of the right hand.

Releasing the operating handle will immediately stop the descent.

Note: Pulling the operating handle too far will cause over speeding and uncontrolled descent. If member begins to over speed, release lever with left hand and maintain firm grasp of rope with right hand to stop your descent. It is essential that the right hand always stays in contact with the rope to help prevent a rapid descent.

8. ANCHORING AT WINDOW



Figure 21

Anchor hook at window sill as shown in figure 21.

Place anchor hook in palm of left hand. (Figure 22)

Grasp rope between EXO and storage bag with right hand.



Figure 22

8.1 PREPARING TO EXIT WINDOW

Maintain left hand on hook and right hand on rope.

Place head and upper torso into window opening. (Figure 23)

Place hook into selected anchor position with left hand.



Figure 23

Hold hook in place with palm of left hand. Do not wrap fingers around anchor hook or rope.

Left hand maintains anchor hook position inside of window. (Figure 24)



Figure 24

8.2 EXITING WINDOW

Pull rope taut with right hand. This will enable EXO to clear window sill.

Place right fist outside, against wall, below window sill. (Figure 25)

Make sure anchor hook is set and that no portion of left hand will be trapped under the hook or rope.



Figure 25

Maintain left hand position on the hook inside of window.

Roll forward in a head first manner until upper torso and right leg are outside of window. (Figure 26)

Note: This maneuver eliminates the need to straddle the window and keeps member in lower portion of the window below high heat.



Figure 26

Lock left leg on interior wall.
(Figure 27)

Maintain position of left hand on the anchor hook.

Note: This maneuver allows for a controlled exit, positioning your body below the window, evenly loading the system and ensures proper position of the anchor hook.



Figure 27

Maintain grasp of rope with right hand.

Release left leg from interior wall.

Maintain left hand position to allow the body to pivot to an upright position. (Figure 28)

Release left hand from anchor hook.

Note: Left hand must maintain its grasp on the anchor hook until the body is in an upright position.



Figure 28

Place toes against the wall, with feet shoulder width apart.

(Figure 29)

While grasping rope with the right hand, slide hand out so rope is at a 90 degree angle to the EXO.

Bring left hand to left side of the EXO and access operating handle.

Slowly pull the operating handle towards you to disengage cam and begin descent.

Maintain position of the right hand at a 90 degree angle to the EXO during the descent.

Continue descending until reaching the ground or lower floor.

Disconnect carabiner from the PSS “D” ring and move to an area of safety.

Note: If conditions permit, member shall descend to ground level.



Figure 29

8.3 PROPER USE OF OPERATING HANDLE

Operating handle is controlled with the left hand

To descend, pull operating handle towards the body.

Speed of descent will be controlled by the operating handle and the proper positioning of the right hand.

Releasing the operating handle will immediately stop the descent.

Note: Pulling the operating handle too far will cause over speeding and an uncontrolled descent. If member begins to over speed, release lever with left hand and maintain firm grasp of rope with right hand to stop your descent. It is essential that the right hand always stays in contact with the rope to help prevent a rapid descent.



Probationary Firefighters Manual Chapter 6

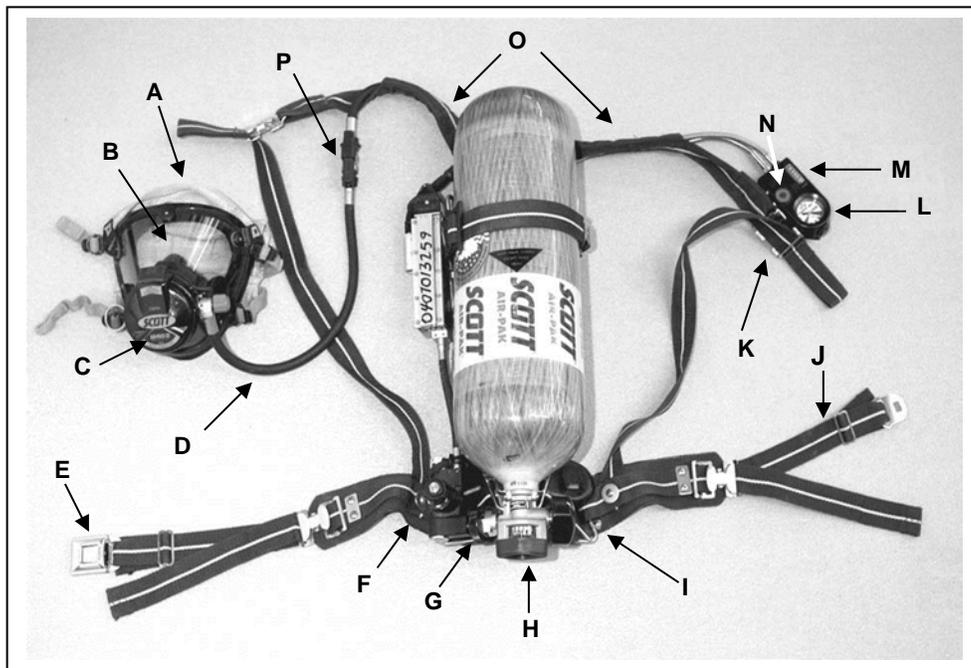
SELF CONTAINED BREATHING APPARATUS (SCBA) & PERSONAL ALERT SAFETY SYSTEM (PASS)

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with the FDNY's policy on self contained breathing apparatus (SCBA) and personal alert safety system (PASS) use.• To familiarize members with the use, care and maintenance of FDNY's SCBA & PASS alarm equipment.
CONTENTS:	<ul style="list-style-type: none">• Description of the Scott 4.5 Mask and explanations of its use and care• Description of the PASS alarm and explanations of the use and care of the various versions of same.• Addendums:<ol style="list-style-type: none">1 Toxins Reference2 (APR) Adapter
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Training Bulletins SCBA

Table of Contents

Section	Subject	Page
1.	Introduction	1
2.	Limitations	2
3.	Description.....	3
4.	Inspection.....	24
5.	Donning and Removal Procedures	32
6.	Emergency Procedure.....	39
7.	Communication	42
8.	Disinfecting & Cleaning Procedures	43
9.	Preventive Maintenance / Inventory.....	46
10.	Identification.....	48
11.	Conclusion	49
12.	Addendums	51

THIS PAGE WAS INTENTIONALLY LEFT BLANK



- | | | |
|-------------------------------|-----------------------------------|-----------------------------------|
| A Kevlar Head net | F Universal Air Connection | K Alligator Clip |
| B Facepiece | G High Pressure Coupling | L Remote Console |
| C Regulator | H Cylinder Valve & Gauge | M Indicator Lights |
| D Low Pressure Hose | I Pak-Alert SE 7 | N Manual Alert Button |
| E Quick Release Buckle | J Waist Belt | O Shoulder Straps |
| | | P Quick Connect/Disconnect |

1. INTRODUCTION

- 1.1 FDNY currently uses the NFPA 2007 Edition, Scott 4.5 Positive Pressure, Self Contained Breathing Apparatus (SCBA). This SCBA meets the approval of the National Fire Protection Association (NFPA), Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH). Use of the SCBA is regulated by the U.S. Department of Labor Safety and Health Act and together with full firefighting clothing, makes it a part of the framework of firefighters' personal protective equipment.
- 1.2 The NFPA 2007 SCBA Standard mandates that all SCBAs must have a visual and audible low air alert device. All of the FDNY's SCBAs have a Heads-Up Display (HUD), a Universal Air Connection (UAC), and a Chemical, Biological, Radiation, Nuclear (CBRN) approval. The regulator diaphragm is made of butyl rubber similar to a "Level A" entry suit. The CBRN approval means that the SCBA has met the NIOSH and NFPA criteria for exposure to Liquid Mustard and Sarin Agents. An approved SCBA CBRN regulator can be identified by its orange background label. An approved back frame assembly can be identified by a CDC NIOSH sticker.
- 1.3 **Members are not fully protected from CBRN agents unless wearing the NFPA 2007 compliant SCBA in conjunction with Proper Protective Clothing (e.g., "Level A" entry suit) and proper Haz-Mat training.**

2. LIMITATIONS

2.1 PROTECTION

- 2.1.1 The SCBA is designed to protect against the Immediately Dangerous to Life and Health (IDLH) atmosphere.
- 2.1.2 The facepiece further protects against entry of contaminants through the eyes.
- 2.1.3 Because the facepiece does not cover the ears, airborne contaminants can enter the respiratory tract through a punctured or ruptured eardrum.
- 2.1.4 The SCBA does not protect against the absorption of toxic and hazardous substances, or radiation through parts NOT covered by the facepiece.
- 2.1.5 The SCBA does not protect against heat exhaustion or exposure to flame or heat.
- 2.1.6 The actual working and exit time achieved from an SCBA will vary considerably depending upon physical conditioning, type of work load, physical characteristics, training, and a number of other factors. It is the individuals' responsibility to know their work and exit times of the SCBA.
- 2.1.7 If a member runs out of air, that member should remove the regulator from the facepiece. The donned facepiece will provide some protection to the skin on the face. Notify Officer and immediately leave the contaminated area. This member MUST be accompanied to a safe area by another member using an SCBA.

2.2 CONFINED SPACES

The Code of Federal Regulations 29-CFR 1910.146 defines a confined space as any area that is:

- ◆ Not designed for continuous human occupancy; and
 - ◆ Large enough so a person can enter and work; and
 - ◆ Has limited means for entry and escape
- 2.2.1 Confined spaces include, but are not limited to, basements, sub-basements and cellars, manholes, pits, tunnels, wells, windowless buildings, storage containers, and other spaces that may be oxygen deficient or contain dangerous levels of airborne contaminants.
 - 2.2.2 All confined spaces are to be considered dangerous until proven otherwise.
 - 2.2.3 All members entering a confined space shall operate with SCBA donned until the space is deemed safe.
 - 2.2.4 Members operating in a confined space must work in teams of two or more and maintain contact with each other, in case assistance is needed.
 - 2.2.5 When a member of a rescue team has to leave an area to service an SCBA, another member must accompany them.

2.3 CONTACT LENSES AND GLASSES

2.3.1 Contact lenses may be worn with the SCBA.

2.3.2 When the use of corrective eye lenses is required during SCBA use, the corrective lenses must not interfere with a good seal between face and facepiece. For example, glasses with temple bars or straps that pass between the face and the seal of the facepiece must not be used. Each size facepiece may be equipped with a lens frame kit. Training Bulletin; SCBA; Addendum 7, details how to procure a Scott AV 2000 lens kit.

2.4 UNDERWATER USE

2.4.1 The SCBA is NEVER to be used underwater.

2.4.2 Submersion in water will render the SCBA inoperative.

2.4.3 If the SCBA becomes submerged, it MUST be placed out of service and returned with a completed service tag (RT-2) stating the problem, to the Mask Service Unit.

3. DESCRIPTION

3.1 BACKFRAME AND HARNESS ASSEMBLY

3.1.1 The backframe is the rigid base and back plate to which the Harness Straps and Pressure Reducer Assembly are attached. Its main purpose is to hold the air cylinder. This is done by means of an adjustable cylinder band and a locking tab.

3.1.2 The harness assembly consists of two adjustable shoulder straps and adjustable waist straps made of Kevlar with a quick release buckle. The shoulder straps have pockets through which the low pressure hose and the remote gauge line pass. The waist belt rests on the hips of the wearer and distributes most of the weight of the SCBA to that area.

3.2 BREATHING AIR CYLINDER

3.2.1 Cylinders are constructed of an aluminum shell and wrapped with a fiber composite including neck and bottom, which strengthen and protect the shell.

3.2.2 Pressurized to 4500psi, the cylinder holds purified breathing air.



Figure 1



Figure 2



Figure 3

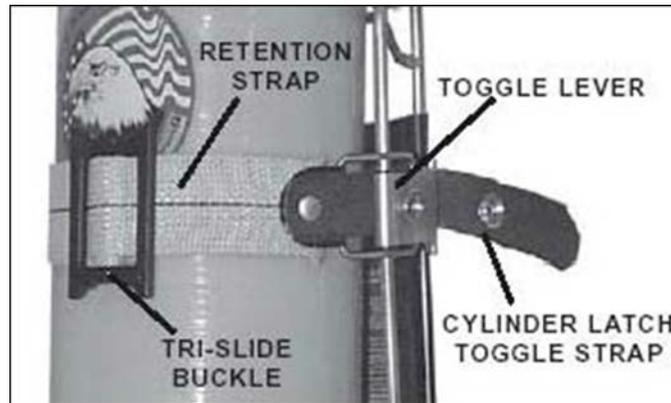


Figure 4

3.2.3 The Date of Manufacture is listed on the SCOTT label by month and year. The service life of an air cylinder is 15 years. If a manufacture date is greater than 15 years, the cylinder must be removed from service, bled down, tagged, and returned to MSU. **Figure 1**

3.2.4 Hydrostatic testing is done every 5 years. If the test date shows greater than 5 years, the cylinder must be removed from service, bled down, tagged and returned to MSU. The hydrostatic test date will also be found on the top of the cylinder. For example, the number 102 will indicate that this cylinder was tested in January of 2002, and will need to be retested by January of 2007. **Figure 2**

Note: 10 minute escape cylinders used by SOC for confined space, need to be hydrostatic tested every 3 years.

3.2.5 Cylinders that have had a Hydrostatic retest will have a round Hydro Recertified label glued to it, with month and year of retest. **Figure 3**

3.2.6 The SCBA assembly has the capability of accepting 30, 45 or 60 minute cylinders. Since all 4.5 cylinders are pressurized to 4500psi, the difference between them is their varying cylinder sizes. The cylinder slide buckle is the only adjustment that must be made when using a different duration cylinder. Each cylinder has a similar hanger to lock onto the backframe. **Figure 4**

3.2.7 **SCOTT 4.5 NIOSH RATED SERVICE TIME CYLINDERS**

The service duration times for 30, 45 and 60 minute cylinders are determined by a NIOSH Breathing Machine Test simulating an average adult moderate work rate of 40 liters per minute.

30 minute cylinder = approximately 1200 liters

45 minute cylinder = approximately 1800 liters

60 minute cylinder = approximately 2400 liters

3.2.8 These are rated durations and the actual time achieved from the cylinder will vary considerably. The End of Service Time Indicator (EOSTI) alarms (vibralert and HUD) actuate when approximately 25% of full cylinder pressure remains in the cylinder and valve assembly. The alarms will continue to operate until the cylinder is nearly depleted. It is the individuals' responsibility to know their working and exit time of the SCBA.

The working and exit time of the SCBA will depend on factors such as:

- ◆ The degree of physical activity of the user
- ◆ The physical conditioning of the user
- ◆ The degree to which the user's breathing is affected by excitement, fear or other emotional factors
- ◆ The degree of training or experience which the user has with this or similar equipment
- ◆ Whether or not the cylinder is fully charged at the start of the work period
- ◆ The atmospheric pressure; for example, if used in a pressurized tunnel or caisson at 2 atmospheres, the duration will be one-half as long as when used at 1 atmosphere; and at 3 atmospheres, will be one-third as long
- ◆ Loose or improperly fitted facepiece
- ◆ The condition of the SCBA

- 3.2.9 The cylinder valve assembly consist of:
(See Figure 5)
- A. **Rubber Bumper**-for protection of the assembly.
 - B. **Cylinder Gauge**-reads the pressure of the air within cylinder and gauge assembly. Cylinder gauge must read the same on both sides.
 - C. **Cylinder Hanger**-connects cylinder to backframe assembly.
 - D. **Over Pressurization Disk**-a safety feature should the Cylinder be over pressurized.
 - E. **Cylinder Valve**-to be opened fully counter clockwise when in use. To close, push valve in and turn clockwise to stop.

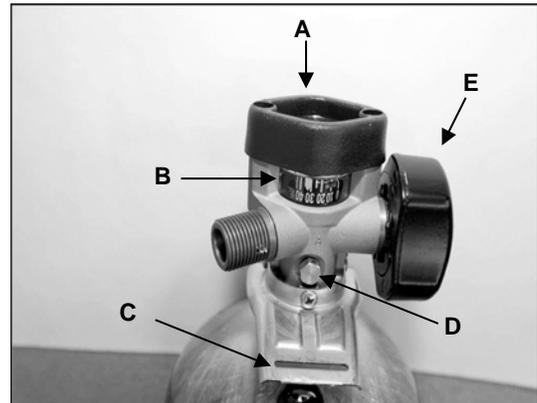


Figure 5

- 3.2.10 Spare cylinders should be placed in either storage boxes or apparatus holders. Extra cylinders should be placed on their sides, with the valve stem and handle protected from damage
- 3.2.11 Inspect all spare cylinders (depots, High-Rise Units, company and reserve apparatus) weekly on Mondays for FULL pressure (4500psi). Stored cylinders found below FULL should be tagged and returned to the Mask Service Unit for further inspection.
- 3.2.12 Compressed air is dangerous, service cylinder so that they do not fall or roll away. Do not open the cylinder valve when the cylinder is not in the backframe or secured in some other manner. When opening a cylinder valve of a secured cylinder, be sure not to direct airflow at yourself or any other individual.
- 3.2.13 Avoid fully depleting cylinders and leaving valve open. Doing so will allow moisture and contaminants to build up inside the cylinder.
- 3.2.14 Designated training cylinders are identified with a blue top and/or a polymer protective sleeve. These cylinders are **not** to be used for firefighting purpose.
- Note** It is prohibited to perform any of the dragging methods, listed in the Unconscious Firefighter Removal procedures, on members wearing a company or spare SCBA. Dragging a member with an SCBA, **for training purposes**, has caused injury to members and unnecessary damage to air cylinders and SCBA's. Each Battalion is issued a fully outfitted Unconscious Firefighter mannequin to train with.

3.3 CYLINDER EXCHANGE

3.3.1 Exchange cylinder for one that is FULL when

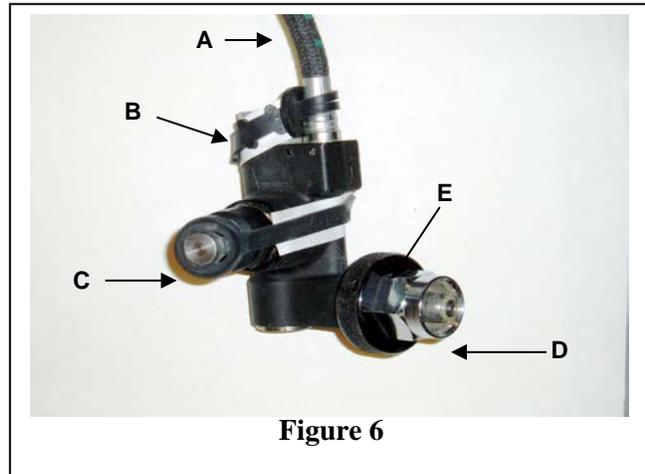
- A. Prior to operating, the remote gauge reads less than FULL (green area).
- B. While operating, when the remote gauge and HUD reads less than 1/4 (Vibralert, Remote Gauge and HUD (EOSTI) will warn of this).

3.3.2 Exchange Procedure

- A. Shut down the cylinder valve FULLY and purge all residual air from the SCBA.
- B. Uncouple the high pressure hand coupling from the cylinder.
- C. Unsnap and lift cylinder toggle strap.
- D. While pressing down on the cylinder locking tab, grasp the cylinder at the rubber bumper and slide the cylinder hanger away from and free of the bottom hook.
- E. Slide cylinder over locking tab until top of cylinder clears band.
- F. Slide in a FULL cylinder in opposite direction of removal.
- G. As cylinder hanger clears bottom hook of wire frame, let hook slide back and lock into hanger slot.
- H. Attach high pressure hand coupling to cylinder and turn clockwise. Coupling is to be made hand tight, never use a wrench to tighten coupling.
- I. Push down on cylinder band toggle lever to firmly secure cylinder to backframe. Toggle lever should not be hard to push down, but have some tension. If necessary, readjust the slide buckle on the retention strap.
- J. Open cylinder valve FULLY. Listen for any leaks in the entire SCBA system.
- K. Shut down the cylinder valve and purge all residual air from the SCBA system, prior to placement in apparatus mounting bracket.

3.4 HIGH PRESSURE HOSE AND HAND COUPLING (Figure 6)

- A High Pressure Hose
- B Relief Valve
- C UAC Connection
- D Nylon O-Ring
- E High Pressure Hand Coupling



3.4.1 The high pressure hose and high pressure hand coupling conveys breathing air from the cylinder to the pressure reducer assembly. Air pressure within this hose can be as much as 4500psi.

3.4.2 NEVER use a wrench to tighten the high pressure hand coupling

3.4.3 During inspection of the SCBA, there may be a need to tighten or replace the Nylon O-Ring. To do so, use a 1/8" Allen wrench and a 7/16" open end wrench. **Figure 7**



Figure 7

3.5 UNIVERSAL AIR CONNECTION (UAC)

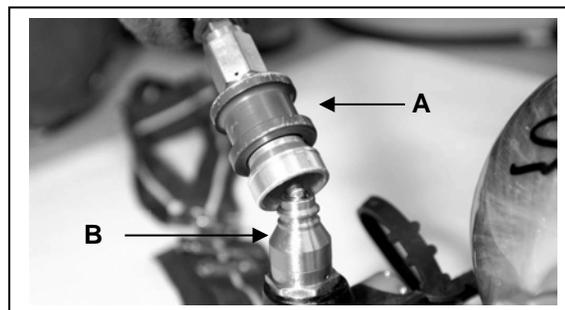


Figure 8

- 3.5.1 SCOTT 4.5 SCBAs are fitted with a UAC System which permits **emergency replenishment** of an approved SCBA breathing air supply cylinder on a user's SCBA from an approved air supply source while in use. This is not a Quick Charge attachment and must **not** be used for routine recharging of the air cylinder, buddy breathing, transferring air from another SCBA, or any unapproved use. The UAC is for **emergency use only** when the SCBA user is incapacitated within the hazardous atmosphere. The UAC manifold is equipped with a relief valve which will open if the supply pressure of the emergency air supply exceeds the maximum pressure rating of the complete SCBA. However, the supply pressure from the High Pressure Coupling (A), of the emergency air supply to be connected to the UAC (B), must not exceed 4500psi. **Figure 8**
- 3.5.2 The UAC Connection must have its protective dust cover in place. A missing cover allows damage to the UAC or debris and contaminants to enter the connection, allowing for a possible malfunction when used with the Fast Pak. An SCBA with a missing UAC dust cover places the SCBA out of service. It must be tagged with an RT-2 and forwarded to MSU.
- 3.6 PRESSURE REDUCER ASSEMBLY (PRA) (**Figure 9**)

- 3.6.1 The Pressure Reducer Assembly (PRA), mounted on the left side of the backframe, reduces the high pressure breathing air received from the cylinder. Consisting of two systems, the PRA normally reduces the operating pressure to 100 psi before entering the regulator's low pressure hose.



Figure 9

- The regulator then controls the pressure within the facepiece to slightly above atmospheric pressure.
- 3.6.2 A malfunction of the PRA's primary system will automatically direct breathing air into a secondary system. When this occurs, the operating pressure will only be reduced to 150 psi and cause the vibralert alarm to activate. The member will only know that the vibralert alarm has activated and **MUST NOTIFY THEIR OFFICER AND IMMEDIATELY LEAVE THE CONTAMINATED AREA.**
- Note:** If a member of a company, using an SCBA, leaves a contaminated area, this member must be accompanied to a safe area by another member using a SCBA.
- 3.6.3 Failure of both the primary and secondary systems in the open position will activate a Relief Valve in the PRA, which will rapidly discharge all pressure in excess of 185psi into the atmosphere. When this occurs, the cylinder valve should be partially closed, allowing only a minimal amount of air to release, permitting the member to both breathe and conserve air. **MEMBER MUST NOTIFY THEIR OFFICER AND IMMEDIATELY LEAVE THE CONTAMINATED AREA.**
- Note:** If a member of a company, using an SCBA, leaves a contaminated area, this member must be accompanied to a safe area by another member using a SCBA.

3.7 Low Pressure Hose

- 3.7.1 The low pressure hose conveys breathing air from the PRA, to the regulator assembly.
- 3.7.2 The Low pressure hose incorporates a Quick Disconnect with HUD connection. This connection allows for one of the options with the Fast Pak.
- 3.7.3 To disconnect – While pushing the plug “D” into the socket, pull the locking sleeve “E” back toward the guard. The plug “D” will separate. **Figure 10**
- 3.7.4 To reconnect - align the HUD plug with the mating connector and push plug “D” into socket until the locking sleeve “E” pops forward. Test for proper engagement by tugging on the coupling. **Figure 11**

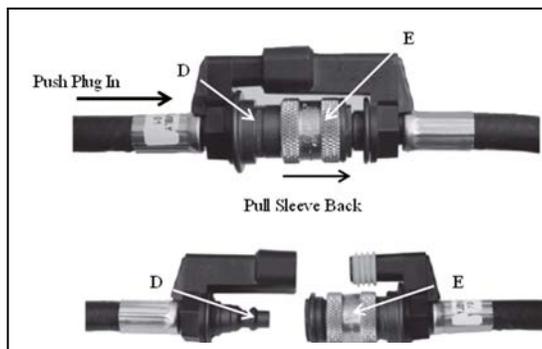


Figure 10

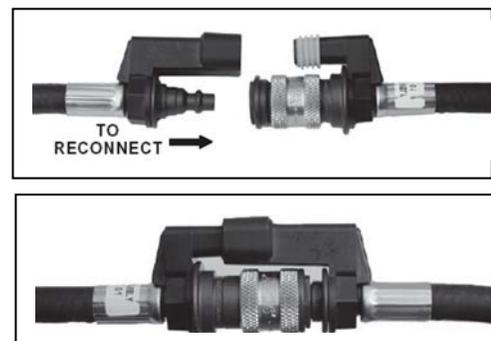


Figure 11

3.8 REGULATOR ASSEMBLY

3.8.1 Positive Pressure Demand Regulator

The Positive Pressure Demand Regulator regulates and maintains pressure within the donned facepiece. This is done with the breathing air received from the Pressure Reducer Assembly. The positive pressure inside the facepiece (internal pressure) is slightly higher than the pressure outside (atmospheric pressure), and is maintained when the seal between the two atmospheres is disturbed. Internal pressure within the facepiece creates an outward thrust of breathing air from any opening, thereby preventing contaminants from entering the member's breathing zone. Prolonged facepiece disturbance can deplete available breathing air sooner than expected.

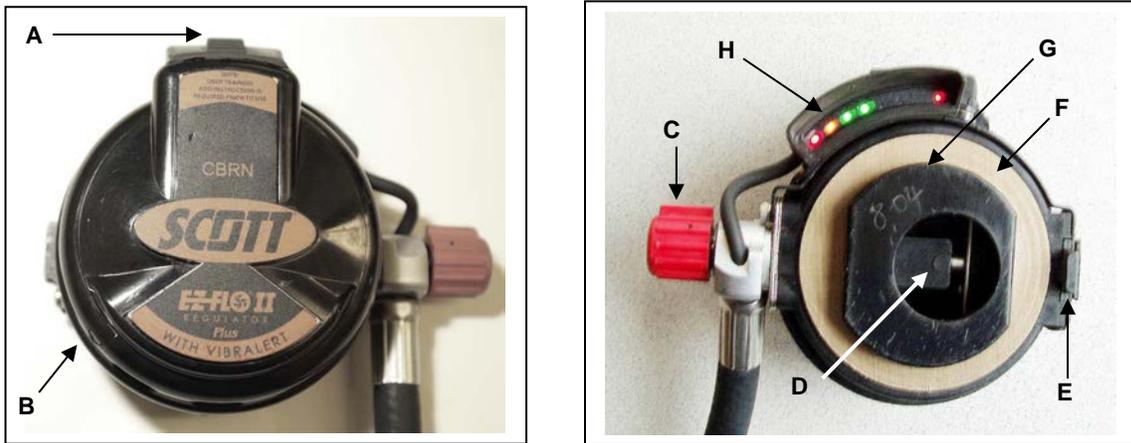


Figure 12

- | | |
|---------------------------------|---------------------------|
| A Manual Shut-Off Switch | E Snap Lock |
| B Regulator Cover | F Regulator Gasket |
| C Purge Valve | G Spray Bar |
| D Vibralert Alarm | H Heads-Up Display |

3.8.2 Manual Shutoff Switch (Figure 12 {A})

- A. A manual shut-off switch is mounted on top of the regulator assembly. The function of the switch is to stop the flow of air into the facepiece prior to facepiece removal. When used, the switch conserves the limited amount of breathing air which can remain in the SCBA. If the switch is not pressed, a full 45 minute cylinder can be depleted in approximately 4 minutes, exhausting the member's available breathing air.
- B. When pressed, the switch holds the regulator in the closed position, stopping air flow. The switch automatically releases when the member inhales sharply through the facepiece, allowing air to continue to flow. If the manual shut off fails to release for any reason, turn the red purge valve downward, 180 degrees to start the flow of air. Notify the officer and leave to a safe area, accompanied by another member using a SCBA.

3.8.3 Regulator Cover (Figure 12 {B})

The EZ Flow II regulator has a high density plastic cover that won't dent. It provides less exhalation resistance, which can increase overall operating time.

3.8.4 Purge Valve (Figure 12 {C})

- A. A red purge valve knob is located on the left side of the regulator assembly. It is a manual override allowing the user to create a constant flow of air into the facepiece of up to 225 liters per minute. Control this flow by partially closing the Purge Valve. When the regulator is correctly positioned on the facepiece, a stem on the purge valve will point upwards in its normal mode. Turning the valve downward 180 degrees away from the member's face will activate the purge. Do not force the valve past the 180 degree stop.

- B. The purge valve is used:
1. To relieve any residual pressure remaining in the SCBA system after the air supply is shut down.
 2. To release all air remaining in the attached breathing air cylinder, prior to placing the entire SCBA assembly into a Haz-Mat overpack drum.
 3. To clear the spray bar holes of any small particles.
 4. To clear the facepiece of any contaminants that may have entered.
 5. To defog the facepiece.
 6. For the following **EMERGENCIES**:
 - a. Failure of the regulator in the closed position, (no air to facepiece) turn purge valve counter-clockwise. If failure of the regulator in the open position, (too much air flow in the facepiece), air flow can be controlled by opening the purge valve fully and partially closing the cylinder valve.
 - b. To provide airflow if facepiece becomes severely damaged.
 - c. If the manual shut off switch fails to release for any reason.

Note - In all SCBA emergencies, the member must notify their officer and immediately leave the contaminated area. This member **MUST** be accompanied to a safe area by another member using a SCBA

3.8.5 Vibralert Alarm (Figure 12 {D})

- A. A vibralert alarm is housed within the regulator assembly. The alarm gives warning by both an audible and vibratory action around the facepiece. The vibratory action is especially evident when working in areas with background noises, which may muffle the audible alarm.
- B. The vibralert is an EOSTI that activates at approximately 25% of the cylinders air capacity, alerting the member to exit the contaminated area. The vibralert and HUD work independently and may not activate at precisely the same time.
- C. The 30, 45 and 60 minute rated cylinders are durations, and the actual time achieved for exiting the IDLH area from the cylinder will vary considerably depending upon your physical condition, type of work load, physical characteristics, training and a number of other factors.
- D. The alarm will also activate if the PRA's primary system malfunctions, thus activating the secondary system.
- E. Upon activation of the vibralert alarm, the member shall notify their Officer and immediately leave the contaminated area. This member **MUST** be accompanied to a safe area by another member using an SCBA.

3.8.6 Snap Lock (Figure 12 {E})

A spring-loaded snap lock is located on the right side of the regulator assembly; it secures the facepiece to the regulator. With the lock facing downward and purge valve up, the regulator inserts into the facepiece's molded groove, and is then rotated clockwise until the lock snaps into place. The snapping action between the molded notches on the facepiece correctly positions the regulator for use.

3.8.7 Regulator Gasket (Figure 12 {F})

A regulator gasket glued on the regulator assembly provides a seal between the facepiece and the regulator. The integrity of the gasket ensures contaminants remain outside the facepiece.

3.8.8 Spray Bar (Figure 12 {G})

A spray bar, comprised of nine small holes, surrounds the upper part of the regulator assembly. As the member breathes, air passes through the bar and is directed toward the lens, helping to keep the facepiece clear of any condensation buildup.

3.8.9 HEADS-UP DISPLAY OPERATION (Figure 12 {H} & Figure 13)

The HEADS-UP DISPLAY is an independent End of Service Time Indicator (EOSTI) that provides a visual monitor of the air supply in the cylinder. The display is fitted to the facepiece-mounted regulator and appears across the bottom of the user's field of view through the facepiece. The HUD consists of four rectangular lights to represent the cylinder pressure at Full, Three-Quarters, One-Half, and One-Quarter. A fifth round red light indicates Low Battery. The HUD operates as follows:

- A. When SCBA's cylinder valve is turned on, the HUD will initialize and illuminate all five lights for twenty (20) seconds. Operation of all five lights must be verified every time SCBA use has begun and with every regular operation inspection.

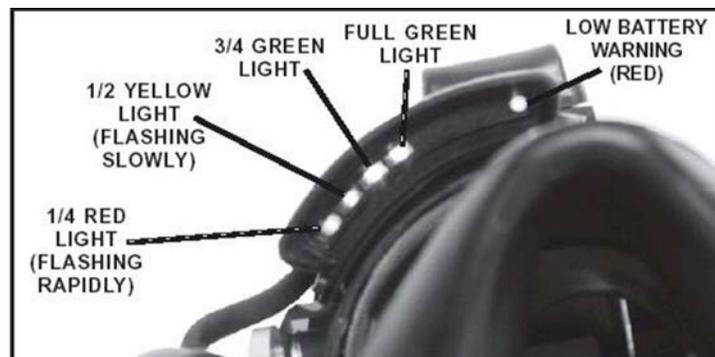


Figure 13

- B. After initialization, the rectangular indicator lights will show the level of the air supply in the cylinder as follows:
1. FULL cylinder - indicated by the two green lights glowing near the center of the display.
 2. THREE-QUARTERS cylinder - indicated by a single green light glowing.
 3. ONE-HALF cylinder - indicated by the yellow light flashing slowly at once a second.
 4. ONE-QUARTER cylinder EOSTI - indicated by the red light at the far left flashing rapidly at ten times a second. WHEN THIS WARNING LIGHT IS FLASHING RAPIDLY, THE MEMBER MUST NOTIFY THEIR OFFICER AND LEAVE THE CONTAMINATED AREA IMMEDIATELY. This member MUST be accompanied to a safe area by another member using an SCBA.
 5. If a member runs out of air, that member should remove the regulator from the facepiece. The donned facepiece will provide some protection to the skin on the face.

Note: The HUD and vibralert work independently and may not activate at precisely the same time.

It is the individuals' responsibility to know their work and exit times of the SCBA.

- C. When the batteries require changing, the round low battery indicator at the far right of the display will light for twenty (20) seconds and then begin to flash slowly at once a second. When the low battery indicator is actuated, the batteries still have sufficient life to operate the HUD longer than the longest duration cylinder installed in the SCBA. However, the batteries must be changed immediately upon termination of use of the SCBA, or before re-entry into the hazardous atmosphere.

INDICATOR LIGHTS	WHAT THEY MEAN	WHAT YOU SHOULD DO
Two Green Lights Glowing	Full Cylinder	Continue Using Mask
One Green Light Glowing	¾ Cylinder	
One Yellow Light Flashing Slowly	½ Cylinder	
One Red Light Flashing Rapidly	¼ Cylinder	Leave Hazardous Area Immediately

3.9 FACEPIECE (Figure 14)

- 3.9.1 The Scott AV 2000 is manufactured in three (3) sizes that are color coded. The size and colors are :
- a. Small size – Green color face seal
 - b. Comfort Seal - Black color face seal
 - c. Extra Large size - Red color face seal
 - d. All members are fit tested as part of the respiratory protection policy and must wear the correct face piece size, that they were fit tested for. Members issued a personal face piece, should wear that face piece. When a member's facepiece is placed out-of-service, it must be returned to MSU with an RT-2 attached. Six (6) comfort seal face pieces are provided for all SCBA riding positions. They are etched with the company designation and affiliated SCBA number.

Note: Divisions have been issued small and extra large facepieces to be used as spares for units under their command. Units requiring a spare small or extra large facepiece shall contact their Division.

- 3.9.2 The outer edge of the lens is fitted with a frame. The rubber seal is molded to form a chin cup at the lower part of the facepiece, where the member's chin rests during use. The remainder of the rubber seal continues around the upper part of the facepiece and has the ability to conform to various facial contours. Failure to get a positive seal will allow air to escape from around the facepiece.
- 3.9.3 A Kevlar head net and strap assembly is fastened to the facepiece. The net is designed to conform to the member's scalp. Two pull straps are attached to each side of the facepiece; pulling the straps, first the bottom and then the top snug, will ensure a proper facepiece to face seal. A buckle-thumb release is attached to each pull strap and facilitates the loosening of the straps prior to facepiece removal.
- 3.9.4 Nose cup assembly is designed to be an integral part of the facepiece and **must** be in place. Inhalation valves, voicemitters, voicemitter ducts, and nosecup retainer must all be present to ensure proper inhalation of breathing air. These components help remove carbon dioxide from within the facepiece.
- 3.9.5 Split ring, attached to a head net tab "D" ring on the user's right side, is provided to secure the facepiece during a stand-by position and while the SCBA is stored on the apparatus.
- 3.9.6 SCBAs should not be worn when conditions prevent a good face to facepiece seal. Such conditions may include, but not limited to, growth of beards, side burns, a skull cap that projects under a facepiece or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of the facepiece. Use of the SCBA without a good face to facepiece seal may reduce the duration of use and/or expose the user to the atmosphere the SCBA is intended to protect against.

3.9.7 All AV 2000 face pieces should have an installed grey nose cup. Black nose cups have been discontinued. Facepiece with a black nose cup should be forwarded to MSU requesting a grey nose cup.

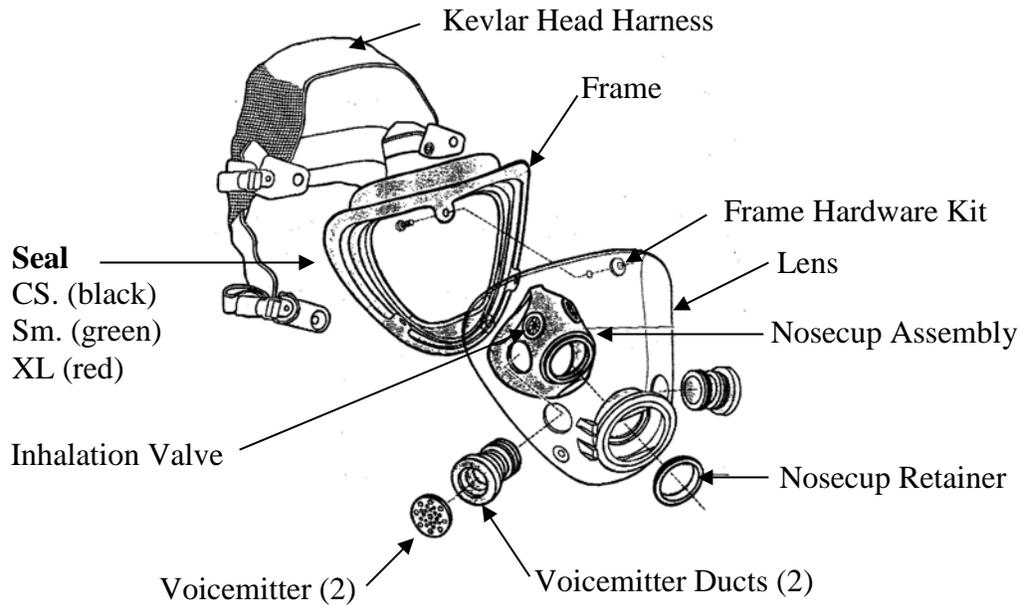


Figure 14



Figure 15

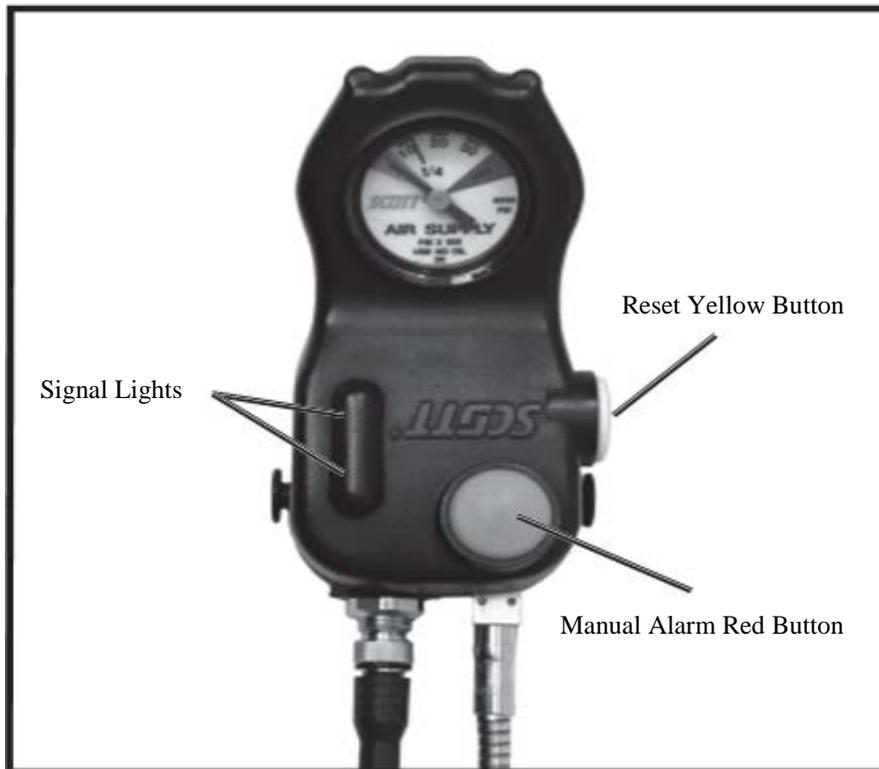


Figure 16

3.10 REMOTE CONSOLE ASSEMBLY WITH PAK-ALERT SE 7

3.10.1 The Scott Pak-Alert SE 7 is intended to be integrated only with the Scott Air-Pak 4.5 Self-Contained Breathing Apparatus (SCBA). The Pak-Alert SE 7 is a Personal Alert Safety System (PASS) intended to assist in locating a member who is incapacitated or in need of assistance.

Note: Pak-Alert SE 7 and PASS are used interchangeably.

3.10.2 The Pak-Alert SE 7 consists of a motion sensor module mounted to the bottom of the SCBA backframe, a pressure switch mounted between the cylinder and gauge line, and a control console mounted on the wearers' right shoulder strap at the pressure gauge location. **Figure 15**

3.10.3 The Control Console, which is located on the right shoulder strap, contains a cylinder air pressure gauge, a console lens, a manual alarm button (red indicator), and a reset button (yellow indicator) located on the side of the console. **Figure 16**

A break in the Control Console tube will result in a slight air leak. While this leak will not greatly reduce the member's breathing air, the member **MUST NOTIFY THEIR OFFICER AND IMMEDIATELY LEAVE THE CONTAMINATED AREA.** This member must be accompanied to a safe area by another member using an SCBA.

The vent holes on the back of the Control Console should **NEVER** be plugged or sealed in any way, regardless of a suspected air leak. If a leak is suspected, member **MUST NOTIFY THEIR OFFICER AND IMMEDIATELY LEAVE THE CONTAMINATED AREA.** This member must be accompanied to a safe area by another member using an SCBA. There are two (2) lights on the back of the Pak Alert SE 7 called buddy lights. They flash green in normal mode and red in alarm mode.

3.10.4 Provided proper batteries have been installed and the cylinder contains air, this PASS device is automatically activated when the SCBA is pressurized by opening the cylinder valve. Once activated, the Scott Pak-Alert SE 7 will remain activated until:

1. The cylinder is turned off and the residual air pressure purged from the regulator, and
2. The reset button has been pressed twice.

3.10.5 In the automatic mode, the Scott Pak-Alert SE 7 constantly monitors motion of the SCBA backframe. The motion sensor is located in the sensor module along with the audible alarm. If the sensor module does not sense motion of the SCBA for 20 seconds, the Pak-Alert SE 7 will signal a pre-alarm condition. If there is still no motion of the SCBA for the next 12 seconds, the full alarm will sound.

Note: A noticeable change in the Pak Alert SE 7 from the previous model is the audible alarm, which now has a variable pitch, that helps eliminate audible alarm saturation. It allows for an easier way to hone in on the audible alarm and reduces reflective alarm sound.

3.10.6 PRE-ALARM

- A. Once the SCBA is pressurized, the Pak-Alert SE 7 will automatically sound a pre-alarm if the SCBA remains motionless for more than 20 seconds. When a pre-alarm occurs, the green flashing light on the control console is replaced by a red light which flashes approximately once per second and is accompanied by an ascending/descending alarm that increases in decibels during the pre-alarm cycle.
- B. If the user is not incapacitated or not in need of assistance, the pre-alarm is normally reset by movement of the SCBA. When reset, the red flashing light will be replaced by the green flashing light and the ascending/descending tone will stop.
- C. A pre-alarm may also be reset by pressing and holding the reset button until 3 quick audible chirps are heard and the red flashing light on the control console is replaced by the green flashing light.
- D. The motion sensor is in the sensor module under the air cylinder valve and not in the control console, so that actual movement of the SCBA backframe is required for reset. Shaking the control console will not reset the Pak-Alert SE 7.

Note: Buckling and tightening the SCBA waist strap will decrease pre-alarm activations.

3.10.7 FULL ALARM

- A. If the Pak-Alert SE 7 is not moved, the Pak-Alert SE 7 will go into full alarm 12 seconds after the pre-alarm starts.
- B. Full alarm is indicated by a loud, almost continuous, 3-tone alarm from the sensor module accompanied by flashing of the red signal light on the control console and buddy lights. The full alarm condition can only be cleared by manually pressing the reset button twice, located on the side of the control console.
- C. After the full alarm has been silenced by pressing the reset button twice, the Pak-Alert SE 7 will remain activated with the green light flashing once per second. In the activated or "automatic" mode, it will again go into pre-alarm followed by full alarm unless there is movement of the SCBA at least once every 20 seconds for as long as the SCBA is pressurized.

3.10.8 MANUAL ALARM

- A. If a member requires immediate assistance, the Pak-Alert SE 7 provides a red manual alarm button located on the front of the control console on the user's right shoulder.

- B. The manual alarm causes the full alarm signal to be given. Provided working batteries are in the Pak-Alert SE 7, the manual alarm may be activated by pressing the manual alarm button at any time, **even when the SCBA is not pressurized**. If the manual alarm button has been pressed without the SCBA pressurized, the alarm can be silenced by pressing the reset button twice. The Pak-Alert SE 7 is now on and in an automatic mode. To turn the unit off, press the reset button twice again while the unit is not in the alarm mode.

3.10.9 TURNING THE PAK-ALERT SE 7 OFF

- A. The Pak-Alert SE 7 cannot be turned off if the cylinder valve is open and/or pressure remains in the SCBA. Pressing the reset button when the SCBA is pressurized will only reset an alarm condition and return the Pak-Alert SE 7 to automatic mode. When use of the Pak-Alert SE 7 and SCBA is no longer required, first close the cylinder and then vent the residual air from the SCBA by opening the regulator purge valve. After waiting until the airflow stops, close the regulator purge valve and turn-off the PASS by pressing the reset button twice. The green flashing light will go out and a 15 second beep sequence will be heard from the sensor module as residual air bleeds from the system. After the air has been completely bled off the system, the unit will sound a quick two-tone chirp indicating the Pak-Alert SE 7 is deactivated.
- B. If the SCBA is turned off and de-pressurized without pressing the reset button twice, the Pak-Alert SE 7 will continue to monitor motion in automatic mode. This means that the Pak-Alert SE 7 may be used to monitor motion after the SCBA is turned off and de-pressurized. Resetting the full alarm after the SCBA has been de-pressurized will not turn off the Pak-Alert SE 7. The reset button must be depressed twice with no alarm condition to turn off the Pak-Alert SE 7 (the 15 second beep sequence and two tone chirp should be heard).

Note: The loud audible alarm and red flashing light can be turned on at any time by pressing the red manual alarm button on the control console.

3.10.10 LOW BATTERY

- A. If while using the SCBA, the batteries begin to approach the end of their useful life, the sensor module will begin to sound a chirp every two seconds and the green light on the control module will go out. This is a low battery condition. In this condition, the Pak-Alert SE 7 will continue to operate normally, going into pre-alarm after 20 seconds with no motion, and full alarm after 12 more seconds of no motion.
- B. While in low battery condition, the Pak Alert SE 7 will continue to operate for a period of time greater than the longest duration cylinder available for the SCBA. However, the batteries must be replaced before using the SCBA again.

Failure to replace the batteries and/or continuing with multiple uses of the SCBA after the Pak-Alert SE 7 has indicated the low battery condition, may result in failure of the Pak-Alert SE 7 during use.

3.10.11 BATTERY TEST

When the Pak-Alert SE 7 is in the off condition (cylinder valve closed with no green flashing light on the control console), the batteries can be checked by pressing and holding the reset button on the console. A green light will illuminate on the console to indicate sufficient battery power remaining; a red light indicates that the batteries must be replaced before the SCBA is used again.

3.10.12 BATTERY REPLACEMENT

Warning: The Pak-Alert SE 7 is intended to assist in locating a member who may be in a life-threatening situation. Failure to follow the instructions for opening, changing the batteries, and closing the battery compartment may result in damage, which could cause failure of the PASS during a life-threatening emergency or could cause a fire or explosion in a flammable or explosive atmosphere possibly resulting in injury or death.

Note: Before replacing batteries, close SCBA cylinder valve, open SCBA purge valve to vent out residual air, close SCBA purge valve and press the reset button twice. A 15 second beep sequence occurs as the residual air bleeds off. Unit will sound a two-tone chirp and green light will go out indicating unit is inactive. Never remove or replace batteries with system pressurized or damage may occur to electronic components.

- A. When replacing batteries on SCBA equipped with harness and backframe, place SCBA in a clean, non-hazardous area.
- B. With a philips screwdriver, remove the battery housing cover as shown in **Figure 17**. Carefully remove the cover and set aside.
- C. Remove used batteries from battery compartment by sliding them out of the battery compartment. **Figure 18**
- D. Install six (6) fresh new AA batteries of the same brand. Always replace all batteries at the same time. The battery holder is marked with the style and orientation of the batteries required. (Figure 4). Use six each of one of the following 1.5 volt AA batteries.

Eveready Energizer Alkaline E 91 or EN 91
Duracell Alkaline PC 1500, MN 1500 or MX 1500.

Note: Do not mix battery brands. Verify correct orientation of batteries as shown by labels inside the battery holder.

BATTERY COMPARTMENT AND COVER SEAL

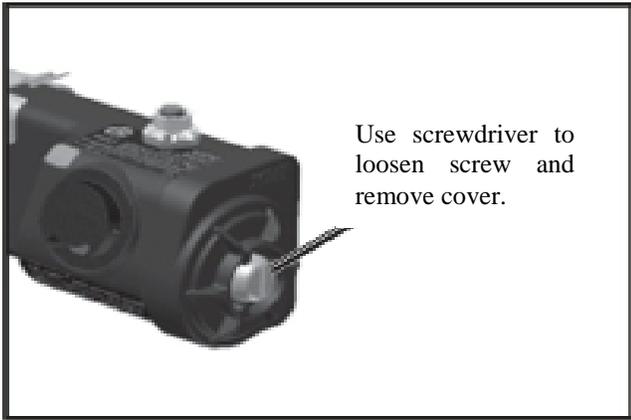


Figure 17



Figure 18

- E. Before assembly of battery cover, are the type indicated above, and they have been installed properly.
- F. The battery cover must be installed so that it is watertight after replacement. Clean the sealing rib around battery compartment and sealing face of the cover by wiping with a clean damp cloth to remove any dirt or foreign matter which might prevent a proper seal. Check cover gasket for tears or cuts. If damage is found, remove SCBA from service and tag for repair by Mask Service Unit.
- G. Install battery cover and tighten the cover screw until snug. After replacement of batteries, perform a Regular Operational Inspection before returning SCBA to service. Except for the replacement of batteries, no attempt shall be made to do maintenance or to make adjustments or repairs beyond the scope of this Training Bulletin.
- H. Do not mark, paint, etch or drill any of the Pak Alert components or housing in any way.
- I. Requisition replacement batteries for the PAK Alert SE 7, by faxing an RT 2 to MSU @ 212-860-3628

3.10.13 SPECIFICATIONS

BATTERY LIFE (NEW BATTERIES)

ALKALINE BATTERIES: TYPE AA

Eveready Energizer Alkaline E91, EN 91, Duracell Alkaline PC 1500, MX 1500 or MN 1500

In Automatic (green flashing light; no sound) ----- Approximately 1000 hrs

In Full Alarm (95 dBa sound and red flashing light) ---- Approximately 8 hrs

3.10.14 INTRINSICALLY SAFE LISTING

- A. The Pak-Alert SE 7, when installed on a Scott SCBA, is listed as intrinsically safe in Class I Division 1 Groups A, B, C and D hazardous locations.
- B. To maintain an intrinsic safe listing, the SCBA with Pak-Alert SE 7 must be inspected regularly as per SCBA inspection procedures. Pak-Alert SE 7 components must not be tampered with in any manner. The battery compartment must only be opened in an area known to be free of flammable or explosive hazards.
- C. If the Pak-Alert SE 7 is used in an area of explosive or flammable hazards, failure to regularly inspect as instructed, failure to correct damage before use or the installation of incorrect batteries may lead to a fire or explosion, possibly resulting in personal injury or death.

3.11 CLEANING, MAINTENANCE, AND STORAGE

- 3.11.1 Cleaning, maintenance and storage of a SCBA with a Pak-Alert SE 7 shall be done as part of the normal SCBA post use inspection and cleaning.
- 3.11.2 The exterior of the Pak-Alert SE 7 may be cleaned while cleaning the exterior of the SCBA by wiping with a damp sponge and thoroughly wiping dry. The lens on the front of the control console should be cleaned after every use to insure maximum light intensity at all times. Do not use solvents for cleaning or attempt to paint the exterior surfaces of the Pak-Alert SE 7.
 - A. If during use, the SCBA and/or Pak-Alert SE 7 is suspected of being contaminated with a hazardous substance, the contaminate must be identified and properly removed or the contaminated component(s) must be replaced before next use.
 - B. The Pak-Alert SE 7 and SCBA must be stored in a clean dry area with an air temperature that does not drop below freezing.

4. INSPECTIONS

4.1 INSPECTION TIMES

4.1.1 SCBAs must be inspected:

- A. Immediately after the 0900 and 1800 hour roll calls,
- B. Immediately before the start of Multi-Unit Drill,
- C. After each use.

4.1.2 At the start of each tour members will be assigned an SCBA for their use. The Company Officer will supervise the inspection of each SCBA by the assigned member, and then make an entry in the Company Journal of this event indicating SCBA #, names of inspecting members, and the results of inspection.

4.1.3 Place defective SCBAs out of service and replace with a battalion spare. Defects found must be included on the SCBA Record Card (Form SD-30). When repairs to SCBAs are required, the officer on-duty will prepare one invoice and one receipt on Form RT-2. Defective items and RT-2 forms will be delivered by messenger to the Mask Service Unit. Form RT-2 must include the SCBA serial number and specify defects. Small replacement parts for SCBAs may be requested from MSU by telephone. Delivery of such items will be accomplished through the bag. Requesting unit will hold defective item until replacement is received, then return defective part in receiving envelope for charge-off at MSU.

4.2 INSPECTION PROCEDURES

4.2.1 Remove SCBA from apparatus mounting bracket and rest wire frame on a clean, dry surface with cylinder on top and straps spread out.

4.2.2 Check the cleanliness and condition of the entire SCBA assembly:

- A. Backframe - no deformities or breaks at weld spots.
- B. Harness Assembly - no cuts, rips or frayed straps. Remove the ends of the waist straps and buckle from the belt retainers. Squeeze alligator clips on waist belt and pull straps, so both ends overlap each other evenly. Ensure that shoulder straps are fully extended.

4.2.3 Facepiece -

- A. Disinfect and Clean.
- B. Inspect head net and straps for fraying and elasticity. Check that buckle thumb leavers are in working order.
- C. Inspect internal parts:
 1. Check rubber seal around lens, be sure there are no deformities, cracks or tears.
 2. Inspect for presence of a grey nose cup assembly.

3. Inspect inhalation valves in nose cup assembly, be sure they are both present and lay flat against the nose cup.
4. Make sure voicemitter ducts are present and not deteriorated.

D. Inspect external parts:

1. Inspect for cracks, scratches, dirt and debris that would prevent a good seal or distort vision.
2. Look for the presence of two voicemitters and that the edges are sealed by the rubber duct.
3. Check that the five head harness retaining buttons are present. Check for their tightness by trying to move them with thumb and forefinger.

Note: If either the nose cup assembly or voicemitter is found to be damaged or missing during inspection or at any other time, the facepiece shall be placed out of service and forwarded to the Mask Service Unit for repair. The officer on duty shall forward a letterhead report to the Chief of Operations via the chain of command stating full particulars. Report shall include name of member discovering the facepiece and name of member who last used and/or inspected the facepiece. The officer shall interview all members involved in order to ascertain how the nose cup or voicemitter became damaged or missing.

E. Check Facepiece seal:

1. With the facepiece attached to the regulator assembly, hold regulator in left hand, close eyes and blow into facepiece to clear it of any dust particles. With chin into chin cup, place facepiece against face and inhale. During this action facepiece should close in and hold onto the member's face, indicating that the regulator's diaphragm is functioning. If there is not a proper seal, reposition the facepiece and try again. If the leak persists, there may be a problem with the regulator and/or facepiece. The member may require a different size facepiece. Have a member who can achieve a good seal with a standard facepiece check this unit. Small and extra-large facepieces are available through the Division or Mask Service Unit. Follow procedures outlined in this bulletin if a defect in regulator is suspected. In the event a member can not achieve a good seal with any of the facepieces available, the following action shall be taken:
 - a. Division of Safety and the Mask Service Unit will be immediately notified by telephone.
 - b. A report giving details and actions taken is to be forwarded by the Company Commander to the Bureau of Operations. The Bureau of Operations will forward a report to the Safety Command.
 - c. Member is not to operate in areas requiring SCBA usage until problem is solved.

2. During the initial inhalation, a click should be heard at the regulator assembly. This click indicates the functioning and ON position of the manual shut off switch. (If the SCBA was supplied with air, it would then flow into the facepiece). Before removing the facepiece, pause breathing and press the manual shut off switch on the regulator assembly.
 - a. Place the facepiece out-of-service for any problems. Complete an RT-2 and forward to MSU.

4.2.4 CYLINDER INSPECTION

- A. Remove Cylinder from back frame for full inspection.
 1. Be sure SCBA is purged before disconnecting high pressure hose
 2. Uncouple high pressure hand coupling.
 3. Unsnap and lift cylinder band toggle, push down cylinder retaining latch, push cylinder toward top of backframe, then with two hands, pull cylinder towards you.
 4. Check cylinder hydrostatic test date. Cylinders require hydrostatic testing every five years and have a service life of 15 years.
 5. Check cylinder gauge for a full reading, if not replace it with a full one.
 6. Inspect cylinder for dents, cracks, gouges, or any damage on the outside of the cylinder including composite over wrap.
 7. Check for charred or missing decals, melted rubber, bulging, peeling, or distorted fiber. Look for discoloration of paint that has turned brown or black.
 8. Inspect Cylinder valves for physical damage; be sure pressure gauge reads the same on both sides of gauge.
 9. Inspect cylinder valve threads for damage or missing threads. Cracks are indicated by a bright silver line along the cylinder threads. Cracks are caused by strain exerted on the cylinder threads, if an assembled SCBA is dropped at the high pressure hose coupling. **Figure 19**
 10. If no defects are found with the cylinder after inspection, replace on the back frame and connect to the cylinder hanger.
 11. If a Cylinder is found defective, it shall be immediately depressurized to a slight positive pressure, placed out-of-service, tagged and returned to the Mask Service Unit.

Note: Compressed air is dangerous. Service cylinder so that it does not fall or roll away. Do not open the cylinder valve when the cylinder is not in the back frame or secured in some other manner. When opening a cylinder valve of a secured cylinder, be sure not to direct airflow at yourself or any other individual

Caution: If cylinder threads are cracked, pressure from the opened cylinder could cause the threads to break away, thus causing the high pressure hose coupling to be blown off the cylinder. DO NOT touch the cylinder threads, since although not immediately visible, a metal sliver may pierce the skin like a splinter.

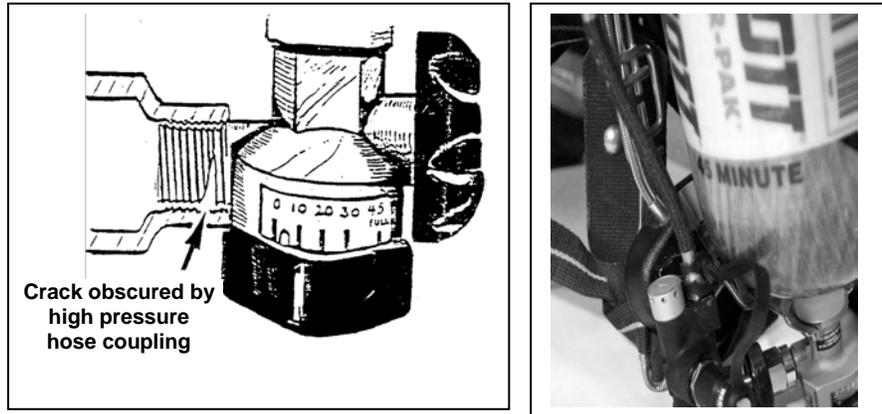


Figure 19

4.2.5 HIGH PRESSURE HAND COUPLING AND RIC-UAC

- A. Inspect condition of high pressure hose and high pressure hand coupling. Check for presence and tightness of nipple seal (nylon “O”-ring). “O”-ring is held in place and tightened with a 1/8” Allen screw and 7/16” open end wrench.
- B. Check the condition of UAC by removing the dust cover and visually inspecting the UAC for damage or deformities. Damage to or dirt in the connection may cause failure of use with Fast Pak. Assure that the dust cover is securely replaced after inspecting the UAC. If the UAC shows any sign of damage or the dust cover is missing, place SCBA out-of-service.
- C. Reconnect the high pressure hand coupling to the cylinder valve, coupling is hand tight. Secure cylinder, adjust cylinder band slide as needed, and secure with toggle.
- D. Inspect spare cylinders the same.

4.2.6 PRESSURE REDUCER ASSEMBLY (P.R.A.)

- A. Check PRA for visible damage.
- B. Check high pressure hose for fraying and visible damage.

4.2.7 LOW PRESSURE HOSE

- A. Check that the low pressure hose is not damaged and it is connected to the PRA and swivels freely at purge valve.
- B. Check that the quick disconnect is engaged properly by tugging on the coupling and that the HUD plug is properly aligned and fitted into the mating socket.

4.2.8 REGULATOR ASSEMBLY

- A. Check that the HUD visor and manual shut-off switch boot is intact, not damaged, or distorted.
- B. Inspect the regulator cover that there are no signs of cracks, or heat damage.
- C. Remove the Facepiece from the Regulator to check that the Regulator Gasket is present and seated, not chipped, or torn.
- D. Check the Regulator locking latch that both screws are present and the latch slides smoothly.
- E. Make sure Manual Shut Off Switch is depressed and the Purge valve tip is in the 12 O'clock position, so air is not lost when cylinder is turned on.
- F. Connect Regulator to Facepiece:
With Purge valve at 12 o'clock to the facepiece, align the flats of the regulator and facepiece together, insert, turn regulator ¼ turn clockwise.

4.2.9 OPERATIONAL INSPECTION OF SCOTT PAK-ALERT SE 7

- A. Inspection and test of the Scott Pak-Alert SE 7 is to be conducted along with inspection and test of the SCBA. If during the inspection any malfunction of the SCBA or the Pak-Alert SE 7 is noted, remove the SCBA from service and tag for repair by MSU.

B. BATTERY TEST

When the Pak-Alert SE 7 is in the off condition (cylinder valve closed with no flashing green light on the control console), the batteries can be checked by pressing and holding the reset button on the console. A green light will illuminate on the console to indicate sufficient battery power remaining; a red light indicates that the batteries must be replaced before the SCBA is used again.

If the low battery condition (a steady chirp every two seconds with no flashing lights) occurs at any time during regular operational inspection, do not use the SCBA. Change the battery in the sensor module immediately and repeat the regular operational test or take the SCBA out of service until the batteries are changed and the regular operational test is successfully performed.

- C. In several of the inspection procedures, a full alarm will be observed. The full alarm condition includes an audible tone that can exceed 95 decibels at approximately 10 ft. The alarm should be reset immediately on verification that it is functioning properly. Hearing protection should be worn if prolonged exposure to a full alarm condition is anticipated.

- D. While performing the visual inspection of the SCBA:
Visually inspect all Pak-Alert SE 7 enclosures, lenses, and wire conduits for cracks, wear or other damage.
- E. Before pressurizing the SCBA by opening the cylinder valve:
Check the Pak-Alert SE 7 manual alarm feature by pressing the manual alarm button, located on the front of the control console. The manual alarm shall begin sounding a loud continuous 3-tone alarm accompanied by flashing of the red signal light on the control console. Reset the manual alarm by pressing twice on the reset button located on the side of the control console. Unit will sound three chirps and the green light will flash. Turn the unit off by pressing the reset button twice again. Unit will sound a two-tone chirp and a green light will go out.
- F. When opening the cylinder valve:
The Pak-Alert SE 7 shall sound 3 quick chirps and the light on the control console shall begin flashing green approximately once per second. The 3 chirps will sound at approximately the same time the vibralert in the mask-mounted regulator actuates briefly. Also at this time, hold regulator in hand to visually check that all five lights on the HUD have illuminated for 20 seconds. After 20 seconds, only 2 green lights shall remain lit, indicating a full cylinder.
- G. Check pre-alarm:
With SCBA pressurized but with airflow stopped (with manual shut-off switch depressed on regulator), leave SCBA motionless for 20 seconds. The green flashing light shall be replaced by a red flashing light. An ascending/descending tone will sound, increasing in volume.
- H. Check pre-alarm reset:
With the SCBA pressurized but airflow stopped, leave the SCBA motionless until pre-alarm occurs. Move or turn SCBA backframe within 12 seconds of pre-alarm. This will cause the Pak-Alert SE 7 to reset. The red flashing light shall be replaced by a green flashing light and the ascending/descending tone shall stop. Continue with regular operational inspection. During the inspection, the SCBA must be moved or turned every 30 seconds or less to prevent the sounding of the full alarm.

AFTER COMPLETION OF ALL SCBA CHECKS AND BEFORE TURNING OFF CYLINDER VALVE:

I. Check manual reset of pre-alarm:

With SCBA pressurized and airflow stopped, leave SCBA motionless until pre-alarm condition occurs. Within 12 seconds, press and hold reset button. Three (3) chirps shall sound, then release button. The Pak-Alert SE 7 shall reset to the automatic mode and the red flashing will be replaced by a green flashing light.

J. Check full alarm:

Leave SCBA motionless until pre-alarm condition occurs. Do not reset. Within 12 seconds a loud, continuous 3 tone alarm shall begin, accompanied by the flashing of the red light on the control console.

K. Check alarm reset:

While in full alarm, fully press reset button, release, and press again. The Pak-Alert SE 7 shall reset to the automatic mode. The loud alarm shall stop and the red flashing light shall be replaced by a green flashing light.

4.2.10 OPERATIONAL CHECK OF REGULATOR

- A. With chin into chin cup, place facepiece against face. Member should then inhale sharply to start the flow of air and then breathe normally, as a functional check of the regulator inhalation/exhalation valve. If the exhalation valve is stuck or a fluttering sound is heard, send SCBA to MSU for repairs. **DO NOT TAKE THE REGULATOR ASSEMBLY APART.**
- B. Slowly remove facepiece from face and air should flow freely. Stop the flow of air by pressing the manual shut-off.
- C. Check the regulator Purge Valve by rotating purge valve counter-clockwise, air should flow freely from the regulator. Then place Purge valve back to 12 o'clock position to stop airflow.

4.2.11 CONTINUATION OPERATIONAL CHECK OF THE PAK-ALERT SE 7, HEADS-UP DISPLAY

- A. After finishing all SCBA checks involving airflow, turn off cylinder valve. While observing the lights on the Heads-Up Display, **slowly** open the Purge Valve releasing trapped air. The rectangular indicator lights will simulate four levels of air supply starting at:
 - Full - two green lights;
 - $\frac{3}{4}$ full - one green light;
 - $\frac{1}{2}$ full - one yellow light flashing slowly;
 - $\frac{1}{4}$ full - one red light flashing rapidly (EOSTI).Return purge valve to off position (12 o'clock)

The Pak-Alert SE 7 shall remain active with green light flashing. Do not move SCBA. Pre-alarm shall occur within 20 seconds. Move SCBA backframe slightly, pre-alarm shall reset and green light shall start flashing again.

B. Turn Pak-Alert SE 7 off:

With cylinder valve closed and all residual air purged from SCBA, press reset button twice. The green flashing light will go out, followed by a 2 tone chirp. If there is air pressure left in the system, a 15 second beep sequence will be heard from the sensor module as residual air bleeds off. When air has bled completely from the system, unit will sound a two tone chirp. The Pak Alert SE 7 is now in the "OFF" condition.

4.2.12 PERSONAL ADJUSTMENTS

- A. With bunker gear on, pick up the entire SCBA assembly and don SCBA. Connect the quick release buckle and evenly pull the loose ends of both waist belt straps. Waist straps should be adjusted to fit the member and to distribute the weight of the entire SCBA assembly. Most of the SCBA's weight will be carried by the waist belt, thus removing the weight from the member's shoulders, thereby reducing fatigue.

Adjust the shoulder straps until the backframe touches the member's back. The strap adjustments will serve as a functional check of the harness assembly.

Note: Waist straps should be fully extended using the adjustable slide on the buckle strap. Waist belt adjustments shall be made using the alligator clips **only**.

- B. Fully loosen the shoulder straps, unbuckle the waist belt and remove the SCBA.
- C. Upon completion of inspection, if no defects are found to warrant taking the SCBA out-of-service, return the SCBA to the apparatus mounting bracket. SCBA assembly is stored with the facepiece preconnected to the regulator assembly. The facepiece split ring should be hooked over the left shoulder strap alligator clip, similar to the standby position.
- D. If during the SCBA inspection any defects are noted, the inspecting member must alert the officer on duty immediately.

4.2.13 OUT OF SERVICE SCBAs

If any damage to the SCBA such as worn parts, frayed webbing, improper check of Pak-Alert, HUD, or if the SCBA fails to operate properly in any way during your inspection, it must be placed out-of-service, forwarded to MSU with RT-2 attached, stating the problem. Other than battery changes, it is prohibited to perform any repairs or maintenance. Unauthorized repairs or adjustments jeopardize the safety of every member who may use that SCBA.

5. DONNING AND REMOVAL PROCEDURES

5.1 DONNING SCBA (from standing position)

- 5.1.1 Remove the SCBA assembly from its apparatus mounting bracket, by pulling evenly on the two shoulder straps.
 - 5.1.2 With bunker coat fully snapped and helmet on, hold SCBA in front of legs from the upper part of each shoulder strap with palms down. Backframe of SCBA should face outward and cylinder towards body.
 - 5.1.3 Look over left shoulder to ensure that either no person or object is within the SCBA swing range.
 - 5.1.4 In one continuous motion, swing SCBA over left shoulder, allowing arms to pass through respective shoulder strap loops. Left hand should continue to hold onto left shoulder strap, until SCBA rests on back.
 - 5.1.5 While bending forward, reach back and grasp both ends of the waist belt. Lift the entire SCBA assembly to allow the belt to rest on hips. Connect the quick release buckle of the pre-adjusted waist straps.
 - 5.1.6 Adjust the shoulder straps until the backframe touches the member's back. DO NOT pull too tight since this will transfer the SCBA's weight from the hips to the shoulders, increasing fatigue.
 - 5.1.7 Reach back with right hand and turn cylinder valve FULLY counter-clockwise. Listen for the momentary activation of the vibralert alarm, Pak Alert, and look for the five lights in the HUD.
- Note:** The activation of the vibralert alarm is NOT an indication that the valve is fully open. The valve handle must be turned counter clockwise until it reaches the open stop position. If the cylinder valve is not fully opened, it will restrict air flow, possibly causing an extremely dangerous condition, similar to SCBA shutdown.
- 5.1.8 At this point, the facepiece will either be donned or placed in a standby position. Never allow the facepiece to hang free.

5.2 DONNING SCBA FROM SITTING POSITION

SCBA can be partially donned from an apparatus jump seat equipped with an SCBA bracket mounted behind the member. Other riding positions where the SCBA is mounted next to the member do not allow partial donning, since members must remain in a seated and belted position while responding.

- 5.2.1 Pass arms through the respective shoulder straps.
- 5.2.2 Grab hold of the upper part of the left shoulder strap with left hand.

- 5.2.3 Lean body forward while getting out of jump seat, allowing body motion to pull SCBA from mounting bracket, as hand continues to hold left shoulder strap.
- 5.2.4 Step off apparatus and complete donning procedure.
- 5.3 STANDBY POSITIONS WITH SCBA DONNED
 - 5.3.1 While awaiting orders prior to the anticipated entry into a contaminated area, members are to place facepiece in the Standby Position. This position will prevent the facepiece from dangling and possible damage.
 - 5.3.2 A split ring is attached to the facepiece's right side.
 - 5.3.3 During the standby position, the split ring is hooked over the open tab of the left shoulder strap alligator clip.
 - 5.3.4 When the standby position is used, the open side of the facepiece should be placed against the member's chest, so that debris cannot enter.
- 5.4 DONNING AND REMOVAL OF THE SCBA FACEPIECE
 - 5.4.1 The helmet, hood and SCBA facepiece function as an ensemble that is designed to encapsulate and protect a members head, neck, face and airway from burns and falling debris. A member is exposed to injury when one component fails or is knocked off. Further, it can be the first link in a chain of events that prevents a member from performing an assigned task, and endangers the lives of their fellow firefighters and the civilians they are charged with protecting. The importance of properly donning this protective equipment cannot be overstated.
- 5.5 DONNING PROCEDURE
 - 5.5.1 Adjust the free end of the helmet chin strap so there is just enough to grab with a gloved hand (approximately one inch). Hold the regulator assembly in the left hand with the left thumb on the purge valve.
 - 5.5.2 Hold the regulator assembly in the left hand with the left thumb on the purge valve.



5.5.3 With the head net on the inside, bring the facepiece up to your face.



5.5.4 Grab the helmet brim with the right hand and remove the helmet over the facepiece and left hand.



- 5.5.5 The chin strap should pass over the facepiece and left hand, and rest on the left forearm.



- 5.5.6 Grab the head net with the right hand and pull it over your head while placing your chin in the chin cup. Smooth the net out over the scalp so there are no bumps that will interfere with wearing the helmet.



- 5.5.7 With both hands, tighten the facepiece against the face by pulling the two bottom straps and then the two top straps evenly straight back.
- 5.5.8 Inhale sharply to activate the regulator's inhalation valve.
- 5.5.9 Pause breathing momentarily and listen for any leaking air. If any is heard, it will be necessary to readjust the facepiece before entering a contaminated atmosphere. If no air is heard, then a proper facepiece seal has been obtained.
- 5.5.10 With both hands, pull the Nomex hood over the head net and frame of the facepiece lens.
- 5.5.11 Place the left hand back on the regulator with the left thumb on the purge valve



- 5.5.12 Grab the helmet with the right hand and place it over the hood on your head using the left thumb to guide the chinstrap over the purge valve.



- 5.5.13 With the left hand, grab the free end of the chin strap and pull it tight.

5.6 REMOVAL PROCEDURE

- 5.6.1 Disconnect the chinstrap buckle and remove the helmet.
- 5.6.2 Pull the Nomex hood down around the neck.
- 5.6.3 Place thumbs behind the buckle-thumb releases located on each facepiece strap and pull forward until the facepiece is loose.
- 5.6.4 With the regulator assembly in the left hand, press the manual shut-off switch to stop air flow.
- 5.6.5 While holding the regulator, lift the facepiece up and pull it off of the head.
- 5.6.6 Place the nylon head net inside the facepiece lens. Kevlar head nets shall be stored on the inside of the facepiece which will prevent the head net straps from becoming tangled with the buckles.

5.7 REMOVAL OF HARNESS ASSEMBLY

- 5.7.1 While bending forward, squeeze and fully extend both shoulder strap alligator clips.
- 5.7.2 Slip right arm through right shoulder strap.
- 5.7.3 With left hand grasping left shoulder strap, press button on waist belt quick release buckle with right hand.
- 5.7.4 As left hand continues to grasp shoulder strap, stand straight and allow SCBA to swing over left shoulder to front of body.
- 5.7.5 Lay entire SCBA assembly down.
- 5.7.6 Shut down the cylinder valve and purge all residual air from the SCBA system.
- 5.7.7 Change cylinder if gauge reads less than (45) FULL.
- 5.7.8 Inspect SCBA.

6 EMERGENCY PROCEDURES WHILE OPERATING

6.1 QUICK RELEASE ESCAPE

When a member becomes entangled or trapped where he/she needs to perform an emergency procedure, that member MUST transmit a MAYDAY. Waiting to give a MAYDAY transmission until after you have attempted the Quick Release to free yourself may be too late for members to assist you. Cancel the MAYDAY after you have become free and safe.

If while operating, the SCBA assembly becomes entangled in the rear, the Quick Release escape must be used to free oneself. Quickly attempt to free yourself first, and if unable to do so, transmit a MAYDAY for assistance and perform the Quick Release.

- 6.1.1 Leave the facepiece ON if operating in a contaminated area.
- 6.1.2 Squeeze alligator clips and fully extend both shoulder straps.
- 6.1.3 With left hand grasp left shoulder strap as high as possible.
- 6.1.4 Slip right arm through right shoulder strap and unbuckle waist belt.
- 6.1.5 As left hand continues to grasp shoulder strap, member should turn to their left 180 degrees to face the entangled SCBA.
- 6.1.6 With free right hand sweep entire SCBA to locate obstruction.
- 6.1.7 Free SCBA from entanglement. If a cutting tool is to be used, it is best to be kept in the right pocket of the bunker coat. This allows control of the SCBA with the left hand.
- 6.1.8 Place both hands on shoulder straps and back away from the obstruction.
- 6.1.9 Re-don SCBA. Buckle waist belt then shoulder straps. When continuing with firefighting operations, cancel the MAYDAY when member becomes safe.

6.2 LOW PROFILE MANEUVER

There are times where it may be necessary to pass beneath low clearance overhead obstructions. Generally, this may be when crawling through or operating in a confined area.

- 6.2.1 Leave the facepiece ON if operating in a contaminated area.
- 6.2.2 Squeeze and fully extend both shoulder strap alligator clips.
- 6.2.3 With left hand grasp left shoulder strap as high as possible.
- 6.2.4 Slip right arm through right shoulder strap and unbuckle waist belt.

- 6.2.5 As left hand continues to grasp shoulder strap, allow SCBA to swing over left shoulder to front of body.
- 6.2.6 Lay SCBA assembly down on cylinder and push ahead, as body follows behind. The left hand should always continue to grasp shoulder strap as a means of orientation.
- 6.2.7 Once overhead obstruction is cleared, redon SCBA. Buckle waist belt then shoulder straps.

6.3 REDUCED PROFILE MANEUVER

A reduced profile maneuver is used when a member finds it difficult to maneuver past an obstacle, within a structure or on a fire escape, with the SCBA donned.

- 6.3.1 Leave the facepiece ON if operating in a contaminated area.
- 6.3.2 Squeeze and fully extend the right shoulder strap alligator clip.
- 6.3.3 Slip the right arm through right shoulder strap and grasp waist belt without unbuckling.
- 6.3.4 While right hand grasps waist belt buckle and left hand grasps cylinder at the rubber bumper, twist the entire SCBA assembly as far left as necessary to pass obstacle.
- 6.3.5 Use right hand as a guide while passing through obstacle.
- 6.3.6 After passing obstacle, return SCBA assembly to its normal position on members' back.
- 6.3.7 Reach back and pass right arm through right shoulder strap.
- 6.3.8 Adjust the right shoulder strap for wearing comfort.

6.4 SWIM MOVE

There may be a need to get through a narrow opening such as wall studs without removing the SCBA. If the swim move cannot be performed, use the reduced profile maneuver.

- 6.4.1 Place right knee, right shoulder, and head through studs. (placing left shoulder through first, may cause low pressure hose to get pinched on the object you are trying to pass, cutting off air supply). (Figure 21)
- 6.4.2 Bring left arm over left shoulder in swimming motion. (Figure 22)



Figure 21



Figure 22

6.5 DAMAGED FACEPIECE

If the facepiece is damaged while operating, the positive pressure feature will compensate for a leak and continue to maintain positive pressure within the facepiece. This will result in an outward flow of air. The larger the opening, the quicker the air supply will be depleted.

6.5.1 Leave the facepiece ON to continue to provide respiratory protection.

6.5.2 Conserve as much breathing air as possible by covering the damaged area with one hand.

6.5.3 If the leak is more than can be controlled with one hand:

- A. Continue to cover as much of the damaged area as possible.
- B. Press the manual shut-off switch after each breath to further limit the loss of breathing air.
- C. If damaged area is too large to allow the regulator shut-off to release, then use the purge valve in an ON and OFF motion for each breath. This action helps to conserve the limited amount of breathing air necessary for escape.

6.5.4 Notify Officer and immediately leave the contaminated area. This member MUST be accompanied to a safe area by another member using an SCBA.

Note: If a member runs out of air, that member should remove the regulator from the facepiece. The donned facepiece will provide some protection to the skin on the face.

6.6 FACEPIECE SHARING

- 6.6.1 Sharing facepieces with other members or civilians is **PROHIBITED**.
- 6.6.2 Facepiece sharing with other members and/or civilians is **PROHIBITED**. Facepiece sharing hampers the search for an exit and depletes the limited air supply in less time, thus posing risk to both member or civilian and rescuer. Facepiece sharing increases the exposure to airborne contaminants such as Carbon Monoxide (CO), Hydrogen Cyanide (HCN), as well as numerous other carcinogenic toxins. Therefore, the member or civilian should be removed from the contaminated area as soon as possible, to a location where proper medical treatment can be administered.
- 6.6.3 If it is not possible to remove the member or civilian from the contaminated atmosphere, then one of the following options can be used to provide an air supply while freeing the trapped individual.
 - A. For trapped members, utilize the nearest available FAST Pak.
 - B. For civilians, utilize a FAST Pak other than the one assigned to the FAST Unit.
 - C. Utilize a spare SCBA to provide air strictly to the trapped member or civilian.

Note: Donning a facepiece in an IDLH/smoke environment, may make it difficult to create the negative pressure needed to release the regulator manual shut-off switch. The red purge valve may have to be turned on, to provide/initiate an air flow.

7 COMMUNICATION

7.1 COMMUNICATION WITH FACEPIECE DONNED

Communication among members operating with donned facepieces is necessary to jointly accomplish tasks. More importantly is the need to maintain respiratory protection while operating in toxic atmospheres. Therefore, at no time shall a member remove their facepiece to communicate.

7.2 USING THE HANDIE-TALKIE WITH THE SELF CONTAINED BREATHING APPARATUS

- 7.2.1 Remove the microphone from the harness clip.
- 7.2.2 Place the microphone **directly on** the voicemitter.
- 7.2.3 After completing radio transmission, the microphone can be returned to the harness clip.

7.3 COMMUNICATION BY HAND/TOUCH SIGNALS

- 7.3.1 Speaking between members with facepieces donned is sometimes impractical because of the high noise levels on the fireground from power saws, stream impact, ventilation, etc.

- 7.3.2 Units should have prearranged hand/touch signals to communicate orders for routine movements. Touch signals will be especially useful when smoke or other factors make visibility poor.
- 7.3.3 Engine companies can establish signals as outlined in Firefighting Procedures Volume II: Fire Tactics and Procedures - Engine Company Operations.
- 7.3.4 Ladder, Rescue, and Squad Companies can establish signals similar to those of Engine Companies to communicate orders for search, ventilation, etc.

7.4 EMERGENCY TOUCH SIGNAL

- 7.4.1 When one member forcibly strikes another member with four distinct blows on the shoulder and then pulls that member in a specific direction, the second member will recognize that the other member knows of an emergency and should promptly follow in that direction.
- 7.4.2 The standard signal to communicate emergencies (such as mayday transmissions) shall be known, understood and used by all members.

7.5 EMERGENCY DISTRESS

A member who is in distress and unable to communicate shall immediately activate the emergency button of the Personal Alert Safety System (PASS/Pak-Alert) alerting members to the need for assistance.

When a PASS alarm is activated in the full cycle for ten seconds, the member hearing the alarm should immediately notify the Incident Commander. An immediate investigation of the alarm must be made to determine the cause. The results of the investigation must be transmitted to the Incident Commander as soon as possible.

Note: All members must be teamed-up when operating within an IDLH atmosphere. When a member needs to leave the IDLH area to service their SCBA, they MUST notify their Officer and be accompanied to a safe area by another member using an SCBA. *All members shall comply with the provisions of Firefighting Procedures, Volume 4, Book 1, Chapter 1 titled Safety Team.*

8 DISINFECTION AND CLEANING PROCEDURES

8.1 DISINFECT AND CLEAN SCBA_s

- 8.1.1 During roll call inspection, after members have each been assigned an SCBA for the tour, and after each use.

8.2 DISINFECTING SOLUTIONS

- 8.2.1 A hypochlorite solution consisting of one-quarter cup of household chlorine bleach to one gallon of water (1:100 dilution) is recommended by the Center for Disease Control. Technical Services distributes bleach packages, use one package to one gallon of water. This solution is to be used in routine disinfecting procedures and to disinfect SCBA parts contaminated with blood or body fluids.
- 8.2.2 NEVER INCREASE THE CONCENTRATION OF HOUSEHOLD BLEACH IN THE DILUTION BEYOND THE RECOMMENDED AMOUNT. Stronger amounts of the solution will prematurely deteriorate rubber and severely corrode metallic parts. Both solution concentration and duration of immersion must be strictly adhered to.
- 8.2.3 Certain cleaning and disinfecting agents such as quaternary ammonium compounds (Ammonium Chlorides) found in glass cleaner, will cause damage, deterioration, or accelerated aging to parts of the SCBA. Use only the recommended cleaning and disinfectant solution.
- 8.2.4 Wear goggles to protect eyes when preparing or using a hypochlorite solution.

8.3 GROSS DECONTAMINATION

- 8.3.1 Contaminated SCBAs or components that can't be cleaned or disinfected due to blood or other body fluids shall:
 - A. be placed in a double sealed clear plastic bag with a biohazard label attached;
 - B. a tag shall be attached to the bag noting details of the incident including known and suspected contaminants;
 - C. be placed on the apparatus in an appropriate location to preserve the integrity of the bag, and shall be transported back to quarters;
 - D. at quarters, bag shall be placed in a light traffic area;
 - E. notify SOC for pick-up.
- 8.3.2 When decontaminating, bagging, or handling such equipment to be sent to SOC, members shall wear BSI (Body Substance Isolation).

8.4 CLEANING SOLUTION

- 8.4.1 When cleaning SCBA parts, use household strength soap or detergent mixed with warm water. Use of strong industrial strength cleansers, abrasive soap pads or brushes are damaging and not recommended.
- 8.4.2 Never mix disinfectant or cleaning solutions, or their respective cloths and sponges.

8.5 FACEPIECE CLEANING PROCEDURE

- 8.5.1 Remove facepiece from regulator assembly.
- 8.5.2 Put on goggles and rubber gloves to protect eyes and hands from hypochlorite solution.
- 8.5.3 Immerse facepiece in the hypochlorite solution for five minutes, wiping lens with cloth. Never allow facepiece to remain immersed for longer than five minutes.
- 8.5.4 Remove facepiece from solution and thoroughly rinse under cold running water.
- 8.5.5 Wash facepiece with cleansing solution and sponge, and again thoroughly rinse under cold running water.
- 8.5.6 Nose cup is designed to be an integral part of the facepiece and does not need to be disassembled for cleaning and disinfecting.
- 8.5.7 In the event the nose cup is removed for cleaning or inspection, make certain it is reassembled behind the chin pocket of face seal and properly seated between the flanges of the voicemitter ducts.
- 8.5.8 Shake off remaining water droplets from facepiece. The facepiece shall be dried; drying shall not be done in direct sunlight or in high heat.
- 8.5.9 Clean remaining SCBA parts of dirt and debris with damp sponge.
- 8.5.10 Areas where SCBAs are stored should also be kept thoroughly clean of dust and dirt.
- 8.5.11 Place the Kevlar head net inside of the facepiece lens. In order to achieve a proper facepiece seal when donning the SCBA, Kevlar head nets shall be stored on the inside of the facepiece. This will prevent the head net straps from entangling with the thumb buckles

8.6 REGULATOR DISINFECTING PROCEDURE

- 8.6.1 Supplies needed:
 - 8.6.1.1 70% Isopropyl Alcohol in a spray bottle.
 - 8.6.1.2 Drinking (potable) water - running or in a spray bottle.
- 8.6.2 Remove the breathing regulator from the facepiece by rotating the regulator 1/4 turn clockwise.
- 8.6.3 Remove any obvious dirt from the external surfaces of the regulator using 70% Isopropyl Alcohol with a sponge or soft cloth.

- 8.6.4 Inspect the inside of the regulator assembly through the regulator opening (Figure 23). If excessive dirt or soil is present, return the entire SCBA with a completed RT-2 to MSU, noting reason. Do not insert any foreign objects into the opening.
- 8.6.5 Depress the manual shut-off, close the purge knob by turning fully clockwise and spray a minimum of 6 full pumps of 70% Isopropyl Alcohol into the regulator opening. Make sure to also wet the immediate area around the opening (Figure 23). Swirl to completely cover internal components. Turn regulator opening face down and shake excess liquid out. Allow for 10 minutes of contact time to disinfect prior to rinsing.

Note: Alcohol and water should not be directed into the spray bar ports.



Figure 23

- 8.6.6 Rinse regulator with drinking water using a spray bottle or softly running water. The inside of regulator must be **thoroughly rinsed** after applying the 70% alcohol. Failure to thoroughly rinse may cause a number of adverse effects. Rinsing is a key component to the SCBA integrity after disinfecting.
- 8.6.7 Shake excess water out of regulator. Completely air-dry the regulator before use. Perform regulator check by opening the purge valve and observe the air flow from the regulator spray bar. Droplets of water indicate the regulator is not dry. If this occurs, repeat drying procedure and regulator check.

Note: Under no circumstances should the face of the regulator be banged against a hard surface to expedite the removal of water. It may damage the spray bar ports or crack the exterior surface of the regulator. Shaking and opening the purge valve is the only acceptable way to remove water.

9 PREVENTIVE MAINTENANCE PROGRAM / INVENTORY

- 9.1 A calendar year Preventive Maintenance Program has been implemented for each SCBA. The intent is to flow test and ensure the operational condition of each SCBA.

- 9.1.1 MSU will perform a complete annual inspection, repair and flow test of each SCBA and FAST Pak (including the UAC) on one of the following occasions:
 - A. Units scheduled by Fleet Services for apparatus PMP (only at Randall’s Island). These SCBAs will remain on the apparatus and transported to Randall’s Island. The serviced SCBAs will be returned with the Unit’s apparatus and placed back in-service.
 - B. Units scheduled for training at the Fire Academy.
 - C. If a Unit’s SCBAs do not receive an annual inspection on one of the above occasions, MSU will notify the unit and make other arrangements.

9.1.2 The month and year of the last service date is recorded on the surface of the PRA where the High Pressure Hose connects. (Figure 24)



Figure 24

9.1.3 Squads, SOC Support Ladders, CPC Ladders, and Haz-Mat Tech Units should include the 2 SCBAs assigned to the second piece with the annual PMP.

9.1.4 Battalion Spare SCBAs - each battalion is assigned 12 spare SCBAs. An RT-2 stating annual PMP should be attached and forward with the spares to MSU on the following schedule;

- January 1Spares 1, 2, 3
- April 1Spares 4, 5, 6
- July 1.....Spares 7, 8, 9
- October 1.....Spares 10, 11, 12

9.1.5 Borough and Division assigned SCBAs are forwarded April 1.

9.1.6 Battalion assigned SCBAs are forwarded August 1.

9.1.7 Each reserve Engine, Ladder and Rescue are assigned their own SCBAs and facepieces. The unit responsible for the maintenance of these reserve apparatus should forward the reserve SCBAs along with the company SCBAs.

10 IDENTIFICATION

10.1 The Pressure Reducer Assembly on all SCBAs are labeled with both unit identification and sequential numbering within the unit. (Figure 25)

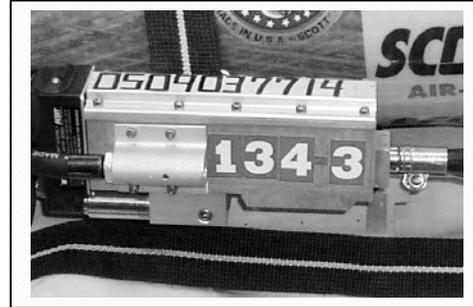


Figure 25

10.2 The labeling allows for quick identification of SCBAs at operations, as well as, individual assignment of SCBAs at the start of the tour.

10.3 SCBA labels are coded with white numerals on colored backgrounds. The colored backgrounds indicate the type of unit to which the SCBA is assigned to, as follows:

<u>UNIT</u>	<u>COLOR CODE</u>	<u>COMPANY</u>	<u>EXAMPLE</u>
Engine	Black	E-245	245-1
Ladder	Red	L-25	25-1
Rescue	Blue	R-2	2-1
Haz Mat	Blue	HM-1	HM-1-1
Squad	Yellow	Sq-1	1-1
Battalion	Yellow	Bn-57	57-1
Battalion Spare	Orange	Bn-33	33-1
Marine	Green	M-6	6-1
MSU Spare	Black	MSU	MS-1

10.4 Labels are not to be removed by members.

10.5 Worn or missing labels will be replaced by the Mask Service Unit.

10.6 All SCBAs are being marked in a manner similar to the handie-talkies. The numbering system duplicates the handie-talkie number designations. For example, #1 is the Officer, #2 is the chauffeur, etc.

10.7 Each SCBA is labeled in the center of the upper section of the back plate on the side that rest against the member's back. The marking is on a 3/4" wide marking tape, and is covered with a clear 4" X 2" protective label. The markings will be visible when the SCBA is properly mounted in the SCBA bracket on the apparatus.

For example, SCBAs in Engine 264 and Ladder 134 would be labeled as following:

SCBA#	Label Wording		SCBA#	Label Wording
264-1	Officer		134-1	Officer
264-2	Chauffeur		134-2	Chauffeur
264-3	Nozzle		134-3	Roof
264-4	Back-Up		134-4	OV
264-5	Control		134-5	Irons
264-6	Door		134-6	Can

11 CONCLUSION

11.1 Members are cautioned against jeopardizing their health by non-compliance with these procedures or by the use of unauthorized modifications or adapters. The practice of intermittent use of SCBA while in smoke or toxic atmospheres and/or the use of "cheaters" is expressly forbidden.

11.2 Unauthorized variations or a modification of this equipment or its related procedures and/or the use of unauthorized adapters or other equipment with the SCBA is strictly prohibited.

Warning: Only those options and or accessories authorized by SCOTT and approved by NIOSH and where required, by NFPA may be installed on this SCBA. The use of unauthorized and or unapproved options or accessories could cause partial or complete failure of the SCBA which may result in injury or DEATH.

11.3 If a problem arises with an SCBA, and the information required to resolve the difficulties are not covered in this bulletin, unit shall contact the Mask Service Unit and be guided by their instructions.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

ADDENDUMS

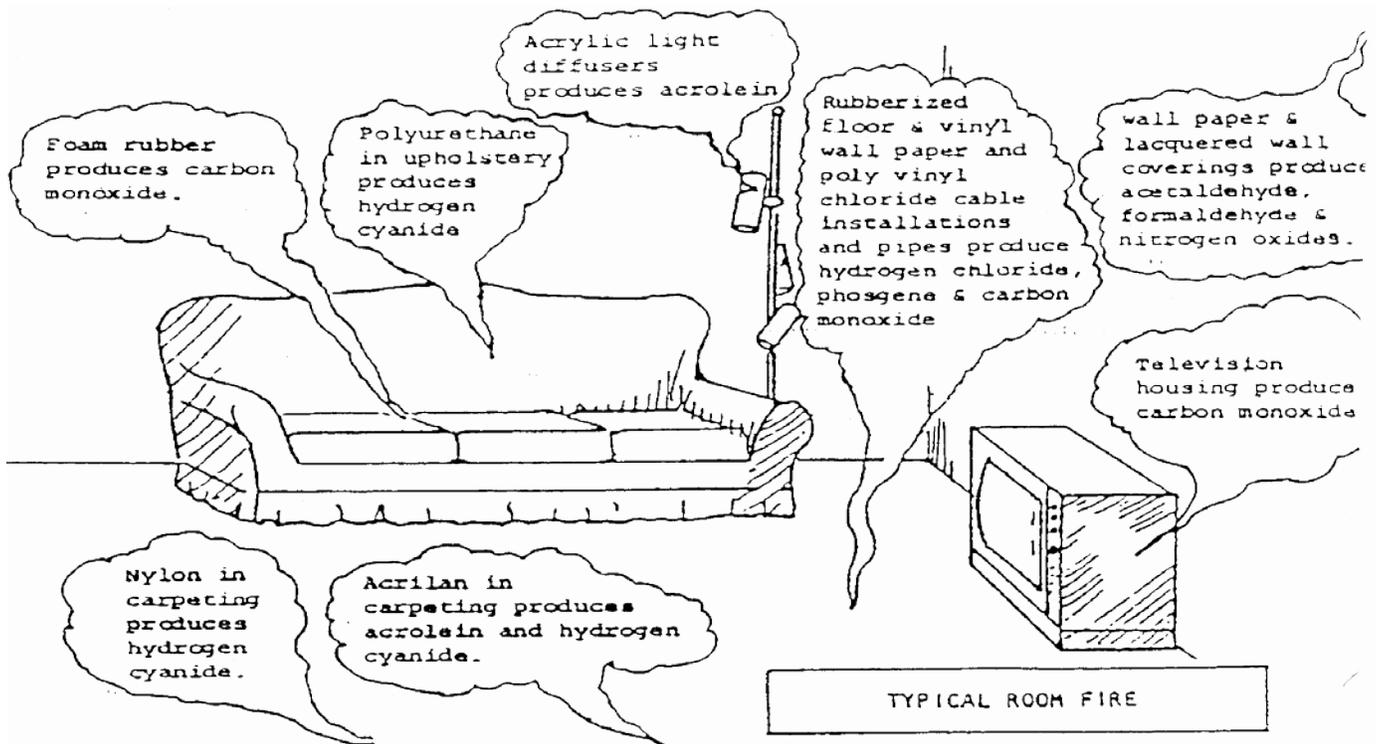
Addendum 1	Toxins Reference.....	52
Addendum 2	(APR) Adapter.....	59

REFERENCE 1

LESSONS LEARNED AND REINFORCED

1. Carbon monoxide is one of the most abundant of fire gases and poisons by asphyxiation. It is colorless, odorless, and tasteless, making it impossible to detect. Since it combines with hemoglobin (an oxygen carrying constituent of the blood) 210 times more readily than oxygen does, carbon monoxide rapidly robs the blood of oxygen needed by the body. At the same time, carbon monoxide prevents the blood from disposing of the waste carbon dioxide it normally brings back to the lungs. This mode of action makes carbon monoxide dangerous at relatively low concentrations. Exposure to 1.3% of carbon monoxide will cause unconsciousness in two or three breaths and will cause death in a few minutes. Exposure to small concentrations for only a few seconds inhibits one's ability to think clearly, rapidly causes disorientation, and gives a feeling of euphoria compounding the risk hazard.
2. Heavy concentrations of carbon monoxide may be present where there is no smoke or only a light haze.
3. Smoldering fires and fires partially extinguished by sprinkler systems produce large quantities of carbon monoxide. Low heat from these fires affects the buoyancy of gases of combustion making ventilation very difficult. This is particularly true with fires in cellars and other low areas, where means of ventilation are restricted.
4. During mask operations and when encountering any emergency situations, poor visibility, or communication problems, self-discipline must be exercised to control any reflex action that may cause you to remove your facepiece.
5. Wear your mask, adhere to the Department's mask policy, accept and understand that carbon monoxide is extremely deadly. This may well save a life - possibly yours.

REFERENCE 2



1. CARBON MONOXIDE

Carbon monoxide is produced by the incomplete combustion of many common materials, including wood and paper. Other more modern sources are foam rubber, rubberized flooring, vinyl wall paper, and pipes and other installations made with polyvinyl chloride. When inhaled, carbon monoxide crowds oxygen from the blood, and this eventually seriously affects the brain as well as other tissues. If the process is not reversed, death follows.

2. HYDROGEN CYANIDE

Materials that give off hydrogen cyanide when they are burned include rubber and paper, and some frequently used in carpets, namely wool, nylon, and acrilan, and in upholstery, namely polyurethane foam. Hydrogen cyanide is a gas that is colorless but has a noticeable almond odor. It can be absorbed through the skin as well as inhaled. It causes one to gasp in breathing, induces muscle spasms, and speeds up the heart rate. Collapse is often sudden. A concentration as low as 270 ppm (parts per million) is fatal.

3. ACROLEIN

At fires involving plastics, and also petroleum, there may be acrolein in the air. In homes, it can arise from the burning of acrilan in carpeting or acrylic light diffusers. Its extreme irritation to your nose can be felt at less than 10 ppm. It can damage your eyes.

4. HYDROGEN CHLORIDE

Hydrogen chloride (HCL) is becoming more frequent at fires because more plastics containing chlorine, for example in PVC, are now found in homes (and also in drug, toy, general merchandise stores). It is produced by the burning of rubberized flooring, vinyl wall paper, and pipes and other installations made with polyvinyl chloride. At fires, the overhaul stage is especially dangerous, as it is for other noxious gases, because, when you remove your mask, toxic fumes can be lingering. HCL is colorless, but has a pungent odor and is intensely irritating not only to your eyes but also to your respiratory tract which may swell enough to suffocate you.

5. PHOSGENE

Phosgene COC12 is tasteless, and is odorless at first, but at 6 ppm it has a musty-hay smell. Smaller amounts can cause coughing and can irritate your eyes. The moisture in your lungs decomposes phosgene into hydrochloric acid. It may take several hours before you feel the full effect. If the concentration reaches 25 ppm, phosgene is deadly.

6. NITROGEN OXIDES

Nitrogen dioxide, a reddish brown gas, irritates your lungs, and enough of it can cause an edema in them that blocks breathing and so can suffocate you. It is insidious, for you can stand the irritation in your nose and throat, even when you are breathing in a lethal dose, whose real effects may not come for several hours.

Nitric oxide is dangerous in itself, but especially because oxygen and moisture are enough to turn it into deadly nitrogen dioxide. These oxides of nitrogen, when inhaled, form nitrites and nitrates, which chemically attach to your blood and lead to nausea, abdominal pains, vomiting, and discoloration of the skin (from oxygen deficiency in the blood). They can also dilate your arteries, vary blood pressure, and cause headaches, dizziness and delayed physical reactions.

7. FORMALDEHYDE

formaldehyde is used commercially for fumigation and as a preservative. At a fire it may be produced by the burning of such things as wall paper and lacquered wall coverings. It collects on carbon particles and is then inhaled. It is intensely irritating, and also has a suffocating effect. It may inflame the bronchial tubes, from which bronchitis may develop.

8. ACETALDEHYDE

Acetaldehyde is less irritating than formaldehyde but it depresses the central nervous system more strongly. Its fruity odor may be masked by other odors present. Exposure to this gas usually leads to severe irritation to the eyes and the mucous membranes. Ingestion has effects similar to alcohol intoxication.

REFERENCE 3

Synopsis of Article: “Firefighter Exposure to Carcinogens” (Fire Command, February 1981 Issue)

At fires, Firefighters breathe in many substances that help bring on cancer. The bad effect may not become noticeable for a long time.

There are many more of these dangerous substances today than there used to be. Chemical technology has been rapidly creating new plastics and other new materials that give off toxic elements when they burn. Moreover, there are many new uses for plastics and asbestos, and they are now found everywhere.

Fire departments try to warn their members about the new substances. Medical research is constantly making reports about the bad effects of this or that new material, and whether it breeds cancer. However, research has simply not kept up with all the new developments. It is especially hard to find out whether they involve cancer, since cancer takes a long time to show itself in the individual who has been contaminated. There have been a few studies of the effects specifically on firefighters which seem to indicate increased risk.

It does not take a lot of research to learn how important it is for firefighters to use masks. Firefighters all should know that a mask definitely reduces the risk of inhaling toxic gases. However, firefighters are inclined to forget this at overhaul time. Instead, they are likely to take off their masks in relief, overlooking the fact that toxic fumes are still in the air.

Plastics and Other New Materials:

In order to make autos lighter and cheaper, more and more plastics have been used in manufacturing auto bodies and parts. In the construction of buildings tons of plastics are now used. PVC can be assumed to be present at every structural fire site, because it is now found so frequently in furniture, electric wire insulation, water pipes, kitchen goods, etc.

A tremendous amount of research will be needed to determine the specific hazards of various plastics and other modern materials when they burn. Literally hundreds of different compounds are given off in the burning of lubricants, flame retardants, reinforcing fibers, biological preservatives, coloring agents, etc. Actual burning may not be needed to create a hazard: sometimes contamination is created simply by the increase in temperature near a fire.

Asbestos:

The danger of a firefighter breathing in particles of asbestos is wide spread, because most buildings were put up before the danger was understood and before the use of asbestos was controlled by federal regulations. Building permits fail to give information about whether asbestos is present. A firefighter pulling down a ceiling or breaking open a wall is exposed to asbestos from insulation, acoustical tile, adhesives, jointing compounds, floor tile, etc.

Chlorinated Organics:

Degreasing agents, solvents, and refrigerants contain chlorinated hydrocarbons, which are considered to be carcinogens. Firefighters encounter them at many places. These include service stations, auto repair shops, and auto dealers; also printing and dry cleaning establishments. Some wood preservatives widely used in constructing wooden houses are also noxious.

Pesticide:

Many pesticides are carcinogenic, and they are found not only on farms but also in garden shops, hardware stores, etc.

Benzene:

There is an airborne danger at fires in places where solvents and other products containing benzene are used or stored. These include gas stations and hardware stores. Moreover, benzene is produced by the burning of PVC, epoxy resins, etc. Benzene is generally thought to be a cause of aplastic anemia, which is often followed by leukemia.

Fossil Fuels and wood:

Coal and oil in burning emit hydrocarbons. Some of these are carcinogenic. Burning wood creates formaldehyde (a carcinogen) which is also found in insulation and wallboard.

REFERENCE # 4

Most smoke related injuries are incurred by firefighters when smoke conditions are "light" and not so excessive as to prevent entry without mask. (See attached case presentation)

Some examples of these "light" smoke conditions that members operate in are food on the stove, oil burner and electrical fires, and fires involving household and office furnishings.

During the course of a tour it is possible that a member could operate within a few of these "light" type smoke conditions without benefit of SCBA.

If he was asked what kind of tour he had, he probably would answer by saying "it was an easy tour, no work, only a few small jobs." However, a member exposed to a few small jobs without the use of SCBA, could incur an accumulative effect associated with some of the following smoke conditions:

TYPE FIRE	GASES GENERATED	EFFECT
Household , Office furnishings	Chlorine, Sulfur Dioxide, Hydrogen Chloride, Phosgene	All are strong pulmonary irritants
Electrical	Hydrogen Chloride is released by thermal degradation of PVC	Irritant to the mucus membrane of the eyes and respiratory tract in concentrations as low as 15 PPM.
Oil Burner	Sulfur dioxide	Irritation to eyes, nose and throat. Usually respiratory tract is affected.
Food on the stove	Sulfur, Nitrogen dioxide	Irritation to mucus membranes and eyes.
All Others	Carbon monoxide	Carbon monoxide, a product of incomplete combination of carbonaceous materials, is found to be present at all fires. CO is considered to represent the most dangerous acute exposure faced by firefighters. Even at low concentrations, CO may impair judgment, visual acuteness and decision making - all faculties crucial to the safety of the firefighters. Furthermore, CO exposure and thermal load in conjunction with rigorous physical activity, present combined stress to the circulatory system, which may contribute to the development of cardiac disease.

Practically every structure contains materials that when involved during a fire, are capable of producing toxic gases. These gases can be present even though smoke is barely visible. You may not feel that you have been exposed to “smoke inhalation” by taking these few “light” feeds during a tour. However, you definitely have "inhaled" toxic products of combustion.

The Federal Government issues a warning that smoking cigarettes may be hazardous to your health. Our message is: “The negative effects that the accumulated light feeds have on a firefighter’s body over the course of tours, weeks, months and years, are hazardous to one’s health.”

Facepiece And Air Purifying Respirator (Apr) Adaptor-40 Mm & Single Mpc Plus Cartridge Filter

1. INTRODUCTION

The Fire Department is occasionally called to operate at incidents where respiratory protection is necessary for extended periods of time. In order to provide safe and alternative protection for our members at these operations, the Department has issued Air-Purifying Respirators (APR). Previously issued adaptors and cartridges provided particulate and limited chemical vapor protection. Updated adaptors and cartridges still provide particulate protection plus a wider range of chemical vapor protection, but like all APR's have serious limitations. These limitations are outlined below.

2. DESCRIPTION

This is a full facepiece respirator consisting of the following three components:

- ◆ Scott AV-2000 facepiece (Members' personal facepiece).
- ◆ Scott 40 mm facepiece adaptor with a single filter port.
- ◆ Scott MPC Plus cartridge filter for protection against airborne gases, vapors and particulates.



- 2.1 Each member is fit tested using their personal Scott AV-2000 facepiece during their periodic medical using an adaptor in the APR mode.
- 2.2 The respirator seals against the skin of the user's face and removes harmful contaminants from the inhaled air by chemical reaction or mechanical filtration.
- 2.3 The Inhalation Valve in the 40mm adaptor acts as a check valve to prevent the backflow of exhaled air through the MPC PLUS cartridge. Exhaled air leaves the facepiece through the exhalation valve in the 40mm adapter.

3. **BENEFITS AND GENERAL LIMITATIONS**

The protection offered by this respirator depends upon the quality of the facepiece fit, the condition of the respirator and the use of the MPC PLUS cartridge. The length of time the respirator will provide protection also depends upon the conditions of use.

The conditions of use include but are not limited to:

- ◆ The type of air contaminant has been identified.
- ◆ The concentration of contaminants in the atmosphere is known.
- ◆ Atmospheric monitoring has been conducted and will continuously be done.
- ◆ Oxygen (O₂) level is at least 19.5% and not more than 23.5%.
- ◆ Concentrations of other atmospheric chemicals including but not limited to Carbon Monoxide (CO) and Hydrogen Sulfide (H₂S) do not exceed the Immediately Dangerous to Life and Health (IDLH) levels.
- ◆ It is **NOT** to be used in fire conditions.
- ◆ It is **NOT** to be used in either confined spaces or permit-required confined spaces.
- ◆ The elapsed time since the filtration element was placed in service is monitored.
- ◆ The psychological state of the wearer is monitored.
- ◆ The level of physical activity of the wearer is monitored.
- ◆ The Incident Commander must authorize the use of APRs.

4. **OPERATIONAL GUIDELINES AND USES**

This respirator is intended to be used in very limited and specific situations. No member shall don a respirator without specific instructions from the Incident Commander. The Incident Commander should only make this decision after consultation with the Haz-Mat Group Supervisor and all the risks have been properly evaluated. If any uncertainty exists than the use of SCBA should be continued until such time as the hazards can all be evaluated properly.

Anticipated uses include:

- ◆ Asbestos incidents, non-fire related.
- ◆ Confirmed or suspected biological incidents where continuous atmospheric monitoring is done.
- ◆ Decontamination operations of a long duration where the filter will remove the known contaminants and atmospheric conditions are monitored and meet the above criteria.

5. SPECIAL MATTERS

- 5.1.1 These adaptors and cartridges should **not** be carried in the member's bunker gear. They should remain in their sealed pouches in the infection control compartment (CFR-D Manual, Chapter 3) on the apparatus for use at incidents approved by the IC.
- 5.1.2 Air Purifying Respirators (APR) are not positive pressure devices and do not provide the protection of SCBA. Proper facepiece seal must be maintained.

6. CARTRIDGE PROTECTION

The MPC PLUS air-purifying cartridge is rated as adequate protection against the following substances:

<u>Cartridge Code</u>	<u>Substance</u>
HEPA	Particulate filter (99.97% filter efficiency level) effective against all particulate aerosols with particulates that are 0.3 microns and larger.
OV	Organic Vapor
AM	Ammonia
CL	Chlorine
HC	Hydrogen Chloride
MA	Methylamine
FM	Formaldehyde
HF	Hydrogen Fluoride
SD	Sulfur Dioxide
CD	Chlorine Dioxide
CK	Cyanogen Chloride
AC	Hydrogen Cyanide
PS	Chloropicrin
CS	Tear Gas
CN	Tear Gas
GB	Sarin
DMMP	Dimethyl Methylphosphonate

7. DISTRIBUTION

- 7.1 Distribution will be conducted by the Mask Service Unit
- 7.2 Every Fire Operations field unit will receive this equipment for each approved riding position. The distribution will be as follows:
- 7.2.1 Division vehicles- Two adaptors and four cartridges that will remain sealed in their pouches. A third adaptor and two cartridges will be delivered to be used and kept for training purposes.
- 7.2.2 Battalion vehicles- Two adaptors and four cartridges that will remain sealed in their pouches. A third adaptor and two cartridges will be delivered to be used and kept for training purposes.

- 7.2.3 Engine, Ladder, Rescue and Squad Companies will receive six adaptors and twelve cartridges that will remain sealed in their pouches. A seventh adaptor and two cartridges will be delivered to be used and kept for training purposes.
- 7.2.4 Special Field Units will receive the appropriate number of sealed pouches for the approved riding positions and one additional set for training purposes.

8. REPLACEMENT

For replacement of filter cartridges and adaptors, forward a 23-BS-2 form to the Mask Service Unit.

9. DONNING PROCEDURE

- 9.1 Examine the facepiece to be certain it is complete and in serviceable condition. Check to see that the inhalation and exhalation valves are properly installed and operational. Check that the nose cup is properly positioned behind the face seal chin pocket.
- 9.2 Assemble MPC PLUS to facepiece.
- 9.3 Don facepiece.
- 9.4 **PERFORM NEGATIVE PRESSURE LEAK CHECK.** Close off inlet side of MPC PLUS by placing the palm of one hand over inlet located on front of MPC PLUS canister and inhale slowly, holding breath momentarily. Leakage should not be detected and the facepiece should be drawn slightly to the face.
- 9.5 Should any leakage be detected, correct problem by readjusting the facepiece.

10. DOFFING PROCEDURE

- 10.1 The respirator removal must be done in a fresh air environment. Leave the contaminated area and be certain that the respiratory protection is no longer required.
- 10.2 If you have been exposed to contaminants, decontamination of PPE must be accomplished prior to removal of the respirator.
- 10.3 Loosen all head harness straps to their full outward position.
- 10.4 Remove by pulling the facepiece up and back over the head. Care must be taken to prevent contamination of the interior portion of the facepiece during and after doffing.
- 10.5 Facepiece should be cleaned according to established procedures. If the respirator is to be reused, replace the expended MPC PLUS cartridge with a new cartridge and follow the donning procedures above.

INSPECTION CHECKLIST

Examine the facepiece for completeness and serviceable condition. _____

Be certain that all components are undamaged. _____

Examine 40mm adaptor gasket for rips and tears. _____

Check inhalation valve for damage and proper installation. _____

Verify that the adaptor is properly seated so that the facepiece retainer notch is aligned with the facepiece locking clips. **FAILURE TO PROPERLY MOUNT THE ADAPTOR MAY RESULT IN NO RESPIRATORY PROTECTION.** _____

Check the 40mm adaptor gasket for cleanliness. _____

Don AV-2000 APR and perform negative pressure leak. _____

When the AV-2000 APR is properly donned and adjusted, detection of any contaminant odor or taste, or irritation of the eyes, nose or throat may be evidence of an improper seal or that the filter cartridge is exhausted. Return to the clean area to check facepiece fit and if cartridge replacement is necessary.



MANAGING MEMBERS IN DISTRESS

PART TWO

<u>TITLE</u>	<u>PAGE</u>
Firefighter Removal.....	69
Converting the SCBA into a Harness.....	77
Drag Rescue Device (DRD).....	84
Firefighter Removal Using Large D-Ring.....	86
FAST Unit.....	89
FAST PAK.....	97
FAST Radio.....	103
PAK Tracker.....	107
Safety Team (2 In / 2 Out).....	119

THIS PAGE WAS INTENTIONALLY LEFT BLANK

Managing Members in Distress

THIS PAGE WAS INTENTIONALLY LEFT BLANK

FIREFIGHTER REMOVAL

1. INTRODUCTION

- 1.1 When a MayDay is transmitted for a firefighter that is lost, missing, trapped or in distress, time will not be on your side. There will usually be a time lag between the trapped firefighter recognizing that they are in danger and the transmission of a MayDay. Studies have shown that once the firefighter realizes that they are in danger they will most likely try to remove themselves before transmitting a MayDay.
- 1.2 The situations encountered where a firefighter may need assistance, can take many forms and will involve both conscious and unconscious members. It can be as simple as finding a disorientated member and leading them to safety or as complicated as a trapped, unconscious member requiring extrication.
- 1.3 Depending on the member's location, fire conditions and the cause of injury, various drags or carries may be appropriate. Removal of the distressed firefighter to a tenable atmosphere usually involves little danger from spinal injury if there was not a fall or other injury involved. At times, fire conditions may be so severe that immediate removal of the distressed firefighter is critical, even with a spinal injury. In all cases a member should be positioned at the downed members head.
- 1.4 The removal methods outlined in this bulletin can be used for members that are either conscious or unconscious. Once the member is out of immediate danger, immediately begin to assess their "ABC" status (airway, breathing, circulation) and treat as necessary. At this point the member should be secured to a backboard or stokes basket prior to moving them any further, especially if there is any indication that a spinal injury is present.
- 1.5 The removal methods described are intended to be used only under difficult fireground conditions. They require the use of minimal equipment and set up time. They are intended for use as lifesaving steps under extreme circumstances. They are not intended for use at removal situations, where time and equipment concerns allow the use of more suitable, sophisticated hauling and patient handling systems.

2. OPERATING UNIT RESPONSIBILITIES

- 2.1 It is important to emphasize that the operating units continue to fight the fire when a MayDay/Urgent is transmitted for a distressed firefighter. The abandonment of Engine or Ladder company operations to assist in a rescue where resources have been deployed to handle the situation, places the trapped member and the rescuing firefighters in severe danger. During this highly emotional time members must realize, that if they are not assigned to the removal effort, they must continue with their assigned operation. Company Officers must prevent members of their unit from leaving their area of responsibility.

3. OFFICER RESPONSIBILITIES

3.1 Unless there is no one else available the Company Officer should not get physically involved in the operation. It is the responsibility of the officer to supervise the operation and keep the members focused with the job at hand. Listed below are some additional responsibilities of the Company Officer.

3.1.1 Transmit the MAYDAY/URGENT, if it has not already been done.

3.1.2 Provide the exact location of the member.

3.1.3 Get the identification of the member to the IC.

3.1.4 Call for any resources that may be necessary for the removal.

3.1.5 Keep the IC up to date on the operation as to:

- Air status of the distressed member and operating members.
- Progress on the packaging of the member if required.
- Once the removal starts and progress reports.

3.1.6 Monitor the conditions in the area of the operation.

3.1.7 Monitor handie-talkie transmissions.

3.1.8 Secure the removal route.

3.1.9 Call for an additional FAST Pak if the first is placed into operation.

4. STEPS TO FOLLOW WHEN MEMBER IS LOCATED

4.1 When the member has been located, the appropriate radio transmission must be made. Whether or not the removal involves a conscious or unconscious member, the priorities will be:

- **Fire/Environment.**
- **Air.**
- **Immediate medical care, if required and possible.**
- **Removal.**

Additional considerations are:

- Identification of member.
- Packaging, if required

5. EMERGENCY COMMUNICATIONS

- 5.1 If possible, the member transmitting the MAYDAY/URGENT shall begin, by pressing the Emergency Alert Button, ensuring the message gets transmitted at maximum wattage. Whenever the Emergency Alert Button is activated and/or a MAYDAY/URGENT transmitted, all handie- talkie communication on that frequency are to cease, except those between the member initiating the MAYDAY/URGENT and the IC.
- 5.2 The term MAYDAY or URGENT shall be repeated three times followed by the Company designation and position of the member initiating the emergency transmission to the IC. See Communications Manual, Chapter 9 for the proper format.
- 5.3 It is important to transmit a clear and concise message with the appropriate information. An unclear message will only cause confusion and delays. When wearing the facepiece, the microphone must be placed directly on the voicemitter.
- 5.4 All members must be aware that a message not acknowledged is a message not received. The emergency transmission **MUST** be acknowledged by the IC.

6. FIRE/ENVIRONMENT

- 6.1 Consider the environment that you are operating in. The conditions in the area of the distressed member will dictate the sequence of events. If your safety is in question, move to an area of refuge.
- Can you operate safely in the area?
 - What is the structural stability?
 - Is a hoseline needed for protection?

7. AIR SUPPLY

- 7.1 The air supply of the member needs to be assessed whether the member is conscious or unconscious. Removing the member from the IDLH is critical for survival. Assuring that the distressed member has an adequate supply of air is the next priority. A member will suffer brain damage without air in four to six minutes. In six to ten minutes a member will move towards clinical death. Removing the member without first addressing the air supply greatly diminishes a member's chance of survival.
- 7.2 Once the member is located, a FAST Pak must be called for immediately, regardless of whether the member has air or not. Every emergency situation is unique. The rescuer must be trained to assess each situation and decide which re-supply method via the FAST Pak is best. This decision can vary depending on several factors:
- Condition of the distressed member's SCBA.
 - Position of the distressed member.
 - Accessibility for the various air supply methods.

- 7.3 There are two ways to supply air to the distressed member:
- High Pressure.
 - Low Pressure.
- 7.4 The high pressure air system permits emergency air replenishment of an SCBA from an air supply source while still in use through the Universal Air Coupling (UAC). The UAC is for emergency use only when a member is low or out of air within an IDLH. If the condition of the distressed member's SCBA is in doubt **DO NOT** provide air via the high pressure system.
- 7.5 Air may be supplied to the member through the use of the low pressure system by one of the following methods:
- FAST Pak regulator with the member's facepiece.
 - Hansen Fitting of the low pressure hose.
 - FAST Pak facepiece and regulator.
- 7.5.1 The member assigned to monitor the air supply of the FAST Pak must protect the low pressure hose, e.g., high heat, hot embers, sharp objects and entanglement.
- 7.6 If unable to determine if an unconscious member has air or not, supply the member with air. There are three ways to determine whether the member has air:
- Turn the purge valve. If there is air, the flow will be heard.
 - If the facepiece is on, break the seal between the member's face and facepiece and listen for air escaping.
 - Look at the remote gauge of the downed member.
- 7.7 Use the downed member's facepiece, unless it is damaged or missing, instead of the facepiece with the FAST Pak. The member might require a special size facepiece, and using their personal facepiece will provide a better seal.
- 7.8 Once the member is supplied with air and packaged, if required, remove them from the IDLH as soon as possible.
- If the FAST Pak is **NOT** at your location, **START** the removal procedure. Communicate with the member assigned the FAST Pak to determine a suitable location to meet.
- 7.9 Once an unconscious member is supplied with air, turn the purge valve half way to allow a constant flow of air.

Note: Members in distress should not remove their facepiece. If the air supply is depleted remove the regulator and leave the facepiece on for protection. Having the facepiece on will aid in re-establishing the air supply in the event the member becomes unconscious.

8. IMMEDIATE MEDICAL CARE

8.1 Once clear of the IDLH environment, stop and assess the medical needs of the distressed member. Treatment should be in accordance with CFR protocols driven by patient condition. Address situations that are immediately life threatening such as:

- No pulse or not breathing.
- Major bleeding.

8.2 Be prepared to assist with and transfer medical care to EMS.

9. REMOVAL

9.1 There are a number of scenarios that can trap or disable firefighters. The method used to remove the distressed member will be based on the conditions and the ability of the member to assist in their own removal. Innovation and adaptation may be required to complete the rescue.

9.2 The removal of a conscious member will most often involve assisting them in exiting the area. If the member is unable to assist in their own removal, a determination will have to be made as to whether to wait for assistance or leave the area immediately.

9.3 There are two basic types of removals that will be encountered:

- Horizontal
- Vertical

Additional considerations for determining what method to use for the removal would be:

- Location and distance to an exit.
- If stairs or ladders are involved.
- Condition of the operating environment.
- Presence and extent of injuries.

10. IDENTIFICATION

10.1 There are a number of ways a member can be identified. Once the member is located and the proper radio transmission has been made, the member needs to be properly identified to ensure it is the member originally reported in distress.

10.1.1 Conscious Member

Ascertain the following information:

- Name.
- Unit working in that tour.
- Assignment.

10.1.2 Unconscious Member

- a. If possible, depress the EAB of the member in distress. The activation of the distressed member's EAB will identify them on the Electronic Fireground Accountability System (EFAS). Notify the IC via handie-talkie prior to EAB activation of the distressed member.

If unable to activate the distressed member's EAB, key the mic on the distressed member's handie-talkie to obtain their identity on EFAS

- b. Positioning them on their right side (Photo 1) will provide access to the following:
- Member's name on back of the bunker coat.
 - PRA identification number which will provide the unit and position. This method will work as long as the SCBA is not a spare.
 - Helmet frontpiece of the distressed member which may not be the unit the member is working in.
 - The engraved identification number on the side of the handie-talkie.



Photo 1

- c. The unconscious member's tools may indicate member's assigned position.

10.2 To accurately identify the distressed member by the use of the Pak-Tracker and EFAS, it is **imperative** that all members ensure that both the SCBA and the handie-talkie coincide with their assigned position.

11. PACKAGING

- 11.1 Statistics will show that most often the distressed member will be found by a member or members of an operating unit. Our main concern is the timely removal of the member from the IDLH. If the member is unconscious or unable to assist in their own removal, the member(s) who first found the firefighter must start the packaging process. There are a number of methods that may be used to package a member. Listed below are the most common methods that may be used for packaging:
- Use of the SCBA straps and personal harness.
 - Nylon Tubular Webbing.
 - Stokes basket/backboard.
 - SKED Stretcher.
- 11.2 Packaging a conscious member is not always required for removal. In most situations, packaging an unconscious member will be required for removal. The method used to package the member will be determined by the type and the degree of difficulty involved in the removal.
- 11.3 When an unconscious firefighter is found, it is more effective to take the time to package the member prior to attempting removal. Attempting removal before packaging will delay the removal, and may pull the member out of their SCBA harness and bunker gear.
- 11.4 If possible, position the member so that their back is facing toward the direction of removal prior to starting the packaging process.
- 11.5 An operating member/unit that locates and starts the packaging process of the distressed member will most likely will be fatigued and have a diminished air supply. Turning the operation over to the dedicated FAST Unit upon their arrival will facilitate the timely removal of the distressed member. Standardized firefighter packaging procedures will allow the rapid transition from the operating unit to the FAST unit.

12. TRAINING

- 12.1 All members should be well versed in Emergency handie-talkie transmissions. Upon discovery of a distressed member, the appropriate MayDay/Urgent message shall be transmitted over the handie-talkie.
- 12.2 Many firefighter removal scenarios require extensive assistance. A FAST Unit is on the scene of every working fire or emergency and is dedicated to assist distressed members. Members should be familiar with the proper packaging techniques and basic removal methods. These methods should be practiced with full PPE including gloves.

13. CONCLUSION

- 13.1 When an MAYDAY/URGENT transmission is made for a member in distress, a series of events will be set into motion. Decisive actions need to be taken in order to successfully remove the member from the IDLH.
- 13.2 Once the member is located, the appropriate MAYDAY/URGENT transmission shall be made. We need to address the fire/environment, air supply, immediate medical care and determine the method of removal. If packaging of the member is required, determine the best method based on the complexity of the removal. The distressed member needs to be properly identified to ensure it is the member originally reported in distress.
- 13.3 The Incident Commander/FAST Group Supervisor needs to be notified as to the location, the condition of the member and the operating environment, and what resources will be needed.
- The removal of trapped firefighters is greatly facilitated by the use of the personal harness. All equipment issued and used by operating members must be worn properly including the waist strap of the SCBA. This will greatly enhance your effectiveness as a rescuer. These items will also help rescuers rescue you in the event *you* become the unconscious firefighter!
- 13.4 The Department has pioneered the concept of the FAST Unit. These procedures are presented with the hope that they will greatly assist a FAST Unit in the difficult task of assisting and removing distressed members from hazardous situations. The rapid deployment of the FAST Unit is imperative because time will not be on our side when a firefighter needs assistance. In order to be proficient in these procedures, they must be practiced.

CONVERTING THE SCBA INTO A HARNESS

1. THROUGH THE LEG METHOD

- 1.1 Locate the waist strap of the SCBA.
- 1.2 Fully loosen both halves of the waist belt.
- 1.3 Unbuckle the waist belt.
- 1.4 Lift up one of the distressed members legs and place it on your shoulder.
- 1.5 Take one half of the waist belt and put it behind the distressed member's leg and bring it up between their legs.
- 1.6 Take the other half of the waist belt and bring it in front of the distressed member's leg and reconnect the waist strap. (Photo 1)



Photo 1

- 1.7 Take the rappel hook from the personal harness of the distressed member and pull sharply to release the hook from the belt.
- 1.8 Loosen the SCBA shoulder straps of the distressed member.
- 1.9 Open the gate of the hook of the members personal harness and place the open hook through both of the distressed members SCBA shoulder straps starting with the left strap first and then the right strap. The rescuer is moving the hook from their right to the left. The hook is attached in this manner so as to prevent twisting of the handle of the member's personal harness. (Photo 2)



Photo 2

- 1.10 Once both of the distressed member's SCBA shoulder straps are positioned inside the hook of their personal harness hook, release the gate of the hook.
- 1.11 Prior to tightening the distressed member's SCBA straps, webbing should be placed through the top end of the shoulder straps to make a girth hitch.
 - 1.11.1 Place one end of the webbing through both shoulder straps. (Photo 3)



Photo 3

- 1.11.2 Take the other end of the webbing and place it through the center of the webbing that was put through the shoulder straps. (Photo 4)



Photo 4

- 1.11.3 Tighten up on the webbing by pulling on the end placed through the center creating a girth hitch on the members SCBA shoulder straps. (Photo 5)



Photo 5

- 1.12 If time permits or additional securing is required, half hitches may be tied into both the shoulder and the waist straps of the distressed member's SCBA. When tying the half hitches, start with the waist straps first. Pull one side of the waist straps tight to allow enough excess in the strap to tie the half hitch. After the half hitch is completed, tighten the other waist strap. The excess can be wrapped underneath itself to keep it from slipping. Repeat the procedure for the shoulder straps by doing one side then the other. Depending on the size of the member, the shoulder straps can be tied across their chest.

The benefits the knots provide will help to keep the distressed member's SCBA as tight as possible to the member's back. This will help prevent the mask from getting hung up on furniture, or when turning corners. More importantly, when carrying a member up a flight of stairs, these knots prevent the mask harness from riding up and possibly dislodging the member's facepiece.

- 1.13 Packaging the member in this manner will allow for both a vertical or horizontal removal.

2. USE OF THE PERSONAL HARNESS LEG STRAPS

- 2.1 Prior to converting the member's SCBA into a harness, move the firefighter to a sitting position providing we do not suspect any type of spinal injury. Once in a sitting position, rotate the member, if possible, so that their back is facing toward the direction of removal. The benefits of moving the firefighter to a sitting position are:

- It reduces the member's size in half, which will be beneficial in tight locations.
- It will allow full control over the distressed member. This will help prevent members not assigned to the removal process from moving the distressed member prior to the completion of the packaging.
- It will be easier to locate the Universal Air Connection.
- Allows easier access to the SCBA low pressure hose, facepiece and both shoulder and waist straps.

- 2.2 Rescuer 1 shall be positioned behind the distressed member. This firefighter places their knee under the rubber bumper of the distressed member's SCBA cylinder, allowing slack in the distressed members SCBA shoulder straps. (Photo 6)
- 2.3 Rescuer # 2 shall be positioned in front facing the member.



Photo 6

- 2.4 Rescuer 2 pulls on the yellow leg straps of the distressed member's personal harness creating a loop. This will allow rescuer 2 room when ready to feed the SCBA waist buckle straps through the loops of the distressed member's personal harness leg straps and connect. (Photo 7)



Photo 7

- 2.5 Rescuer 1 works their hands down the SCBA cylinder to the waist straps and depresses the alligator clips that tighten the waist straps. (Photo 8)



Photo 8

- 2.6 Rescuer 2 grabs the connected SCBA waist buckle and fully extends the waist straps. (Photo 9)



Photo 9

- 2.7 Rescuer 2 disconnects the waist buckle and feeds the ends of the SCBA waist straps through the loops created in the distressed member's leg straps of their personal harness and reconnects the waist straps. Do not tighten the waist straps at this time. (Photo 10)



Photo 10

- 2.8 Rescuer 1 maintains the distressed member's SCBA cylinder as high as possible creating slack in all of the straps.
- 2.9 Rescuer 2 grabs the rappel hook from the personal harness of the distressed member and pulls sharply to release the hook from the belt and opens the gate of the hook.
- 2.10 Rescuer 1 loosens the SCBA shoulder straps of the distressed member and brings them both forward to allow Rescuer 2 to attach the distressed member's personal harness hook.
- 2.11 Rescuer 2 places the open hook from the distressed member's personal harness through both of the member's SCBA shoulder straps starting with the left strap first and then the right strap. The rescuer is moving the hook from their right to the left. The hook is attached in this manner so as to prevent twisting of the handle of the distressed member's personal harness. (Photo 11)



Photo 11

- 2.12 Once both of the distressed member's SCBA shoulder straps are positioned inside the hook of the personal harness hook, Rescuer 2 releases the gate of the hook. (Photo 12)



Photo 12

- 2.13 Prior to tightening all of the distressed member's SCBA straps, webbing should be placed through the top end of the shoulder straps to make a girth hitch.

Note: Girth hitch procedures are outlined in sections 1.11.1, 1.11.2, 1.11.3 and 1.12.

- 2.14 Packaging the member in this manner (Photo 13) will allow for both a vertical or horizontal removal.



(Photo 13)

DRAG RESCUE DEVICE

1. DESCRIPTION

- 1.1 The Drag Rescue Device (DRD) is designed to assist in the horizontal removal of a non-ambulatory injured or unconscious member. The DRD has been integrated within the bunker coat to comply with NFPA Standard 1971.
- 1.2 The DRD handle is located just under the collar on the back of the bunker coat and is protected by a flap held in place by Velcro and two snaps. (Photo 1) There is a reflective activation tab to assist in locating the DRD handle. (Photo 2)



Photo 1



Photo 2

2. OPERATION

- 2.1 The DRD can be deployed to assist in the horizontal removal of a non-ambulatory injured or unconscious member. The DRD is designed for **horizontal drag only. No other application shall be attempted!**

To Deploy:

- Locate and pull reflective activation tab which is connected to the DRD handle. (Photo 3)
This will deploy the DRD handle from underneath the protective flap. (Photo 4)



Photo 3



Photo 4

- Grasp and pull the DRD handle. When the DRD handle is pulled, the device is designed to tighten around the member's shoulders and chest, securing the member in their bunker coat.
- The injured or unconscious member can now be securely dragged horizontally and will not slip out of bunker coat.

NOTE: Any attempt to use the device for other than a horizontal drag could result in the member slipping out of their bunker coat. In addition, serious injury could occur to member's upper torso. Members should not be dragged up stairs utilizing the DRD.

FIREFIGHTER REMOVAL USING LARGE D-RING

1. INTRODUCTION

- 1.1 The distressed member packaging evolution is an efficient way to prepare a member for a rapid removal. Packaging is accomplished by utilizing the members SCBA, personal harness, the large D-ring of their Bunker coat, and their Drag Rescue Device (DRD).

2. PACKAGING

- 2.1 Place the distressed member in a sitting position and rotate them so that their back is facing toward the direction of the removal prior to packaging.

Rescuer #1:

Rescuer #1 shall take a position behind the distressed member and place them in a sitting position. (Photo 1)

Rescuer #2:

Rescuer #2 shall be positioned in front of and facing the distressed member, and ensure that the waist strap of the members SCBA is engaged. Rescuer #2 then grabs the rappel hook from the personal harness of the distressed member and pulls sharply to release the hook from the belt and opens the gate of the hook. (Photo 1)



Photo 1

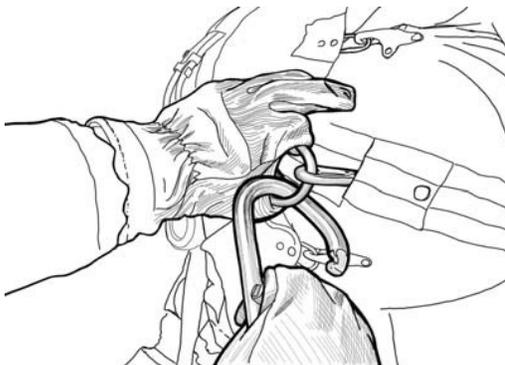


Photo 2

Rescuer #2:

Rescuer #2 places the open hook through the *large D-ring* on the distressed members bunker coat. (Photo 2) The *large D-ring* is the second coat buckle from the top and is connected to the DRD.

Note: At no time shall items be carried on the large D-ring of the bunker coat (e.g. carabineers, keys). These items will interfere with this connection.

Rescuer #1:

Rescuer #1 locates and fully deploys the distressed members DRD, which is located on the back of the member's turnout coat. (Photo 3)

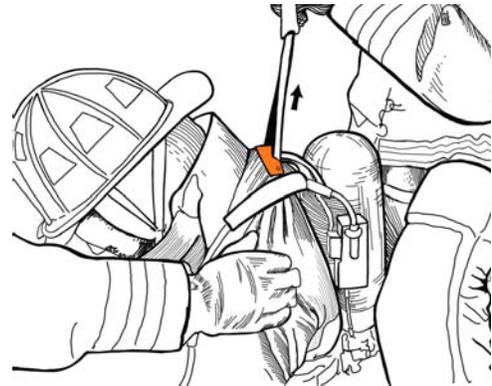


Photo 3

Rescuer #1:

Rescuer #1 wraps the DRD once around the right shoulder strap (over and under) of the distressed members SCBA. (Photo 4)



Photo 4

- 2.2 When the DRD handle is pulled, the device is designed to tighten around the member's shoulders and chest, securing the member in their bunker coat.
- 2.3 The distressed member can now be securely dragged horizontally and will not slip out of the bunker coat or SCBA. This method can also be used to remove a member up or down stairs.

3. MOVING

- 3.1 Once packaged, the distressed member can be securely moved in a number of ways:
- A. Dragged horizontally by grasping the DRD only.
 - B. Dragged horizontally by grasping the DRD with one hand and the distressed members left shoulder strap with the other hand.
 - C. Carried horizontally, or up or down stairs with one rescuer grasping the DRD only and a second rescuer grasping the leg-straps of the distressed member.
 - D. Carried horizontally, or up or down stairs with one rescuer grasping the DRD with one hand and the distressed member's left shoulder strap with the other, while a second rescuer assists by grasping both leg straps of the distressed member (Photo 5).



Photo 5

Note: It is essential that the DRD is wrapped once around the right shoulder strap (over and under) of the distressed members SCBA before using any of these removal methods. Failure to do so could result in the member slipping out of their bunker coat or suffering serious injury to their upper torso.

FIREFIGHTER ASSIST AND SEARCH TEAM – FAST UNIT

1. PURPOSE

The purpose of the Firefighter Assist and Search Team (FAST) is to be immediately available to assist a member who becomes trapped, distressed or involved in other serious life threatening situations. The FAST Unit must be ready to act immediately and decisively when called upon.

2. NOTIFICATION

2.1 The dispatcher shall:

- Allocate a ladder company, which shall be designated as the FAST Unit upon transmission of signals 10-60, 10-66, 10-75, 10-76, 10-77.
- Notify the assigned unit that it is designated as the FAST Unit.
- Notify the IC of the identity of the responding FAST Unit.

2.2 In some situations, a ladder company staffed with four firefighters may be assigned as a FAST unit. When reporting to the ICP, the ladder company officer must inform the IC that they are not fully staffed. The IC should take the staffing level of the FAST unit into consideration upon deployment, and ensure adequate resources are assigned to assist if necessary.

2.3 The FAST Unit should not be used for firefighting purposes. When an IC puts a FAST Unit to work at an incident that has not been declared “Under Control,” immediate notification shall be made to the dispatcher stating the reason for deploying the FAST Unit and a request for an additional FAST Unit. Prior to the arrival of the replacement FAST Unit, the IC shall designate a Safety Team.

3. POSITION

3.1 The FAST Unit shall report to and stage near the Incident Command Post (ICP), within verbal contact, at a position from which they can be readily deployed. An Electronic Fireground Accountability System (EFAS) trained member of the FAST Unit shall report to a Battalion vehicle on scene to monitor the EFAS and the FAST Radio.

However, the IC may assign the FAST Unit to stage at a location other than the ICP, based on the type of building units are operating, e.g. High Rise Office Building. Units shall operate in accordance with established guidelines on FAST Unit staging at different building types.

3.2 At large-scale, high-rise or unusual operations, additional FAST Units may be positioned at other locations as determined by the IC.

4. OFFICER RESPONSIBILITIES

The FAST officer is the most influential member of the FAST Unit. It is important for the FAST officer to anticipate potential rescue situations as presented by the fire, the fire building and the tactics implemented by operating units. In addition, the FAST officer must:

- Constantly evaluate the progress of the operation.
- Continually monitor the location of operating units.
- Determine methods to identify, locate and remove a member in distress.

- 4.1 The officer of the FAST Unit shall announce their arrival on the scene over the handie-talkie and report to the ICP, unless otherwise directed by the Incident Commander.
- 4.2 Upon arrival, the FAST officer shall verify that the IC is aware of the unit's presence and designation as FAST. If assigned by the IC to other than FAST duties, the FAST officer shall REMIND the IC of their FAST designation.
- 4.3 When communicating to other units, the FAST officer and member's radio designation shall include the word FAST after the unit designation. Ex: "L-157-FAST to Command"
- 4.4 Communication between FAST Unit members does not require the use of the word FAST after the unit designation. Ex: "Ladder 157 CAN to Ladder 157"
- 4.5 The FAST officer should bring an up to date copy of the response ticket to the ICP which would include any CIDS information that is available.
- 4.6 The FAST officer shall get a briefing from the IC, and relay the information to the members of the FAST Unit as to the following:
 - Fire location
 - Tactics implemented
 - Location of operating units
- 4.7 The FAST officer should pre-plan possible rescue operations based on their size-up of conditions and the location of operating units.
- 4.8 The IC or the FAST Group Supervisor shall coordinate a rescue plan with the FAST officer prior to deploying the FAST Unit.
- 4.9 It is incumbent of the FAST officer to provide strong and decisive leadership when dealing with a distressed member as well as providing for the safety of the FAST Unit.

5. FAST UNIT RESPONSIBILITIES

All members of the FAST Unit should be fully prepared to operate upon arrival. The FAST Unit must be ready for immediate deployment as directed by the IC.

- 5.1 The FAST Unit is responsible to know what additional equipment they are required to bring to the ICP, in addition to their regularly assigned tools.

The following assignments must be given out at roll call:

- A member assigned the FAST Pak. Member is responsible to manage the air supply of the distressed member, if needed.
- An EFAS trained member assigned to monitor EFAS and the FAST Radio.

If the member **is** EFAS trained, upon arrival, report to the Battalion vehicle being used to monitor EFAS. This FAST Unit member shall **remain in the Battalion vehicle** and monitor both EFAS and the Battalion's FAST Radio for the duration of the incident, **even if the FAST Unit is given an assignment.**

If the member is **not** EFAS trained, upon arrival, report to a Battalion vehicle on scene to monitor the FAST Radio Board. The member assigned the FAST Radio shall **remain in the Battalion vehicle** and monitor the FAST Radio for the duration of the incident, **even if the FAST Unit is given an assignment.**

Note: Whether EFAS trained or not, the FAST Unit member assigned to monitor EFAS and/or the FAST Radio shall **remain in the Battalion vehicle, even if the FAST Unit is given an assignment,** until relieved.

- 5.2 A survey of the fire building should be done to determine the following:

- Access for portable ladders.
- Presence of fire escapes and party wall balconies.
- Building built on a grade, setbacks and the depth of the building.
- Type and location of stairs and elevators.
- Determine if any remote or alternate access points are available.
- Obstructions that would hinder access to any side of the structure.

- 5.3 While staged, the FAST Unit should develop a plan of action. This plan of action should include:

- Information gathered from the survey.
- Progress of fire operations and location of operating units.
- Expected paths of fire travel.
- Hazards posed by the type of construction, occupancy and type of incident.

- 5.4 Determine the availability and location of aerial, tower and portable ladders, in the event there is a need to use and/or place into operation.

- 5.5 Determine the availability of an Engine company to stretch a hoseline for protection.
- 5.6 Monitor the handie-talkies for any emergency transmissions.
- 5.7 Note the location of EMS personnel at the scene.

6. SIZE UP

All firefighting operations should begin with a proper size-up. This is particularly important in FAST Unit operations as well. The focus of a FAST Unit's size-up will be slightly different than normal since the FAST Unit will be performing a size-up for potential distress duties, not just for fighting the fire. The 13-point size-up mentioned below must be evaluated continually, along with anticipation of possible problems by the FAST Unit.

6.1 Construction

- As related to fire spread and collapse potential.

6.2 Occupancy

- Indicates what kind of fire spread can be anticipated and what kind of search may have to be employed (search ropes, team search).

6.3 Area/Access

- Large areas will make for a more difficult search, unconfined fire and flashover hazard that may not be apparent.
- What access routes are available to upper floors, cellars and roofs?
- Will there be a need for search ropes?

6.4 Life

- Consider the area where members are operating.
- Have they all been accounted for?
- What was their last known location/assignment?

6.5 Weather

- Will extremes in the weather affect the readiness of the FAST Unit and will it hamper the rescue efforts?

6.6 Auxiliary Appliances

- Is a sprinkler system operating?
- Is the sprinkler system hampering the rescue effort due to the large amounts of smoke associated with an operating sprinkler system?
- Will the sprinkler system hold the fire in check while the FAST Unit operates?
- Can the sprinkler system be shut down to prevent a drowning danger?

- Who is supplying the sprinkler system?
- Is there a serviceable standpipe system?
- Can the standpipe system be used to help gain access to the trapped firefighters or protect the rescue effort?

6.7 Street Conditions

- Does an aerial or tower ladder have access to the front of the fire building?
- Can the FAST Unit get close to the fire building with their apparatus?

6.8 Water Supply

- Are the first alarm engine companies continuing their attack on the fire?
- Is an engine company with a charged hoseline needed at our location?
- Are there any water source problems?

6.9 Exposures

- Can the exposures provide access to the fire area such by breaching walls?
- Do the exposures provide both access and egress from the roof?
- Is fire extending to the exposures that could endanger firefighters?
- Could the exposures become a secondary collapse hazard in the event of a collapse of the fire building?

6.10 Apparatus/Equipment

- Is all of the required equipment at the ready?
- Are the first alarm ladder company's apparatus in position for use?
- Is there a chauffeur at the turntable?
- Are the members of the FAST Unit familiar with the operation of the apparatus of the first alarm units?
- Are portable ladders available?
- What other equipment may be needed and is it available.

6.11 Location

- What is the last known location of the trapped or distressed firefighter?
- Is the location of the fire known?
- Is the fire showing signs of extending to other floors, cockloft or exposures?

6.12 Time

- How long has the fire been burning? The longer the fire is burning:
 - The greater the structural damage and chance of collapse.
 - The more fire gases are being pumped into the building.
 - Greater possibility of members suffering heat exhaustion.
 - Greater chance of auto exposure and extension to exposures.

6.13 Height of Building

- Will portable ladders be able to reach all windows?
- Is an aerial ladder needed to reach certain areas?

7. OPERATIONS

When the FAST Unit is deployed for a distressed member, the fire conditions in the immediate area of the rescue are likely to be severe. It is vital for the FAST Officer, along with the FAST Unit to consider alternate access points to reach the trapped firefighter

7.1 The FAST Unit may be involved in any of the following:

- Searching for a member.
- Removing a member.
- Assisting in the removal of a member.

7.2 When the FAST Unit operation requires the use of a ladder, avoid repositioning ladders already in place against a fire building unless it is a life threatening situation and a notification is made to the members operating in that area. Ladders in place may be providing a means of egress for operating firefighters.

7.3 Operational considerations for the FAST Unit:

- Search team – make entry to locate, package and remove the member if possible.
- Removal/Resource team – will stage at the entrance and be available to assist. This assistance could be to relieve, augment or supply additional equipment to the search team.
- Use of a two sided approach where the search team makes access via the interior and the removal team makes access via the exterior of the building.
- Attempting a rescue from the outside of the fire building.
- Use of a life saving rope rescue.

7.4 The FAST Unit shall remain intact and not split up when dealing with large commercial or complex buildings.

7.5 When FAST Unit is deployed at an operation for a member in distress:

- Determine the location of the member based on alarm assignment, order of arrival and riding position.
- Use information received from Incident Commander, operating unit or distressed member, to help determine their location.
- Determine the best access to the distressed member and any alternate access points based on pre-determined plan of action.

7.6 When the FAST Unit arrives at the location of the distressed member, the transmitting member of the FAST Unit shall:

- Depress the Emergency Alert button (EAB) on their handie-talkie. This will identify the member of the FAST Unit transmitting the emergency message on EFAS and the FAST Radio. This will also ensure the message is transmitted at the maximum wattage.
- After the Emergency Alert activation, provide the IC or FAST Group Supervisor with the information required for the emergency transmission as outlined in Communications Manual Chapter 9. After all required information is given; the transmitting member shall reset their handie-talkie Emergency Alert by depressing and holding the Emergency Alert button for approximately 2 seconds.
- Assess **Fire, Air, Immediate medical care, Removal** (FAIR).
- Provide additional air supply as needed.
- Confirm positive identification.
- If possible, depress the EAB of the member in distress. The activation of the distressed member's EAB will identify them on EFAS. Notify the IC via handie-talkie prior to EAB activation of the distressed member.
If unable to activate the distressed member's EAB, key the mic on the distressed member's handie-talkie to obtain their identity on EFAS.
- The distressed member's Emergency Alert shall remain activated until determined it is no longer required.
- Package the member for removal.

8. TOOLS/EQUIPMENT

In addition to normally assigned ladder company tools, the FAST Unit shall report to the ICP with the following equipment:

- FAST Pak.
- Search Rope.
- Stokes Basket with long backboard.
- 2:1 Rope
- Pak-Tracker

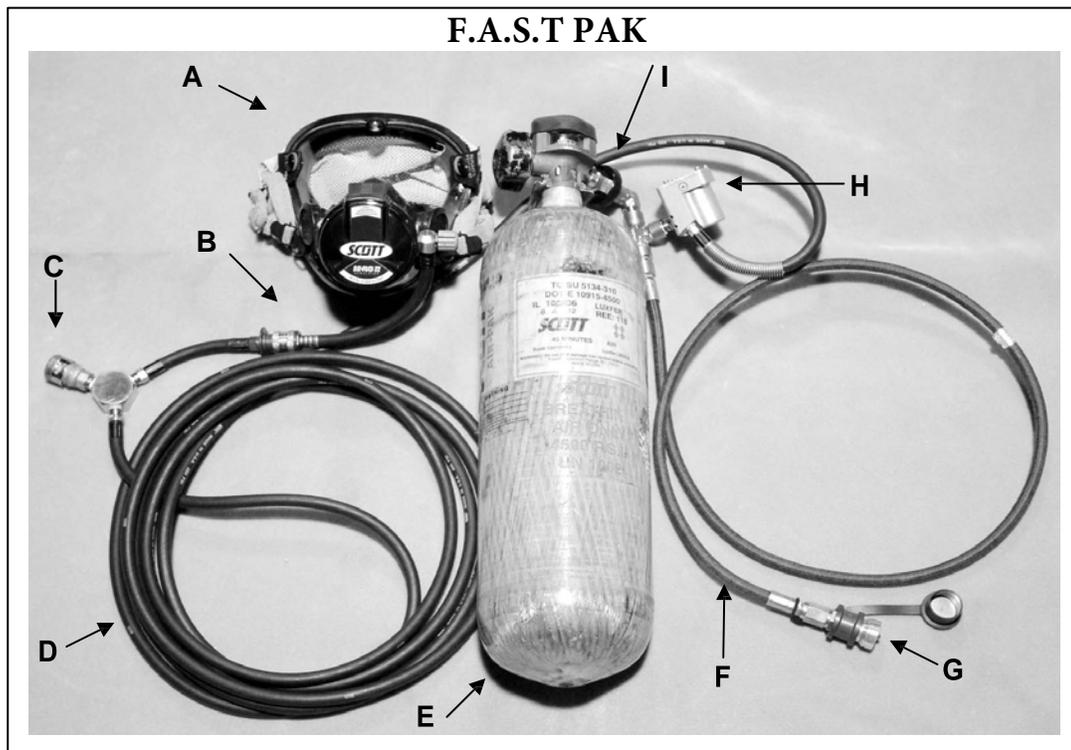
Note: A member other than the member monitoring EFAS will monitor the Pak-Tracker

- 8.1 As part of the size-up, determine what other tools/equipment may be needed for the various rescue possibilities such as:
- Rebar cutter.
 - Life Saving Rope/Life Belt
 - Saws
 - Elevator keys for buildings with elevators.
 - Flotation devices for operations on or near bodies of water.

9. TRAINING

Timely removal is imperative. The rescue will not only be difficult, but it will be one that is emotionally charged. The way to overcome these obstacles is through constant training in rescue procedures.

- 9.1 All units need to be proficient in proper search and radio procedures as well as the use of the Thermal Imaging Camera, search rope, webbing and both power and hand tools.
- 9.2 Practicing packaging and removal techniques will greatly enhance a company's ability to rescue a distressed firefighter. To assist units in practicing these techniques, each Battalion has been issued an Emergency Removal Training Kit.



- | | | |
|----------------------------|---------------------------------|---------------------------------------|
| A. Facepiece | D. 20' Low Pressure Hose | G. High Pressure UAC* Coupling |
| B. Hansen Fitting | E. Cylinder | H. Low/High Pressure Assembly |
| C. Schrader Fitting | F. High Pressure Hose | I. Cylinder Coupling |
- *Universal Air Connection

1. INTRODUCTION

The Fast Pak is a portable air supply. It is intended for use as an emergency air source for members when they are low or out of air while operating in an IDLH atmosphere. The Fast Pak is carried by all Ladder, Rescue and Squad Companies.

2. DESCRIPTION

- ◆ Scott Air Cylinder (45 min)
- ◆ Low/High Pressure Assembly
- ◆ 5 ft. high pressure hose with Universal Air Coupling (UAC)
- ◆ 20 ft. low pressure hose attached to a manifold with Schrader fitting and Hansen fitting
- ◆ Non - CBRN Regulator and Facepiece
- ◆ Carrying Case

3. ADVANTAGES

- ◆ Lightweight, mobile, flexible air system
- ◆ Smaller profile / numerous air supply capabilities
- ◆ Ready for immediate deployment
- ◆ High pressure and low pressure systems can be operated simultaneously

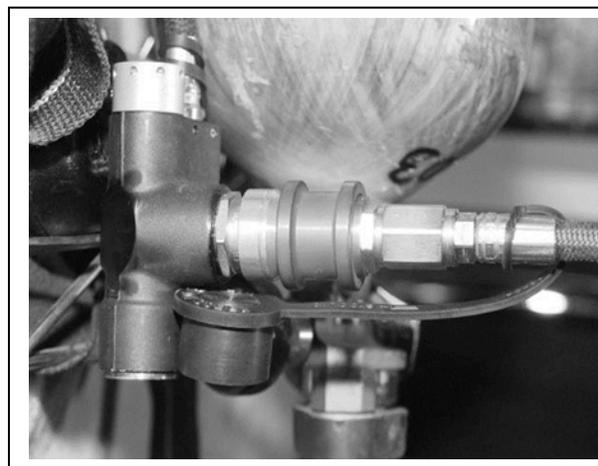
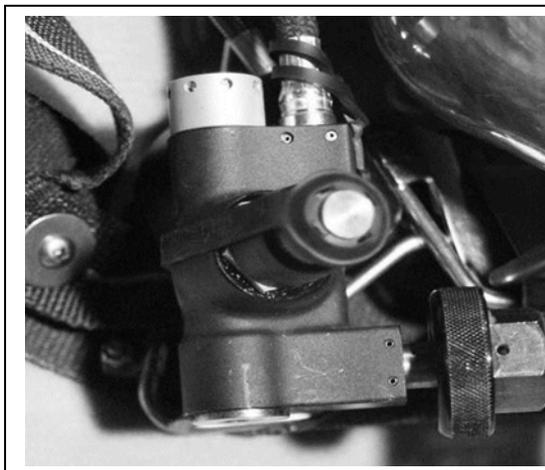
4. LIMITATIONS

- 4.1 The Fast Pak is not equipped with a vibra-alert or heads up display indicator. The only way to monitor the air pressure in the Fast Pak is the cylinder gauge. Therefore, it is **essential** that one member of the FAST Unit is assigned to monitor the actual volume of air remaining in the portable cylinder. This member must have audible communication with the extrication team. Always start an operation with a full cylinder. Operational time of a SCBA resupplied by a Fast Pak can vary depending on several factors. (eg., residual air in the distressed member's SCBA cylinder, emotional/physical condition of distressed member.)
- 4.2 Every emergency situation is unique. The rescuer must be trained to assess each situation and decide which re-supply method via the Fast Pak is best. This decision can vary depending on several factors (e.g., position of the distressed member's body, condition of the distressed member's SCBA). No single method is recommended for all situations.

5. HIGH PRESSURE AIR SUPPLY

- 5.1 This system permits emergency replenishment of an SCBA from an air supply source while in use. This high pressure coupling will fit all UACs.*
- 5.2 The UAC is for **emergency use only** when a member is low or out of air within an IDLH atmosphere.
- 5.3 The 5 ft. high pressure hose will administer air to a member's SCBA via the UAC. This will equalize air in both cylinders in approximately 60 seconds. The Fast Pak has a built in check valve that only permits air to be delivered to a member's SCBA.
- 5.4 To use the Fast Pak with a UAC system, proceed as follows:
- 5.4.1 Fully open the cylinder valve on the Fast Pak and remove the dust cap from the High Pressure Coupling on the Fast Pak.
- 5.4.2 Identify the UAC on the member's SCBA. Remove the dust cap from the UAC on the member's SCBA. (Figure 1)

Figure 1



- 5.4.3 Verify that the cylinder valve on the member's SCBA is fully open.
- 5.4.4 Connect the high pressure coupler to member's UAC. (Figure 1)
- 5.4.5 Air will immediately begin to flow from the Fast Pak cylinder to the member's cylinder. The air will stop flowing when the member's SCBA cylinder and the Fast Pak air supply equalize. When charging is complete, disconnect the UAC hose assembly.
- 5.4.6 Remove member from IDLH as soon as possible after charging is complete. If air replenishment is needed again and time is of the essence, you can use the Fast Pak's remaining air. This will only result in marginally replenishing the member's cylinder. Both cylinders will equalize again, ½ in each cylinder.

Key Points for High Pressure Air Supply

- ◆ Handle the high pressure UAC hoseline assembly in a manner that will prevent a sudden or unexpected pull from moving or damaging the Fast Pak.
- ◆ If the cylinder and/or valve assembly of the distressed member show damage or evidence of exposure to high heat or flame, a decision must be made whether the cylinder is suitable for recharging.
- ◆ Connect the Fast Pak's high pressure coupler onto the members UAC fitting until the sleeve clicks into place. Check the engagement by tugging on the coupling.
- ◆ If the UAC on the member's SCBA is damaged, **do not** attempt to connect the UAC airline assembly from the Fast Pak. **(use one of the low pressure methods)**
- ◆ If the dust cap on the UAC of the member's SCBA is missing, quickly examine and remove any visible debris before connecting into the UAC. If the UAC is impacted or blocked with debris, use one of the low pressure methods.
- ◆ **IF AT ANY TIME DURING THE FILLING PROCESS A LEAK IS DETECTED, IMMEDIATELY DISCONTINUE THE FILLING PROCEDURE AND SUPPLY VIA ONE OF THE LOW PRESSURE METHODS.**

6. LOW PRESSURE AIR SUPPLY

- 6.1 The 20 ft. low pressure hose can be used where space is restricted or when access to the UAC is obstructed. Regulator with/or without facepiece can be passed through debris to member low on air.
- 6.2 During low pressure operations, the 20 ft. hose gives the member responsible for monitoring the air supply, a buffer zone, so they do not crowd the extrication area of the distressed member.
- 6.3 The member assigned to monitor the air supply of the Fast Pak must protect the 20 ft. low pressure hose from high heat, hot embers, sharp objects and entanglement.

6.4 Low pressure line may be used in one of the following four (4) modes:

1. Replace member's regulator with Fast Pak's regulator
 - a. Disconnect member's regulator from facepiece.
 - b. Attach the Fast Pak regulator to the member's facepiece. Ensure that the regulator locks into position.
 - c. During the initial inhalation, a click should be heard at the regulator assembly. This click indicates the functioning and ON position of the manual shut off switch. If the member is unable to activate the inhalation valve, turn the red purge valve downward, away from the face, to achieve a sufficient flow. Rescuers must ensure the purge valve remains open. (This will cause a more rapid depletion of air from the supply cylinder.)
2. Replace low pressure Hansen Fitting of member's SCBA with the low pressure Hansen Fitting of the Fast Pak.
 - a. Disconnect the Hansen fitting on the member's low pressure hose below his regulator. Push the male coupling in FIRST, then pull back sleeve to disengage coupling. (Figure 2)
 - b. Connect the low pressure hose from the member's facepiece mounted regulator to the Hansen fitting on the Fast Pak. Test for proper engagement. (Figure 3)

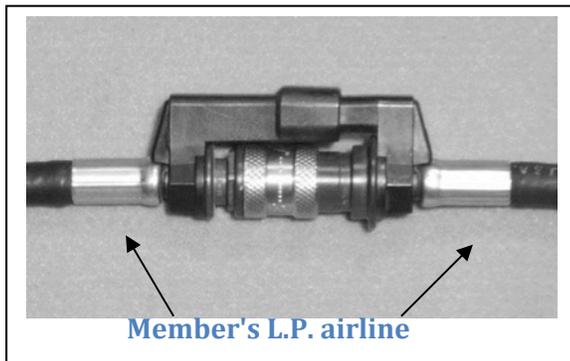


Figure 2



Figure 3

3. Replace member's facepiece with Fast Pak facepiece with regulator attached.
 - a. Remove member's facepiece.
 - b. Place Fast Pak facepiece on member and make necessary adjustments to ensure a proper facepiece seal.
 - c. During the initial inhalation, a click should be heard at the regulator assembly. Air will then flow into the facepiece. If the member is unable to activate inhalation valve, turn the red purge valve downward, away from the face, to achieve a sufficient airflow. Rescuers must assure the purge valve remains open. (This will cause a more rapid depletion of air from the supply cylinder).

4. Schrader Connection

Use of the Schrader Fitting is reserved for the use of SOC units only.

Example: Supply emergency air to a Confined Space Mask carried only by SOC units.

7. USE OF FAST PAK ON NON FDNY MEMBERS

7.1 The Fast Pak can also be used to provide an air supply to non FDNY members when:

- ◆ A victim is trapped in an IDLH atmosphere and immediate removal is not possible.
- ◆ Confined Space rescue as per Training Bulletin, Confined Space.

The Fast Pak assigned to the FAST Unit shall not be deployed for this operation. Additional Fast Paks shall be deployed if needed and victims should be removed from an IDLH atmosphere as soon as conditions permit.

****The FAST Unit shall only be used as per AUC 320****

8. BLEEDING PROCEDURE FOR FAST PAK

- ◆ Close cylinder valve.
- ◆ Verify that the dust cap on the high pressure UAC coupling is in place.
- ◆ Bleed down residual high pressure air by pushing in on the center of the dust cap to vent the high pressure supply line.
- ◆ Bleed down residual low pressure air by using the purge valve.

9. INSPECTION

- 9.1 Verify that the Fast Pak is properly cleaned and decontaminated.
- 9.2 Inspect the Fast Pak carrying bag for worn or damaged components.
- 9.3 Inspect cylinder and valve assembly for damage such as dents, gouges or discoloration of the composite wrapping. Cylinders that show damage or exposure to high heat or flame shall be removed from service and emptied. Attach RT-2 and return to MSU.
- 9.4 Turn on Fast Pak, listen for leaks throughout system.
- 9.5 Check the high and low pressure hose lines for cracks, cuts, abrasions or other signs of damage.
- 9.6 Check all couplings for damage and cleanliness. Engage all couplings and make sure all are working properly.
- 9.7 Check regulator as per Training Bulletin, Mask.
- 9.8 Check cylinder pressure gauge for "FULL" indication. If cylinder pressure is less than "FULL" replace with a fully charged cylinder.
- 9.9 Inspect the cylinder coupling on the Fast Pak combination LOW/HIGH pressure assembly to be certain the nipple seal is present and undamaged. If the gasket is present and undamaged, align the coupling with the cylinder outlet.(Figure 4)

FAST PAK LOW/HIGH PRESSURE ASSEMBLY

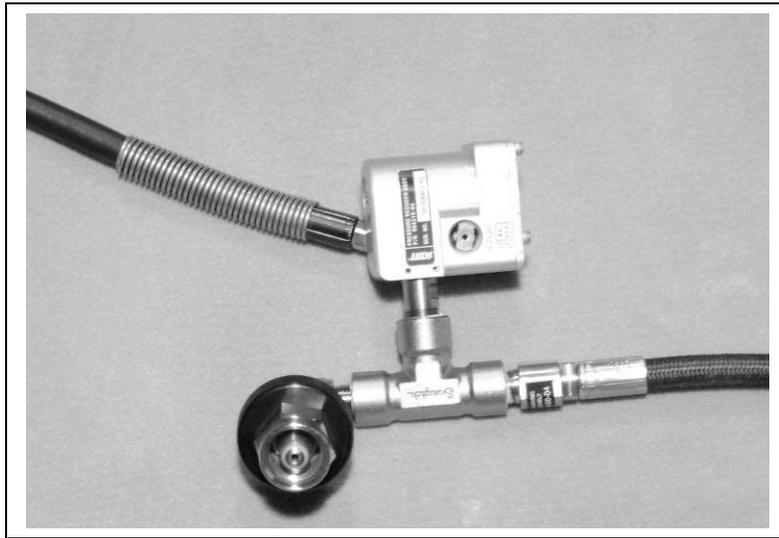


Figure 4

- 9.10 This equipment must be inspected at the beginning of each tour and after each use.
- 9.11 A Mask Record Card (Form SD-30) shall be filled out and maintained for each Fast Pak assigned to a unit. Defects found must be included on the Mask Record Card.
- 9.12 If any malfunction is noted:
- ◆ Remove the Fast Pak from service,
 - ◆ Notify Battalion that the Fast Pak is O.O.S. and request a spare mask for the FAST Unit tool assignment. This spare mask will be referred to as the “Fast Mask.”
 - ◆ Division shall cause an immediate replacement of the Fast Pak through MSU.

10. NOTES

- 10.1 The designated FAST Unit shall report in at all incidents with the Fast Pak (See AUC 320)
- 10.2 Members using Fast Pak must be trained and be prepared to disconnect and reconnect couplings, replace facepiece or regulator while wearing gloves. Members should be prepared to operate in zero visibility, time being of extreme importance and in an IDLH area.
- 10.3 When Fast Pak use is anticipated, it should be turned on in a clean atmosphere and cylinder pressure gauge checked for “FULL” indication.
- 10.4 Once a Fast Pak is put into operation, the I.C. shall ensure that a second Fast Pak is readily available at the scene to be used as a required.
- 10.5 Keep all couplings dry at all times. Water on couplings may freeze during low temperatures preventing connections.

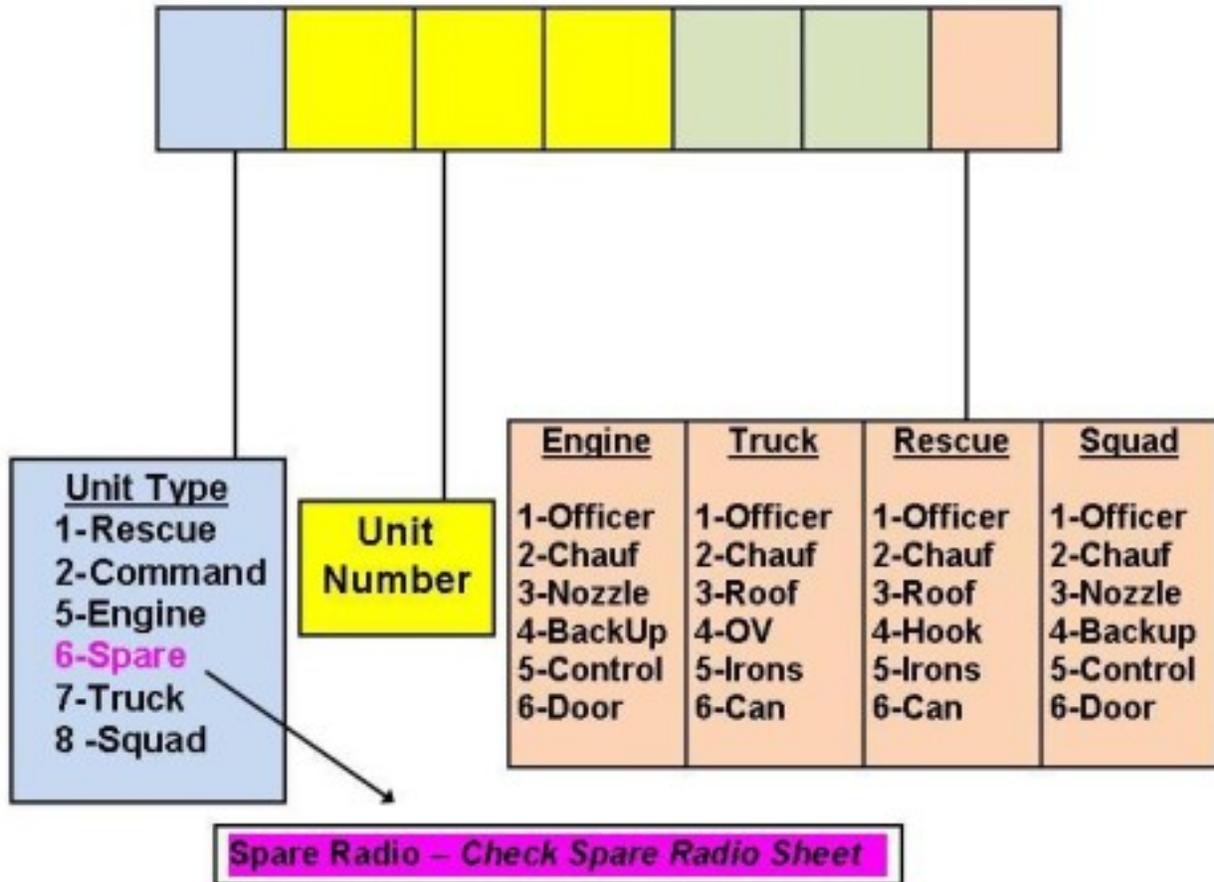
1. FAST BOARD

- 1.1 The 8½” X 14” metal FAST Radio Board is equipped with leather strap and hand-holds to act as a portable workstation. A mounted, metal clipboard container provides compartments for waterproof FAST Radio Forms, pens, pencils and a copy of the daily spare-radio sheet.



2. FAST RADIO FORM

2.1 The FAST Radio Form is made of waterproof paper and has a printed design to facilitate obtaining and documenting the internal radio codes. Each packet has 25 copies of the FAST Radio Form. The Form can be filled out with either pen or pencil, but pencil is superior, especially in wet weather. The member assigned to monitor the FAST Radio shall record the internal radio codes of emergency transmissions in the boxes provided. White space can be used for notes pertaining to the operation. When necessary, the FAST Radio Form can be torn off and given to the Incident Commander.



2.2 Additional forms can be acquired through the Division.

3. PROCEDURE

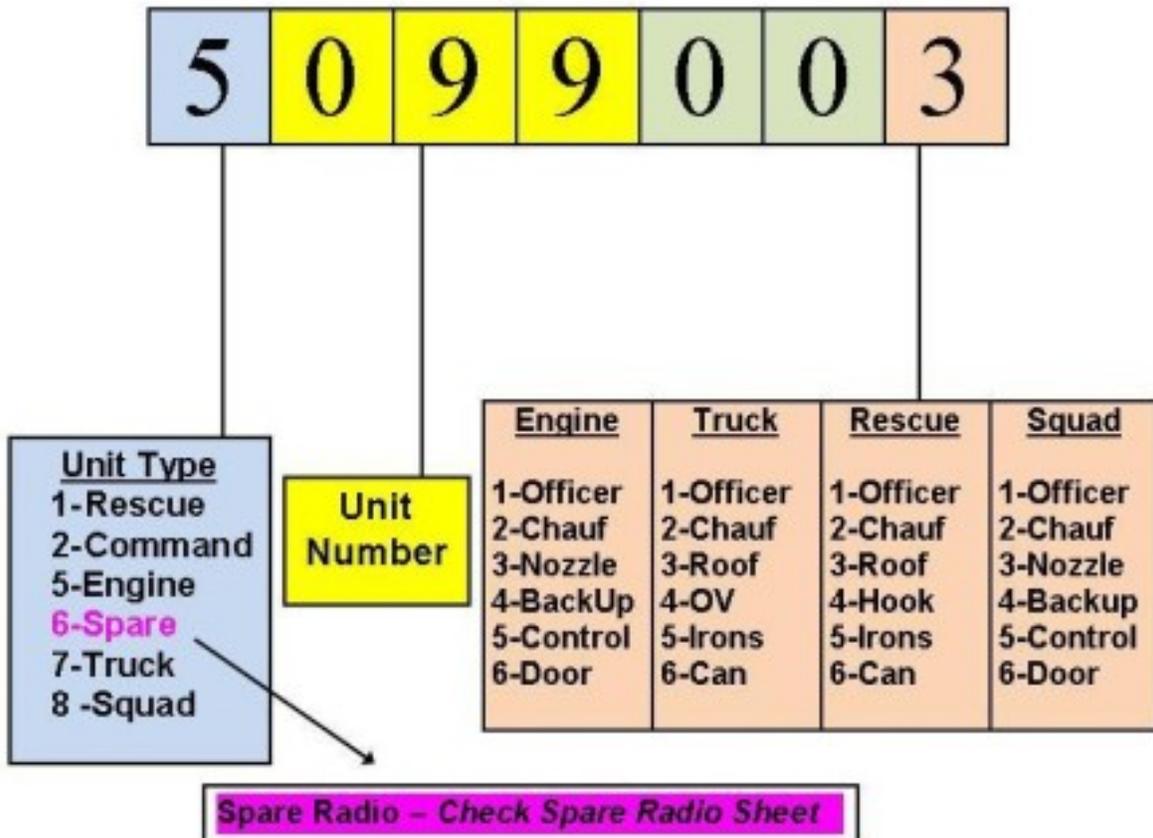
3.1 One member of the FAST Unit shall report to a Battalion vehicle on scene to monitor the FAST Radio Board. The member assigned the FAST Radio shall remain in the Battalion vehicle and monitor the FAST Radio for the **duration of the incident, even if the FAST Unit is given an assignment.** Member shall monitor for:

- Mayday/Urgent transmissions
- Members in distress

Note: If the member is EFAS trained, upon arrival, report to the Battalion vehicle being used to monitor EFAS. This FAST Unit member will then monitor both EFAS and the Battalion’s FAST Radio for the **duration of the incident, even if the FAST Unit is given an assignment.**

3.2 When a Mayday/Urgent has been transmitted, the FAST Radio member shall record the Radio ID number immediately on to the FAST Radio Form.

3.3 When necessary the Radio Designation Chart can be referred to for the member’s assigned position.



FAST Radio Form showing Radio ID indicating Engine 99 – Nozzle

4. RADIO DESIGNATION CHART

4.1 The Radio Designation Chart will show the member's assigned position based on the internal radio codes.

1 – RESCUE COMPANIES		2 – COMMAND : STAFF DIVISION OR BATTALION		5 – ENGINE COMPANIES	
1- - - 001	Rescue Officer	22- - - - -	Staff	5- - - 001	Officer
1- - - 002	Rescue Chauffeur	23- - - - -	Division	5- - - 002	ECC
1- - - 003	Rescue Roof	24- - - - -	Battalion	5- - - 003	Nozzle
1- - - 004	Rescue Hook			5- - - 004	Backup
1- - - 005	Rescue Irons			5- - - 005	Control
1- - - 006	Rescue Can			5- - - 006	Door
6 – SPARE AND COMMUNICATIONS		7 – LADDER COMPANIES		8 – SQUAD COMPANIES	
6- - - 001		7- - - 001	Officer	8- - - 001	Squad Officer
6- - - 002		7- - - 002	Chauffeur	8- - - 002	Squad ECC
		7- - - 003	Roof	8- - - 003	Squad Nozzle
		7- - - 004	OVM	8- - - 004	Squad Backup
		7- - - 005	Irons	8- - - 005	Squad Control
		7- - - 006	Can	8- - - 006	Squad Door
9 – SPECIAL UNITS					
9- - - 001					

PAK - TRACKER

1. INTRODUCTION

- 1.1 The Pak-Tracker Firefighter Locator System is a distress alarm system designed to help identify and locate members in distress. The system consists of two components. The first is a personal transmitter embedded in each SCBA. The second is a handheld receiver (Photo 1) that is capable of receiving a signal from any SCBA in the full-alarm mode.

The Pak-Tracker system serves a dual purpose: The first is its **monitoring/identification** capability, and the second is its **tracking** capability. It is essential for members to understand that the Pak-Tracker receiver is a valuable monitoring/identification tool, serving as an early-warning device and providing a distressed member's identity. In this regard, the Pak-Tracker provides the Department with another valuable identification tool, along with the Electronic Fireground Accountability System (EFAS) and the FAST handie-talkie. In addition, the handheld receiver can also be used as a tracking device in order to guide firefighters to the location of a distressed member.

2. SENSITIVITY DISTANCE

- 2.1 The maximum range from an SCBA's transmitter to a Pak-Tracker handheld receiver is approximately 900 feet line of sight. The range is dependent on the environmental conditions and anything that might cause interference or reflection of the personal transmitter signal.

3. RESTRICTED USE IN SOME LOCATIONS

- 3.1 The Pak-Tracker handheld receiver is not suitable for use in potentially flammable or explosive atmospheres. Always check for the presence of a flammable or explosive atmosphere before entering an unknown environment with the Pak-Tracker.



Photo 1

- A. LCD Display
- B. Numeric Signal Strength Display
- C. Scroll Button
- D. Low Battery Light
- E. Signal Strength Lighted Bars
- F. Enter Button

4. FDNY POLICY FOR PAK-TRACKER OPERATIONS

- 4.1. Pak-Trackers are currently carried by all ladder, rescue and squad companies. Pak-Trackers shall be brought to the Incident Command Post (ICP) by the FAST unit, rescue and squad companies. A member of the FAST unit will monitor the Pak-Tracker. The rescue and squad Pak-Tracker's will remain at the command post as a backup should the FAST unit be deployed.
 - 4.1.1 Unlike EFAS, the Pak-Tracker does not possess the ability to be updated when a spare mask is put in service. For this reason, Battalions shall print out a current copy of the Spare Mask Assignment List at the start of each tour and keep a copy on the FAST radio board. This can be done as follows:
 - Select "SCBA Spare Mask List" from the "Applications" dropdown menu on the FDNY Intranet homepage.
 - Select the "View/Print the Spare Mask Assignment List" link.
 - Select "Citywide Only".
 - Print the citywide list.
 - Attach the citywide list to the FAST radio board.
- 4.2 Upon arrival at the scene, the FAST unit shall report in to the ICP with their assigned Pak-Tracker and bring it to their assigned position. A member of the FAST unit other than the member monitoring EFAS shall monitor the Pak-Tracker. This specific Pak-Tracker **must remain in the monitoring mode near the FAST unit's assigned position**; this allows the Pak-tracker to capture both the initial and subsequent PASS alarm activations and ensures continuous monitoring for distress signals.
- 4.3 When the Pak-Tracker receives an alarm signal, the FAST member monitoring the Pak-Tracker shall immediately notify their company officer with the identity on the LCD display (i.e., the member's unit and assignment). The FAST unit officer shall notify the IC of the activation, and attempt to contact the member to determine whether the signal is for an emergency or an inadvertent activation. If the PASS activation is for a life-threatening emergency, or if no contact can be established, the FAST unit officer shall immediately notify the IC with a "mayday" transmission" as per *Communications Manual, Chapter 9*, and units shall operate as per Department policy in *Firefighting Procedures, Managing Incidents Involving Members in Distress*.
- 4.4 When the IC decides to utilize the "tracking" capability of the Pak-Tracker, the Pak-Trackers left at the command post by rescue and squad can be used immediately for their monitoring and identification capability. The IC shall designate an available member to monitor the Pak-Tracker until the designation of a new FAST unit.

- 4.5 At building collapses where members may be trapped beneath debris, a Pak-Tracker may be used from a tower ladder bucket to help identify and locate trapped members. Because of a signal's tendency to pass through holes, voids, and gaps, this tactic could allow members to determine where to begin searching when units are unsure of a trapped member's location. For example, a member using a Pak-Tracker from a high vantage point in a tower ladder bucket could transmit a handie-talkie message to units on the ground stating, "The Pak-Tracker is receiving a strong signal from Ladder 36 Can in the two-three corner of the debris pile." Units on the ground could then begin selected-debris-removal operations in that area.

5. BASIC OPERATION OF THE PAK-TRACKER LOCATOR SYSTEM

- 5.1 To turn on the Pak-Tracker receiver, press and hold **both** the "Enter" (right) and the "Scroll" (left) buttons at the same time (Photo 2). The signal-strength indicator will light, and the display will show a "power-up" message.



Photo 2

- 5.2 When the Pak-Tracker receives a signal from a PASS device that has been in full-alarm for 10 seconds, the receiver will emit a 2-tone audible alarm, and the LCD display will show the SCBA's identity (**unit** and **member assignment**) and relative signal strength (Photo 3).



Photo 3

This indicates Ladder 110 Irons SCBA. "95" represents the relative strength of the signal.

- 5.3 While the Pak-Tracker can receive and store up to 36 SCBA identities, the LCD display screen is only large enough to display two lines of information. The limitations of the screen will have the following effects:
- When two PASS Alarms are activated at the same time, both SCBA identities are displayed on the LCD screen.
 - When more than two PASS alarms are activated, downward pointing arrows are displayed on the LCD. The left “Scroll” button can then be used to view and cycle through all SCBA identities that have been transmitted. In order to use the scroll feature, press and hold the “Scroll” button for three seconds. After three seconds, the identities will begin to scroll on the LCD display. When the desired identity appears in the top row of the LCD display, release the “Scroll” button.
- 5.4 After an identity appears on the LCD display, a Pak-Tracker receiver can then be locked onto the PASS signal of an individual SCBA and used as a tracking device to find a member in distress. It is important to understand that **a Pak-Tracker receiver can only lock onto one SCBA at a time**. Once a Pak-Tracker has locked onto the signal of one specific PASS alarm, it no longer has the ability to receive any additional PASS alarm signals. A Pak-Tracker is also capable of being unlocked (i.e., returned to “monitoring” mode), in order to monitor for additional transmitting signals, by pressing and holding the “Scroll” button for three seconds.
- 5.5 A signal from an activated PASS alarm may be evident at a greater distance than the audible PASS alarm. It is important to be aware of this fact, because the monitoring member may receive a signal on the Pak-Tracker without actually hearing the distressed member’s audible PASS alarm - the Pak-Tracker may serve as the first and only indication of an emergency in cases when a member is incapacitated and unable to transmit a verbal mayday.

6. OPERATIONS - IDENTIFICATION

- 6.1 When an SCBA’s PASS alarm is activated in the full-alarm mode for ten seconds, the PASS alarm transmits a signal that can be received by the Pak-Tracker handheld receiver. When this occurs, the Pak-Tracker receiver will emit a 2-tone audible alarm and display the identity (**unit** and **member assignment**) of the SCBA.
- Note:** A ten-second time lag is built into the system in order to minimize inadvertent activations.
- 6.2 Having a unit monitor a Pak-Tracker serves as a critical safety measure at fires and emergencies. In this capacity, the Pak-Tracker serves as an early-warning detection device that may indicate that an operating member is in distress. In cases when a member is incapacitated or unable to transmit a verbal mayday (e.g., an unconscious member), it is even possible for a Pak-Tracker activation to serve as the only indication of an emergency.

7. OPERATIONS - TRACKING

7.1 Understanding how the transmitting signal from an SCBA PASS device behaves and how the Pak-Tracker handheld receiver displays the strength of a signal are critical to understanding the operation of the Pak-Tracker locator system. Successful operation of the Pak-Tracker depends heavily on the **interpretation of the relative signal strength** displayed on the Pak-Tracker, along with all other available information about the possible location of the distressed member.

7.2 The relative signal strength displayed on the Pak-Tracker's LCD display screen will vary depending on:

- Distance from the SCBA to the Pak-Tracker.
- Path the SCBA signal takes to get to the Pak-Tracker.
- Materials affecting the signal between the SCBA and the Pak-Tracker.
- Orientation of the hand-held receiver.

Note: The Pak-Tracker is very sensitive in responding to small differences in signal strength.

7.3 The user of the Pak-Tracker must interpret the readings on the display along with other information, such as:

- Training and knowledge in systematic search and rescue techniques.
- Their sense of sight (look where you are going).
- Their sense of sound (listen for an activated PASS device).
- The assignment of the missing member.
- Knowledge of the building layout and building materials.
- Any other pertinent information available on the scene.

7.4 When the Pak-Tracker receives an activated PASS alarm signal from an SCBA, it will sound a two-tone alarm. To lock onto a signal in order to begin tracking a distressed member's location, press the "Enter" button **once**. The LCD display will show that the Pak-Tracker has entered the "searching" mode. If two or more SCBA PASS alarms are transmitting, press and hold the "Scroll" button for three seconds, and continue to hold it until the activated PASS alarm you want to track appears in the top row of the LCD display. To lock onto a selected SCBA: release the "Scroll" button, and press the "Enter" button **once**.

Note: The "Enter" button is a momentary-touch button; the "Scroll" button must be continuously held down. This concept is similar to the door-control buttons used in elevator operations.

- 7.5 To **unlock** from one SCBA in order to switch to another (to change which SCBA to track), press and hold the “Scroll” button for three seconds, and continue to hold it until the desired SCBA PASS appears in the top row of the LCD display. Release the “Scroll” button and press the “Enter” button **once** to select the activated PASS alarm to track.
- 7.6 To begin searching, the Pak-Tracker should be held at waist height out in front of the operating member- the top of the hand-held receiver should be pointed toward the target (Photo 4). This is important because the hand-held receiver’s sensor captures the distress signal from the **top** of the unit, and the relative signal strength will be greatly affected by the orientation of the hand-held receiver.



Photo 4

- During a search, the row of LEDs and the numerical signal strength shown on the LCD display indicate the relative strength and approximate direction of the signal from the SCBA. Pointing the Pak-Tracker in the direction of the strongest relative signal and moving in that direction should lead to the activated SCBA. When the signal strength rises above the 50-percent level, the row of LEDs will begin to light starting with red at the bottom, yellow in the middle, and green at the top.
- 7.7 The Pak-Tracker receiver averages four readings per second. When there are features such as doors, hallways, openings, or windows, take readings at each feature to determine where the strongest signal is coming from.
 - 7.8 Use the Pak-Tracker in a sweeping motion, very slowly in a horizontal direction first. Sweep vertically if the signal may be coming from a higher or lower floor in the building.
 - 7.9 Always pause 3 to 4 seconds for a reading. It is best to pause at distinct directional points, (i.e. to the left, in front, to the right). Sweeping too quickly may average a high reading with a low reading resulting in misleading information. Always move toward the **highest** relative signal strength displayed. In general, the closer you get to the SCBA, the higher the relative signal strength. Multiple signal paths are possible. The relative signal strength must be interpreted with all other available information.

- 7.10 An SCBA signal will pass through some materials, but will not penetrate through other materials.

The signal from the SCBA to the Pak-Tracker will usually pass through:

- Glass
- Light building materials
- Openings such as gaps, holes, stairways, windows, or elevator shafts
- Wood

The signal will reflect and/or not penetrate through:

- Metal, including structural framework
- Large metal objects
- Concrete walls or floors
- Brick or concrete block construction

Note: The signal will attempt to pass around these objects.

- 7.11 When an SCBA is transmitting a signal and the Pak-Tracker responds, assess the situation first to determine the safest method to approach the search and rescue operation.
- 7.12 The member operating the Pak-Tracker must be at the front of the search team to prevent signal interference caused by other members being in the way. The transmitter signal will be absorbed by the human body. The other members of the search team must maintain situational awareness and provide for the safety of the member operating the Pak-Tracker.
- 7.13 Follow this search-and-rescue process with the Pak-Tracker locator system:
- **READ** - Hold the Pak-Tracker pointed at features such as doors, windows, or halls. Look for the highest relative signal strength as shown on the display screen.
 - **INTERPRET** - Decide where the strongest signal appears to be coming from and how best to get there.
 - **FOLLOW** - Move toward the strongest signal while continuing to READ, INTERPRET, and FOLLOW.
- 7.14 To locate an activated SCBA in a building from the street, point the Pak-Tracker at windows and doors to locate the maximum relative signal on the display.
- 7.15 The Pak-Tracker locator system is highly dependent on the interpretation of the relative signal strength information displayed on the Pak-Tracker, along with all other available information about the possible location of the activated SCBA.
- 7.16 Continued training and practice in a variety of situations is essential in order to develop the skills necessary to properly interpret the information provided by the Pak-Tracker locator system.

8. INSPECTION

- 8.1 Inspect and test the Pak-Tracker locator system before each use and at the start of each tour. If any malfunction of the Pak-Tracker locator system is noted during the inspection, place the device out of service, attach an RT-2 indicating the problem and contact MSU for replacement. Each Division has been issued a spare Pak-Tracker. The company shall contact the Division for a spare while awaiting replacement from MSU.

Note: If this inspection is done in direct sunlight it may be necessary to shade the display on the hand-held receiver to be sure the display lights are flashing as described.

1. Visually inspect entire Pak-Tracker body, battery compartment cover, and display for cracks or other damage.
 2. Check the optional Pak-Tracker strap handle for weakness.
 3. Verify that all fasteners and mounting hardware are present and tight.
 4. Check all battery contacts. The contacts must be clean and straight.
 5. Verify that a fully-charged battery is properly installed. Refer to the battery charging and battery installation sections of this manual.
 6. Turn on the Pak-Tracker by pressing both the “Enter” and “Scroll” buttons simultaneously. Verify that the unit powers up and all lights and displays operate properly.
 7. Battery Life - When the battery in the Pak-Tracker has approximately 20 percent of its life remaining, the “Low Batt” indicator light will glow yellow. If the “Low Batt” indicator lights at any time during the regular operational inspection, replace the battery pack with a fully charged battery pack before proceeding with the inspection. See the battery charging and battery installation sections in this bulletin. After the “Low Batt” indicator light appears, the Pak-Tracker will operate for approximately one hour. If the battery is not changed in that time, the Pak-Tracker will shut down and will not operate until a fully charged battery is installed.
- 8.2 When any damage is found, remove the unit from service.

9. BATTERY CHARGING FOR THE PAK-TRACKER

- 9.1 Power for the Pak-Tracker is provided by a rechargeable Nickel-Metal Hydride (Ni-MH) battery pack. The battery pack must be fully charged before placing the Pak-Tracker in service. If the battery or battery charger does not operate as described in these instructions, remove it from service and forward it to the Mask Service Unit by attaching an RT-2 for repair or replacement.

Note: Defective batteries that are placed out of service for any reason shall be forwarded to MSU for disposal. Do not dispose of damaged batteries as ordinary trash.

- 9.2 Plug the charger’s power-supply cord into the charger base. When the charger is connected to a power source, the charging LED will flash once in RED, ORANGE and GREEN -in that order. The charging LED indicator will then go off.

- 9.3 Identify the location of the three battery contacts on the square end of the Battery Pack. Verify that they are clean and not damaged. If there is any evidence of damage, do not use the Battery Pack. Refer to the Maintenance section of this bulletin.
- 9.4 The Battery pack only fits in the charger one way. Orient the battery with the ridge side up and the triangular side of the Battery Pack down with the pull tab out.
- 9.5 Slide the Battery Pack into the charger until the pull tab end seats in the bracket on the front of the charger. The light on the right will flash GREEN while the battery is charging.
- 9.6 When the battery is fully charged, the light will change to solid GREEN. Battery will require approximately 2 hours charging prior to initial use. After each use of the Pak-Tracker, the battery should be recharged until the light turns solid GREEN.
- 9.7 Batteries shall be recharged on a regular basis such as once a week to maintain a full charge ready for use.
- 9.8 If the light in the charger base glows YELLOW, it indicates that the charger is in STANDBY mode.
- 9.9 If the light on the charger base FLASHES RED as soon as a battery is placed in the charger, it indicates a defect in the battery. Remove the battery from service and dispose of according to federal, state, and local regulations. Do not throw away damaged batteries as ordinary trash.

10. BATTERY INSTALLATION FOR THE PAK-TRACKER

- 10.1 Install the battery as follows:
 - 10.1.1 Verify that Rechargeable Battery Pack is fully charged
 - 10.1.2 Inspect the Battery Pack before installing. Verify that there is no damage to the outer plastic cover and that the contacts are clean and not damaged. If there is any evidence of damage, do not use the Battery Pack.
 - 10.1.3 Remove the threaded cover from the bottom of the PAK-TRACKER handle by turning it counterclockwise.
 - 10.1.4 The Rechargeable Battery Pack is triangular with a ridge on one side and will fit into the handle only one way. Hold the Battery Pack by the end with the pull tab and slide the contact end into the handle. There is an arrow under the pull tab indicating the top side of the battery. If properly oriented, the Battery Pack will slide easily into the handle. If oriented wrong, the pack will not fit into the handle. Do not force the battery into the receiver. Be careful not to press any buttons on the Pak-Tracker while inserting the battery.

10.1.5 Thread the cover clockwise onto the end of the handle. Turn the cover until it stops. The sides of the cover will align with the sides of the handle.

10.1.6 Test the operation of the handheld receiver according to the regular operational inspection section of this manual.

Note: The handheld receiver will not operate if the battery is not properly installed. If the hand held receiver does not operate, or if the battery cover does not fit as described, verify that the battery is properly oriented.

11. CLEANING

11.1 The components of the Pak-Tracker are factory sealed to protect the electronics from dirt and moisture. The unit should be cleaned when necessary using a cloth dampened with a solution of mild detergent and water. Wash the hand strap in a solution of mild detergent and water and dry thoroughly before re-attaching. **DO NOT IMMERSE, SPRAY, OR DOUSE THE PAK-TRACKER IN LIQUIDS.**

11.2 After cleaning, perform a regular operational inspection of the equipment.

11.3 Inspect the charger according to the instructions provided with the chargers. If any damage is found, remove the equipment from service and tag for repair or replacement.

11.4 Regularly verify that the batteries are fully charged so that the equipment is ready for use.

12. STORAGE

12.1 All components of the Pak-Tracker Locator System must be completely dry before storage.

12.2 Store the Pak-Tracker in its carrying case.

12.3 When storing the Pak-Tracker for an extended period of time, remove the battery pack to prevent damage to the battery terminals.

13. SCBA IDENTITY VERIFICATION

13.1 Companies shall utilize the Pak-Tracker at multi-unit drills to verify that assigned and spare SCBAs are correctly identified and match the Spare Mask Assignment List.

14. TRAINING

14.1 A Pak-Tracker training kit has been issued to each division. Divisions will be responsible for scheduling training within their commands and providing accountability for the equipment. In order to obtain the division training kit, company officers can contact their respective divisions.

The training kit will include:

- Pak-Tracker with battery
- Battery charger
- Carrying case
- PASS simulator (a transmitting device to be used in place of a company SCBA)

15. PAK-TRACKER PROGRAMMING

- 15.1 The Pak-Tracker system contains a programming limitation that members must be aware of in order to ensure accurate SCBA identification in emergency situations.
- 15.2 A Pak-Tracker transmitter is located in each SCBA PASS device. It is programmed to interface with the Pak-Tracker with a **maximum capacity of eight characters** (i.e., letters, numbers, and dashes). This limitation forces a programming modification in FDNY SCBAs where programming exceeds eight characters. In three-digit companies, such as Ladder 175 Roof, the last character will not be shown on the Pak-Tracker's LCD display (e.g., L175-ROO). This is important to understand so that members can properly identify all units and positions on the LCD display. See specific examples below.
- 15.3 When a PASS device goes into the full-alarm mode for ten seconds, a digital identification signal is transmitted from the PASS device and can be received by the Pak-Tracker handheld receiver. SCBAs are numbered and programmed identically to handie-talkie radio positions.

Examples of eight-digit identities as viewed on the Pak-Tracker's LCD display screen:

1. L1-OFF, L1-LCC, L1-ROOF, L1-OVM, L1-IRONS, L1-CAN
2. L105-OFF, L105-LCC, **L105-ROO**, L105-OVM, **L105-IRO**, L105-CAN
3. E7-OFF, E7-ECC, E7-NOZ, E7-BU, E7-CONT, E7-DOOR
4. E219-OFF, E219-ECC, E219-NOZ, E219-BU, **E219-CON**, **E219-DOO**
5. **BN1-CHIE**, BN1-AIDE **BN57-CHI**, **BN57-AID**
6. SPARE SCBA'S: BN1-1SP, BN1-12SP, BN57-1SP, **BN57-12S**
7. MARINE: M1-OFF, M1-PILOT, M1-CHFEG, M1-ASTEG, M1-WIPER, M1-FF-6, M1-FF-7
8. HAZ-MAT: HM1-OFF, HM1ENT-1, HM1ENT-2, HM1-BU-1, HM1-BU-2, HM1DEC-1, HM1DEC-2, HM1RESCO
9. SQUAD: S270-OFF, S270-ECC, S270-NOZ, S270-BU, **S270-CON**, **S270-DOO**,*S270-7SP,*S270-8SP
10. RESCUE: R1-OFF, R1-LCC, R1-ROOF, R1-HOOK, R1-IRONS, R1-CAN
*R1-7SP,*R1-8SP

* Each rescue and squad company is issued two company spare SCBAs, which are numbered 7 & 8.

SAFETY TEAM (2 IN/2 OUT)

1. POLICY

- 1.1 The United States Department of Labor Occupational Safety and Health Administration's (OSHA) revised standard regarding respiratory protection states: Where an employer does not know or cannot reasonably estimate the concentration of contaminants in the work environment, it is assumed that the atmosphere is Immediately Dangerous to Life and Health (IDLH).
- 1.2 When a fire progresses past the incipient stage, the fire area must be considered an IDLH atmosphere. Every member entering the IDLH atmosphere must be equipped with personal protective equipment and a self-contained breathing apparatus. No member shall enter, leave or operate in an IDLH atmosphere unless the member teams-up with at least one other member and remains within visual or voice contact with that member. Each member of the search team shall know the company identity and assigned position of the other members of the search team. Handie-talkies or other electronic communication devices are not acceptable to replace visual or voice contact. At least one of the members of the team within the IDLH must have a handie-talkie and must be able to contact a handie-talkie-equipped member of the Safety Team outside of the IDLH atmosphere.
- 1.3 At least two members must team up prior to entering an IDLH (Two-In) and there must be at least two other members outside the IDLH (Two-Out), who are designated as a Safety Team. The members of the Safety Team shall be available to assist the interior team(s) if the need arises. If a member leaves a contaminated area, another member using an SCBA must accompany this member to a safe area.
- 1.4 If a known life hazard is discovered and immediate action could prevent the loss of life, appropriate action (rescue activity) may be taken by an individual member. This applies only for a known life hazard, not for standard search and rescue activity. A known life hazard is defined as follows:
- A victim can be seen by the rescuer.
 - A victim can be heard by the rescuer.
 - A member has information from a credible source or a person at the scene indicating the location of the life hazard.

If such action is taken, the Incident Commander must be immediately notified and appropriate adjustments made.

Note: In all incidents of such individual action, the Incident Commander shall forward a report detailing the full particulars to the Chief of Operations. A thorough review of each of these incidents will be conducted.

2. PROCEDURES

2.1 A Safety Team must be available at all times. The FAST Unit will serve as the Safety Team. Prior to the arrival of the Fast Unit, the following guidelines should be followed to establish the Safety Team:

2.1.1 The Safety Team shall normally be made up of the Backup and Control firefighters of the second arriving engine. However, there will be times when entry into an IDLH atmosphere is necessary prior to the arrival of the first two engine companies. The following guidelines shall be followed in these instances:

◆ One 4 Firefighter Engine on Scene:

Based on the officer's size up the following options can be considered:

- 1) The officer and one firefighter enter the IDLH for search without line advancement while two firefighters compose the Safety Team.
- 2) Take a defensive position based on conditions encountered.

◆ One 5 Firefighter Engine on Scene:

The Safety Team is composed of the Control firefighter and the Door firefighter.

◆ One Ladder on Scene:

- 1) 5 FF Ladder-The Safety Team is composed of the LCC firefighter and the OV firefighter.
- 2) 4 FF Ladder- The Safety Team is composed of the LCC firefighter and outside firefighter designated by the officer.

◆ One Engine and One Ladder on Scene:

- 1) 5 FF Ladder-The Safety Team is composed of the Control firefighter and the LCC firefighter.
- 2) 4 FF Ladder- The Safety Team is composed of the Control firefighter and the LCC firefighter.

When an “understaffed” Engine or Ladder Company (unit staffed with less than 4 firefighters) is the only unit on the scene, the company shall take a defensive position. However, if a known life hazard is discovered and immediate action could prevent the loss of life, appropriate action (rescue activity) may be taken by an individual member. This applies only for a known life hazard, not for standard search and rescue activity.

Examples of Defensive Positions, including but not limited to:

- Checking the serviceability of a hydrant
- Hooking up to a hydrant
- Charging the pumps
- Stretching a hoseline to outside the IDLH atmosphere

- Providing medical treatment to victims
- Positioning and raising a Tower/ Aerial/ Portable Ladder
- Conducting a size-up of the scene
- Transmitting the appropriate radio signals

- 2.2 The arrival of the 2nd Engine must be announced over the handie talkie.
- 2.3 Designated members of the Safety Team are to engage in their primary duties while assuming the duties of the Safety Team. Once firefighters enter the IDLH, one member of the Safety Team must account for firefighters inside the IDLH without performing other duties.
- 2.4 In unusual situations, the Incident Commander may vary the make-up of the Safety Team. An understanding of the intent of the FDNY POLICY/OSHA RESPIRATORY STANDARDS, along with knowledge of current Department SOPs, will allow for an efficient operation with minimal adjustments to our SOPs as currently written.

3. DUTIES OF THE SAFETY TEAM

- 3.1 The Safety Team shall be positioned outside the IDLH atmosphere and:
- ◆ Monitor handie-talkie transmissions for calls for assistance from members operating in an IDLH atmosphere, mayday, or urgent transmissions, and transmissions from interior teams that are not being acknowledged.
 - ◆ Be prepared to enter the IDLH atmosphere to render assistance if required.
 - ◆ Be prepared to transmit necessary mayday or urgent handie-talkie message if an interior team needs immediate assistance.
 - ◆ Ensure that the Incident Commander is notified that the Safety Team is entering the IDLH atmosphere if necessary.
- 3.2 **The Incident Commander shall announce the FAST unit's arrival over the handie-talkie at the scene.** On receipt of this announcement, the members performing the duties of the Safety Team shall return to their original assignments.

4. TEAMING UP

- 4.1 When members are teamed up, they must contact their company officer before entering an IDLH atmosphere and advise such officer of their status at frequent intervals, especially when attempting tasks not normally associated with their assignments.
- 4.2 In unusual situations where members assigned to team up are unable to do so, the Incident Commander shall be notified prior to entry into the IDLH atmosphere and the Incident Commander shall make necessary adjustments in the teaming up of members.

5. REFERENCE CHART

1 Engine Company on the scene



5 FF
Control
&
Door FF

4 FF
Two FFs
designated
by the Officer

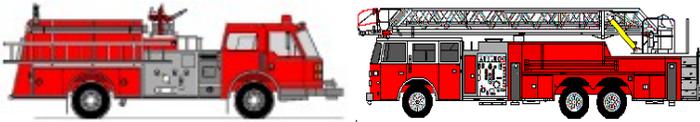
1 Ladder Company on the scene



5 FF
LCC
&
OV FF

4 FF
LCC
&
Outside FF
designated by
the Officer

1 Engine Company & 1 Ladder Company on the scene



5 FF Ladder
Control
&
LCC

4 FF Ladder
Control
&
LCC

2 Engine Companies on the scene



**Backup & Control FFs of
2nd Arriving Engine**

FAST Unit on the scene



Entire Unit Assumes Duties of the Safety Team

THIS PAGE WAS INTENTIONALLY LEFT BLANK



COMMUNICATIONS

OBJECTIVE:	To familiarize members with: <ul style="list-style-type: none">• Basic fire ground communications• Equipment used• Assignments of Handie-Talkies• Maintenance procedures
CONTENTS:	Part One: <ul style="list-style-type: none">• FDNY Radio policies Part Two: <ul style="list-style-type: none">• Exposure Identification Part Three: <ul style="list-style-type: none">• Illustration of current Handie Talkie• Description of Equipment
SOURCE:	<ul style="list-style-type: none">• FDNY Communication Manual• WNYF – 2 of 1991
FDNY REFERENCE:	Part One: Communication Manual, Chapter 9: sections: 1 – 10, Addendums 2&3 <i>Excluding sections – 9.1.1, 9.1.2, 9.1.3, 9.4.3, & 9.11</i> <i>Edited Versions of sections – 9.4, 9.10.1</i> WNYF – 2 of 1991, pp. 20 & 21 Part Two: Communication Manual; Chapter 10, Appendix C <i>Excluding section – 1 & 10</i> <i>Edited Version of section 8</i> Part Three: Communication Manual, Chapter 11 <i>Excluding sections – 2.6, 2.10, 2.12, 2.13, 4.1, 4.2, 6.4 & 7</i> <i>Edited Versions of sections – 1.1, 1.2, 2.5, 3.2, 3.3</i>

PART ONE

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
1	INTRODUCTION	1
2	SUPERVISION	1
3	INTER-UNIT COMMUNICATIONS.....	2
4	EMERGENCY HT COMMUNICATIONS	3
	(MAYDAY / URGENT)	
5	EMERGENCY ALERT TONE ASSISTED RESCUE AND FEEDBACK - ASSISTED RESCUE	13
6	HIGH RISE / HOSPITALS - GENERAL INFORMATION.....	14
7	HANDIE TALKIE SUBWAY RELAY.....	15
8	USE, CARE AND MAINTENANCE	17
9	HT UTILIZATION WITH SELF CONTAINED—BREATHING APPARATUS	17
10	RADIO DISCIPLINE	18
11	EMERGENCY ROLL CALL PROCEDURES	18
12	ELECTRONIC FIREGROUND ACCOUNTABILITY SYSTEM (EFAS).....	21
13	RADIO CODE SIGNALS.....	27

PART TWO..... **33**

PART THREE..... **41**

1. INTRODUCTION

The following procedures for handie talkie (HT) use are established to achieve greater safety, effectiveness and efficiency at fire operations.

- 1.1 Company Officers have many tasks at fire operations. They must report conditions to the **INCIDENT COMMANDER**, carry out orders received and control the individual members of their units so that necessary actions are performed and the safety of members under their command is monitored. HT communications play a vital role in all of these.

2. SUPERVISION

An Officer's span of control must allow for supervision of the actions of members under their command in all situations.

- 2.1 Members are under the "Immediate Supervision" of an Officer when:

- A. They are within sight and/or hearing of the Officer.
- B. They are working with a search line or hose line which is under the supervision of an Officer.

- 2.2 Members are under the "Functional Supervision" of an Officer when they are HT equipped or working with a HT equipped member and are in compliance with the following:

- A. Members assigned to tasks which are not under the "Immediate Supervision" of their Company Officer must contact such Officer before entering a dangerous area and advise such Officer of their status at frequent intervals, especially when attempting tasks not normally associated with their assignment.
- B. If contact cannot be made with their Company Officer, they shall contact (in this priority) their Company Chauffeur, the **INCIDENT COMMANDER** or any other HT equipped member advising such member that contact cannot be made with their Officer. Any of the foregoing who are so contacted must advise the member's Officer as soon as possible.
- C. Members operating alone who team up with other members shall advise their Company Officer. If they separate, notification should again be made.
- D. The Company Officer upon notification as described in paragraphs A and B shall evaluate and notify the Incident Commander of the members location when:
 - 1) Conditions encountered by the member are exceptionally dangerous, or
 - 2) Available manpower is insufficient to assist if the member should become distressed.

- 2.3 When operations are conducted in an area where the ambient noise level interferes with HT communications, provisions must be made to ensure effective communications.

3 INTER-UNIT COMMUNICATION

The importance of communications between units and the **INCIDENT COMMANDER** cannot be overemphasized. Conditions found and actions taken or contemplated must be continually reported. However, discretion must be used. Information of a routine nature should be communicated to Company Officer, while more serious information should go directly to the **INCIDENT COMMANDER**.

- 3.1 The Officer who arrives first at the fire area must transmit the following information to the **INCIDENT COMMANDER**:
- A. Location of the fire. (If a multiple dwelling, report the number of apartments on fire floor.)
 - B. Fire conditions.
 - C. Access to fire area.
 - D. Whether fire is extending and how it is extending and the need for additional lines.
 - E. Difficulties or delays in gaining entrance to fire area or in advancing line. Give reasons.
 - F. If any occupants have been located or are reported missing.
- 3.2 Members operating on the roof must communicate to the **INCIDENT COMMANDER** the following:
- A. The configuration of the building.
 - B. Fire showing out windows not visible from the street and whether any exposure is affected.
 - C. Color and volume of smoke coming from windows.
 - D. Persons trapped and their exact location.
 - E. Location of stairways, fire escapes and party wall balconies. Unusual information affecting safety, for example, a fire escape on the rear of a brownstone.
 - F. If the building fronts on more than one street, and whether there is access for apparatus or equipment.
 - G. Whether there is any difference in the height of the building from front to rear or from side to side.
 - H. Evidence of unusual heat, smoke or fire in the cockloft, or if fire has burned through roof. Need for additional saws.
 - I. Location of parapet and dividing walls.
 - J. Presence of heating ducts, ventilation ducts, air conditioning units and water tanks on roof.

4. **EMERGENCY HT COMMUNICATIONS (MAYDAYS & URGENTS)**

The following transmissions are to be used with discretion. The terms "MAYDAY" and "URGENT" must only be used as is indicated herein. They are intended for use in situations where immediate communication is necessary to protect life or prevent injury. Whenever the Emergency Alert Button has been pressed, and/or a MAYDAY or URGENT is transmitted, all HT communications on that frequency are to cease, except those between the member initiating the emergency transmission and the IC. If possible, the member transmitting the MAYDAY or URGENT shall begin, by pressing the Emergency Alert Button, ensuring the message gets transmitted at maximum wattage and repeating "MAYDAY" or "URGENT" three times followed by the remainder of the message. Normal HT use may be resumed upon completion of the emergency message or signal unless the IC orders otherwise.

NOTE:

- 1 Anytime a building or area is evacuated, units shall account for all members in preparation for a Roll Call. Missing members are to be reported immediately.
- 2 "MAYDAY" transmissions have priority over "URGENT" transmissions.
- 3 To minimize misunderstanding, the terminology used below is mandatory. All members must be completely familiar with the terminology and use it exclusively for its intended purpose. No other wording is to be used for emergency transmissions. The term "COLLAPSE" is to be used to indicate STRUCTURAL FAILURE only.

4.1 MAYDAY

This transmission is an indication that a life-threatening situation has developed. If possible, the member shall press the Emergency Alert Button ensuring that the message gets transmitted at maximum wattage before giving their MAYDAY message. After message is acknowledged, the member can deactivate the Emergency Alert Tone if the "Beacon" tone is no longer required. The term MAYDAY may be used only in the following **five** situations:

Note: The IC may instruct the member transmitting the emergency message to switch to channel 16, the dedicated 5-watt emergency channel. The IC may do this to free up the primary tactical channel and have communications continue with the member at 5 watts. When a member switches to Channel 16, their "Beacon" continues unless the "Emergency Alert Tone" is deactivated. The IC may instruct the member to deactivate the tones if they are hampering communications.

A. Collapse Imminent

1. A member becoming aware of the situation shall immediately press their Emergency Alert Button, and then contact the IC in the following format:
"MAYDAY-MAYDAY-MAYDAY, Ladder 4 Roof to Command, MAYDAY."
2. The IC shall respond in the following format:
"Command to Ladder 4 Roof, go ahead with your MAYDAY."
3. The member transmitting the MAYDAY shall respond in the following format:
"Ladder 4 Roof to Command, MAYDAY - COLLAPSE IMMINENT" and provide the following information:
 - Location of the imminent collapse such as rear wall, side wall.
 - Their location.
4. The IC shall then transmit:
"Command to all units, MAYDAY, GET OUT OF BUILDING, GET OUT OF BUILDING" and repeat this message as often as necessary. All members shall immediately evacuate the building on transmission of this message.
5. The IC shall ensure a roll call is conducted immediately and all members are accounted for.
6. The IC shall notify all units when the MAYDAY has been resolved and that normal operations may resume.

B. Structural Collapse Has Occurred

1. A member aware of the condition shall immediately press their Emergency Alert Button, and then contact the IC in the following format:
"MAYDAY-MAYDAY-MAYDAY, Ladder 44 OV to Command, MAYDAY."
2. The IC shall respond in the following format:
"Command to Ladder 44 OV, go ahead with your MAYDAY."
3. The member transmitting the MAYDAY shall respond in the following format:
"Ladder 44 OV to Command, MAYDAY - COLLAPSE HAS OCCURRED" and provide the following information:
 - Location and extent of collapse
 - Number and nature of injuries
 - If anyone is trapped.
4. The IC shall immediately assign specific units to assist at the location of the collapse and simultaneously ensure a roll call is conducted immediately and all members are accounted for.
5. The IC shall notify all units when the MAYDAY has been resolved and that normal operations may resume.

C. Unconscious or Life Threatening Injury

1. A member discovering either an unconscious member or a member suffering a life threatening injury shall immediately press their Emergency Alert Button, and then contact the IC in the following format:

"MAYDAY-MAYDAY-MAYDAY, Engine 222 to Command, MAYDAY."
2. The IC shall respond in the following format:

"Command to Engine 222, go ahead with your MAYDAY."
3. The member transmitting the MAYDAY shall respond in the following format:
 - A. "Engine 222 to Command, MAYDAY-INJURED MEMBER or MAYDAY UNCONSCIOUS MEMBER" and provides the following information:
 - Location
 - Unit and identity of the injured member
 - Nature and extent of the injuries, if known
 - Resources needed

4. The IC shall assign specific units to assist with the injured member.
5. The IC shall notify all units when the MAYDAY has been resolved and that normal operations may resume.

D Missing Member

1. An Officer who becomes aware that a member under their supervision is missing shall immediately press their Emergency Alert Button, and then contact the IC in the following format:
"MAYDAY-MAYDAY-MAYDAY, Ladder 11 to Command, MAYDAY."
2. The IC shall respond in the following format:
"Command to Ladder 11, go ahead with your MAYDAY."
3. The member transmitting the MAYDAY shall respond in the following format:
"Ladder 11 to Command, MAYDAY- MISSING MEMBER" and provides the following information:
 - Last known location or reference point
 - Unit the member is working in that tour
 - Name of affected member
 - Assignment (e. g., roof, nozzle)
4. The IC shall assign specific units to conduct a search for the missing member and contact units on-scene by HT to attempt to locate the missing member.
5. A member who locates a missing member shall immediately press their Emergency Alert Button, and then contact the IC in the following format:
"MAYDAY-MAYDAY-MAYDAY, Ladder 43 FAST OV to command, MAYDAY."

A. The IC shall respond in the following format:

“Command to Ladder 43 FAST OV go ahead with your MAYDAY.”

B. The member transmitting the MAYDAY shall respond in the following format:

“Ladder 43 FAST OV to command MAYDAY, MISSING MEMBER LOCATED” and provide the following information:

- Location
- Identity of member(s) to determine if it is the member(s) reported missing.
- Any imminent conditions that might affect the missing member(s) e.g., fire nearby, out of air.
- Resources needed to reach safety.

6. If the missing member is an Officer, any team member can transmit this message.

7. The IC shall notify all units when the MAYDAY has been resolved and that normal operations may resume.

E. Lost or Trapped

1. A member who becomes lost or trapped shall immediately press their Emergency Alert Button. The lost or trapped member shall contact the IC in the following format:

"MAYDAY-MAYDAY-MAYDAY, Ladder 133 Chauffeur to Command, MAYDAY." This member shall not activate their PASS alarm until all vital information has been given to the IC. This is to reduce as much background noise as possible.

2. The IC shall respond in the following format:

"Command to Ladder 133 Chauffeur, go ahead with your MAYDAY."

3. The member transmitting the MAYDAY shall respond in the following format:
"Ladder 133 Chauffeur to Command, MAYDAY-MEMBER TRAPPED (or MEMBER-LOST)" and provide the following information:
 - Location if known. If unknown, provide last recognizable reference point such as, basement near oil burner.
 - Identity and number of members involved.
 - Any imminent conditions that might affect trapped members such as fire nearby, out of air, etc.
4. The IC shall immediately assign specific units to locate and rescue members involved.
5. A member who finds the trapped or lost member(s) shall immediately press their Emergency Alert Button, and then contact the IC in the following format:
"MAYDAY-MAYDAY-MAYDAY, Ladder 105 FAST to Command, MAYDAY"
 - A. The IC shall respond in the following format:
"Command to Ladder 105 FAST, go ahead with your MAYDAY."
 - B. The member transmitting the MAYDAY shall respond in the following format:
"Ladder 105 FAST to Command, MAYDAY, TRAPPED or LOST MEMBER LOCATED" and provide the following information:
 - Identity of the member(s) involved
 - Location
 - Any imminent conditions that might affect the trapped/lost member(s) e.g., fire nearby, out of air.
 - Resources needed to reach safety
6. The IC shall notify all units when the MAYDAY has been resolved and that normal operations may resume.

Note: The term "URGENT" shall **not** be used for any of the above situations; these situations are sufficiently serious to warrant "MAYDAY" transmissions.

4.2 URGENT

This transmission is used to indicate that a member has suffered a serious injury that is not immediately life threatening, or to inform members of a serious change in conditions. If possible, the member shall press the Emergency Alert Button ensuring that the message gets transmitted at maximum wattage before giving their URGENT message. After message is acknowledged, the member can deactivate the Emergency Alert Tone if the "Beacon" tone is no longer required.

Note: The IC may instruct the member transmitting the emergency message to switch to channel 16, the dedicated 5-watt emergency channel. The IC may do this to free up the primary tactical channel and have communications continue with the member at 5 watts. When the member switches to Channel 16, their "Beacon" continues unless the Emergency Alert Tone is deactivated. The IC may instruct the member to deactivate the tones if they are hampering communications.

Examples of situations when the term URGENT may be used include the following:

A. Non Life Threatening Injury

1. A member discovering another member with a non life threatening injury that requires medical attention shall immediately press their Emergency Alert Button, and then contact the IC in the following format:

"URGENT-URGENT-URGENT, Engine 161 to Command, URGENT."
2. The IC shall respond in the following format:

"Command to Engine 161, go ahead with your URGENT."
3. The member transmitting the URGENT shall respond in the following format:

"Engine 161 to Command, URGENT-INJURED MEMBER", and provide the following information:

 - Location
 - Unit and identity of the injured member
 - Nature and extent of injuries.
 - Resources needed
4. The IC shall assign specific units to assist injured members.

B. Transmission of Signal 10-70

1. When the first arriving Engine Company is unable to secure a positive water source, the first arriving Engine Chauffeur shall immediately press their Emergency Alert Button, and then contact the IC in the following format:
"URGENT-URGENT-URGENT, Engine 254 Chauffeur to Command, URGENT."
2. The IC shall respond in the following format:
"Command to Engine 254 Chauffeur, go ahead with your URGENT."
3. The member transmitting the URGENT shall respond in the following format:
"Engine 254 Chauffeur to Command, URGENT 10-70" and provide information to assist the IC, e.g., dead hydrant, need to relay due to insufficient pressure, apparatus breakdown.
All members on the scene must be aware that water may still be available through other means, e.g., booster water, roof tank; however a positive water source has not been attained.
4. This shall also require an "URGENT" message to the Borough Dispatcher.
5. The IC shall announce over the HT when a positive water source has been attained. The IC shall also inform the Borough Dispatcher that a positive water source has been attained.

C. Interior Attack Discontinued

1. When the IC decides to discontinue an interior attack and institute an exterior attack, the IC shall immediately press their Emergency Alert Button, and then transmit a message in the following format:
"URGENT-URGENT-URGENT, Command to all units, URGENT - ALL UNITS - URGENT, BACK OUT, WE ARE TRANSITIONING TO AN EXTERIOR ATTACK."
On transmission of this message, all units shall withdraw from the building.
2. Following the transmission of this message, the IC immediately contacts each unit individually by HT to confirm receipt of this message.
3. The IC shall then ensure a roll call is conducted immediately and all members are accounted for.

D. Danger of Collapse

1. A member aware of a structural problem indicating the danger of a collapse shall immediately press their Emergency Alert Button, and then transmit to the IC in the following format:
"URGENT-URGENT-URGENT, Ladder 6 Roof to Command, URGENT."
2. The IC shall respond in the following format: "Command to Ladder 6 Roof, go ahead with your URGENT."
3. The member transmitting the URGENT shall respond in the following format:
"Ladder 6 Roof to Command, URGENT - COLLAPSE FEARED,"
and provide the following information:
 - Location
 - Conditions discovered
4. The IC determines the actions required.

E. Fire Entering an Exposure

1. A member discovering fire extending into an exposure and any delay may considerably enlarge the fire problem shall immediately press the Emergency Alert Button, and then transmit to the IC in the following format:
"URGENT-URGENT-URGENT, Ladder 127 to Command, URGENT."
2. The IC shall respond in the following format: "Command to Ladder 127, go ahead with your URGENT."
3. The member transmitting the URGENT shall respond in the following format:
"Ladder 127 to Command, URGENT - FIRE EXTENDING," and provides the following information:
 - Location
 - Nature of extension
4. The IC assigns specific units to address this fire situation.

F. Loss of Water

1. A member aware of a loss of water, including water loss due to a confirmed burst length, which would endanger members shall immediately press their Emergency Alert Button, and then transmit to the IC in the following format:
"URGENT-URGENT-URGENT, Engine 71 Chauffeur to Command, URGENT."
2. The IC shall respond in the following format:
"Command to Engine 71 Chauffeur, go ahead with your URGENT."
3. The member transmitting the URGENT shall respond in the following format:
"Engine 71 Chauffeur to Command, URGENT - WATER LOSS,"
and provide the following information:
 - Nature of the problem
 - Identity of the units with lines affected
4. The IC shall contact by HT, all of the units affected by the water loss and units operating in positions above the water loss to ensure they are aware of the problem. If necessary, the IC shall back units out of exposed areas, assign specific units to assist in removal of these units, and conduct a roll call to account for all members.

G. Anytime a Change in Conditions will Severely Impact an Operation or the Safety of Members

1. A member aware of a change in conditions that will severely impact an operation or the safety of members shall immediately press their Emergency Alert Button, and then contact the IC in the following format:
"URGENT-URGENT-URGENT, Ladder 132 to Command, URGENT."
2. The IC shall respond in the following format:
"Command to Ladder 132, go ahead with your URGENT."
3. The member transmitting the URGENT shall provide the following information:
 - Nature of the problem
 - Location
 - Members/Units affected
4. The IC shall determine the actions required.

5 EMERGENCY ALERT TONE ASSISTED RESCUE AND FEEDBACK-ASSISTED RESCUE

Procedure – After determination is made that a member is missing, lost, or trapped, these procedures may be initiated.

- 5.1 The Emergency Alert Tone Assisted Rescue can be utilized to home in on the location of missing, lost, or trapped members e.g., a collapse situation. This procedure takes advantage of the increased wattage of the Emergency Alert Tone and maximum volume output regardless of the missing member's volume setting, and requires only one handie talkie.
- 5.2 IC announces over HT that an "Emergency Alert Tone Assisted Rescue" is to be implemented and designates a new primary tactical channel. This channel shall not be the same one on which the missing, lost, or trapped member was operating.
- 5.3 All members, except the member designated to produce the emergency alert tone, are to operate on the newly designated primary tactical channel.
- 5.4 Designated member should be located remote from search activity to avoid confusion among searchers.
- 5.5 The Emergency Alert Tone will be created by the designated member as follows:
 - A. HT is placed on channel which missing, lost, or trapped member was operating.
 - B. The Emergency Alert Button is pressed every few seconds to transmit the emergency alert tone and then pausing, allowing for the possibility of response from the missing, lost, or trapped member.
- 5.6 The emergency alert tone will be transmitted from the missing, lost, or trapped member's HT, permitting searchers to hone in.
- 5.7 Search is conducted with as much ambient noise eliminated as possible.
- 5.8 Searchers listen for tone emanating from missing, lost, or trapped member's HT. When tone has been detected, searchers home in on member's location by use of this tone.
- 5.9 When the definite location of member has been determined, the emergency alert tone should be discontinued to lessen the discomfort of trapped member and to enable communication between this member and searchers.

6 HIGH RISE/HOSPITALS - GENERAL INFORMATION

- 6.1 Elevator cars, core areas and stairs in general hamper effective HT operations.
- 6.2 Certain areas in a building allow good HT operations, such as outer area of the structure, windows or unobstructed shafts. It may be necessary to move around until best location is found.
- 6.3 There is a possibility that radio frequency (RF) transmissions may affect the operation of medical equipment in hospitals.
- 6.4 Members shall, during non-emergency visits to hospitals, restrict the use of HT and other RF transmissions (cellular phones, etc.) in-patient care areas of hospitals.
- 6.5 Except in an emergency, members shall leave the patient care area prior to transmitting via HT.

7 HANDIE TALKIE SUBWAY RELAY

When operations are underway at the scene of an underground subway, the IC can have the repeater system tested to see if it is functioning. Once confirmed it's functioning, the IC may attempt to use the repeater system as a Command Channel. The IC may direct the appropriate officers/firefighters to switch to Channel 14 (Primary Subway Repeater Channel) or Channel 15 (Secondary Subway Repeater Channel).

NOTE: An effective HT relay must be established whether the station is equipped with a repeater or not. Members of the 1st truck and the Officer of the 1st engine shall be utilized when establishing a HT relay.

- 7.1 Truck Chauffeur takes a position at the bottom of subway entrance stairs. If token booth is within 50 yards of stairs to street, contact main dispatcher through the clerk. (There is a telephone in the booth.) Information obtained should be relayed to Company Officer and INCIDENT COMMANDER.
- 7.2 OV firefighter takes a position at the foot of stairs leading to the train platform if it is within 50 yards of chauffeur.
- 7.3 Roof firefighter takes a position approximately 50 yards from the stairs on platform.

7.4 Engine Officer takes a position approximately 100 yards from the roof firefighter on the platform.

7.5 Additional HT equipped members every 100 yards, if necessary.

7.6 Truck Officer proceeds to the location of the fire.

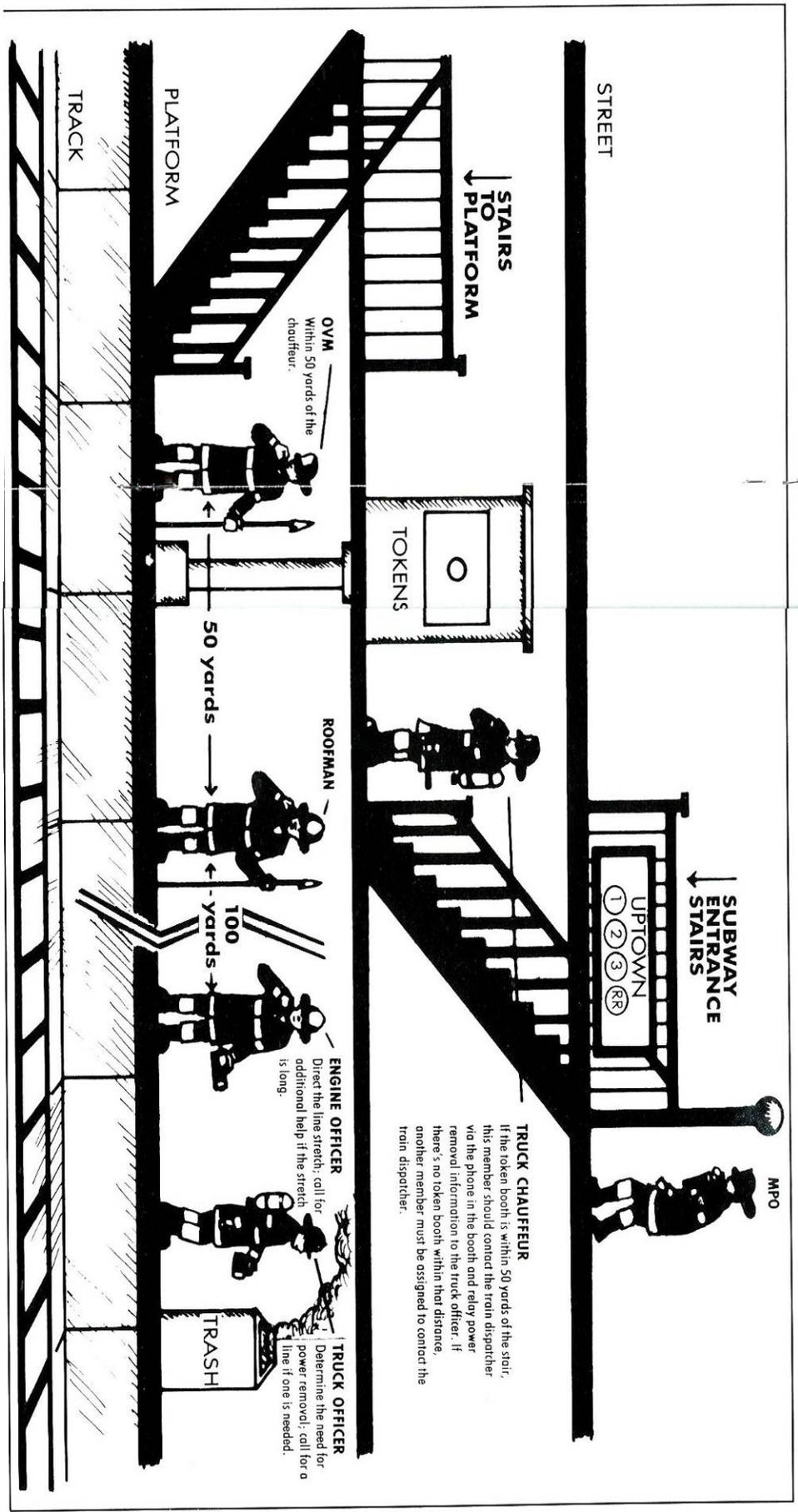
This system can also be adapted for large cellars, sub cellars and maze type areas.

- NOTE:**
1. HT communications are poor from level to level. Communications in straight line are from fair to poor. Some subway stations have multiple levels underground, which will require additional handie talkies. The objective is to be able to communicate to grade level.
 2. If available, **POST RADIOS OR** sound powered phones shall be utilized at subway operations.

OBJECTIVE: To keep Handie-Talkies within range to be able to communicate with street level.

HANDIE-TALKIE RELAY IN SUBWAYS

BY STANLEY DAWE
Battalion Chief, Battalion 9



NOTES:

- For example, the OVM may be able to enhance communications by moving back and forth between the top and bottom of the platform stairs.
- Additional H.T. equipped members may be needed to maintain communications, especially at locations with multiple underground levels

8 USE, CARE AND MAINTENANCE

- 8.1 At the beginning of each tour a visual check of all HTs assigned to the unit must be made. Officers shall assign individual HTs to members at Roll Call according to the established guidelines.
- 8.2 Individual members shall perform necessary tests to ensure proper operation of HT. Any malfunction discovered should be brought to the attention of the Officer immediately. Members are responsible for compliance with procedures established by Company Commanders to assure security of HT.
- 8.3 To reduce damage to the HT unit and to protect it from adverse weather conditions, the unit must be worn under the bunker coat.
- 8.4 Members should monitor the HT while responding to hear any transmission of units on scene relative to possible location of occupants, need for life saving rope, ventilation required, and to receive instructions from the Incident Commander.
- 8.5 Many HTs will be in use at an all hands operation. Therefore, unnecessary chatter shall be kept to a minimum to avoid monopolizing the HT frequency.
- 8.6 When more than one HT is being used in close proximity to another, a whining or screeching noise (feedback) may result interfering with the use of HT. **THIS CAN BE OVERCOME BY KEEPING A HAND OVER THE REMOTE MIC, IF SO EQUIPPED, OF THE UNUSED RADIOS IN THE AREA.**

9 USING THE HANDI-TALKIE WITH THE SELF-CONTAINED BREATHING APPARATUS

- 9.1 **ALL FACEPIECES ARE EQUIPPED WITH VOICEMITTERS (AV 2000). THE PROPER PROCEDURE FOR USE OF THE HT WITH THE VOICEMITTER IS TO:**
 - A. Remove the microphone from the harness clip.
 - B. Place the microphone **DIRECTLY ON** the voicemitter.
 - C. After completing the transmission, the microphone can be returned to the harness clip.

10 RADIO DISCIPLINE

- 10.1 Every firefighter will be equipped with their own HT. We must all remember that the HT is a tool of communications and should be used with discipline. The foremost use of our HT is as a listening device.
- 10.2 At the scene of an expanding operation there will be numerous HTs on the scene. Members should be listening to the radio traffic keeping them abreast of the situation. Your message at that precise moment may not be the most important message at the time. Before transmitting (excluding an emergency report) member shall listen making sure the HT network is clear. Once certain no transmissions are taking place member can then transmit their message.
- 10.3 Members must also be aware that a message transmitted but not responded to should be considered not received. Member shall continue their transmission until they receive a response.

11 EMERGENCY ROLL CALL PROCEDURES

11.1 Conditions requiring an Emergency Roll Call

There are many situations where emergency roll calls are necessary. Some examples are:

Mayday transmission for Collapse Imminent/Collapse Occurred, Urgent Transmission for “Interior attack discontinued and exterior attack instituted” or “Loss of water endangering members.”

Anytime a building or area is evacuated, Chief or company officers shall account for all members in preparation of a roll call by the IC.

Anytime the IC determines an emergency roll call is necessary to account for members.

- 11.2 The member conducting the emergency roll call will be known as the Roll Call Officer (RCO). The RCO must be assisted by another member who is responsible for monitoring the HT frequency that the emergency roll call is being conducted on and recording the members by position, as they reply.

The RCO conducting the emergency roll call must monitor the HT and make sure they are not interrupting any emergency transmissions before transmitting over the appropriate frequency the following statement:

“Roll Call Officer to All Units, Prepare for an Emergency Roll Call”

The RCO will then pause to give officers a chance to account for members, so they can accurately reply when called. Each officer should now account for their members within sight or hearing **without** using the HT.

11.3 Actions to be taken by firefighters when an emergency roll call is conducted

- A. Follow the directions included in the Mayday/Urgent transmission. Maintain radio discipline. **Do not** transmit, unless:

- Called by the RCO
- You have a Mayday/Urgent of your own
- You have a **critical** information regarding the Mayday/Urgent
- You have a **critical** message affecting the on-going operation

- B. If firefighting operations are to continue, complete your assignment

- C. When a firefighter is answering an emergency roll call via the HT, they will reply giving the company number **they are working in**, firefighting assignment and location.

Example: RCO to Ladder 123 Roof, What is your location?

Ladder 123 Roof to RCO, I'm on the roof of the fire building.

This response is the procedure for all members, including details, overtime etc., that may not be working in their assigned companies.

- D. Members not in the immediate vicinity of the member in distress must refrain from self deploying and becoming involved in any rescue efforts, unless specifically ordered. Your assignment must be addressed as assigned. If your assignment is completed, you will be re-assigned as needed by the IC. In numerous cases, when Mayday/Urgents were transmitted, self deployed members became a hindrance to the rescue efforts.

If a member's involvement in the rescue is necessary and they are unable to complete their firefighting assignment, the IC must be notified.

If at anytime while operating at a fire or emergency, you come across a downed member, immediately notify the IC via the proper radio transmission.

Anytime a member is unable to complete their assignment, they must notify the IC.

11.4 Example Roll Call:

RCO to Engine 234, account for your members.
Engine 234 to RCO, we have 4 firefighters and my Nozzle and Backup are accounted for.
RCO to Engine 234 ECC, What is your location?
Engine 234 ECC to RCO, I am operating the pumper.
RCO to Engine 234 Control, What is your location?
Engine 234 Control to RCO, I am on the floor below flaking out the line.
RCO to Engine 234, all members of Engine 234 have been accounted for.
RCO to Ladder 123, account for your members.
Ladder 123 to RCO, Ladder 123 has 5 firefighters; my Can and Irons are accounted for.
RCO to Ladder 123 Roof, What is your location?
Ladder 123 Roof to RCO, I'm on the roof of the fire building.
RCO to Ladder 123 Chauffeur, What is your location?
Ladder 123 Chauffeur to RCO, I'm on the turntable in front of Exposure 4.
RCO to Ladder 123 OV, What is your location?
Ladder 123 OV to RCO, I'm on the rear fire escape.
RCO to Ladder 123, all members of Ladder 123 are accounted for.
RCO to Rescue 1, account for you members.
Rescue 1 to RCO, Rescue 1 has 5 firefighters; my Irons, Can and OV are accounted for.
RCO to Rescue 1 Roof, What is your location?
Rescue 1 Roof to RCO, I am on the roof of the fire building.
RCO to Rescue 1 Chauffeur, What is your location?
Rescue 1 Chauffeur to RCO, I am on the floor above.
RCO to Rescue 1, all members of Rescue 1 are accounted for.

11.5 When the roll call is completed, the RCO shall announce over the appropriate frequency, "Roll Call Officer to all units, the Emergency Roll Call is completed."

12. ELECTRONIC FIREGROUND ACCOUNTABILITY SYSTEM (EFAS)

12.1 The Electronic Fireground Accountability System (EFAS) is designed to improve the accountability of members at all operations. EFAS is installed on the MDT of all Battalion and Division vehicles allowing the Incident Commander (IC) the capability of:

- Immediately identifying any member(s) activating the Emergency Alert Button on their handie-talkie (HT) by displaying their company, position and name.
- Manually identifying any member(s) transmitting a verbal Mayday message via HT.
- Conducting an emergency electronic Roll Call.
- Reviewing HT transmission history.

12.2 It shall be the responsibility of the first arriving Battalion Firefighter, **after performing their primary duties**, to monitor EFAS until relieved by an EFAS trained member of the FAST Unit.

- Upon the arrival of the FAST Unit, the EFAS trained member designated at roll call to monitor EFAS shall report to the Battalion vehicle being used to monitor EFAS. This FAST Unit member will then monitor both EFAS and the Battalion's FAST Unit HT.

Note: The member monitoring EFAS shall be identified by radio designation "EFAS" when communicating by HT, e.g., "**EFAS to Command**" "**Command to EFAS**".

12.3 The EFAS program automatically starts up on the MDT when the vehicle ignition is turned on. The EFAS window is designed to run behind the Starfire window. The EFAS start-up is delayed 1 minute to allow Starfire to connect. **Do not attempt to select the EFAS button during this time.** Members must wait until Starfire completely "boots up" before switching to the EFAS program.

12.4 Officers arriving at an incident, after they have transmitted their 10-84 via the MDT, must key their handie-talkie remote microphone once in order to "check in". Keying the handie-talkie remote microphone will have all members of the unit recognized by EFAS.

12.5 When a member activates their Emergency Alert Button, their identity line in EFAS will automatically be highlighted. Their company, position and name will be listed in red in both the "RADIO STATUS" and "MAYDAYS" areas.

See figure 1- MAYDAY shown in RED

- 12.6 In addition, a hard copy automatically prints showing the company, position and time of Mayday.
- 12.7 The member's identity line will remain red in EFAS until the Emergency Alert is resolved and the handie-talkie is reset. Once cleared, the member's highlighted identity line will change from red (active) back to white in the "RADIO STATUS" area. The member's highlighted identity line will change from red (active) to yellow (cleared) and will remain in the "MAYDAYS" area.
- 12.8 The EFAS system is capable of handling **multiple** Emergency Alert transmissions at the same time. All active MAYDAYS will appear in red in both the "RADIO STATUS" and "MAYDAYS" area. Member monitoring EFAS may have to utilize the scroll bar in the "RADIO STATUS" and "MAYDAY" area, in order view all MAYDAYS that were transmitted.



Figure 1- MAYDAY shown in RED

12.9 If a member transmits a MAYDAY message on their handie-talkie, and does not activate their Emergency Alert Button, the member monitoring EFAS shall highlight that member by utilizing the MDT touch screen and manually assigning them a MAYDAY. Once a MAYDAY is assigned, a hard copy will print showing the members company, position and time MAYDAY was assigned.

12.9.1 Select the member's name. A dialog box will appear for that member. The last person to transmit is always the top line in the "RADIO STATUS" area.

12.9.2 Select the "ASSIGN MAYDAY" button. This will highlight the member's company, position and name, in red, in both the "RADIO STATUS" and "MAYDAYS" area.

See Figure 2 below

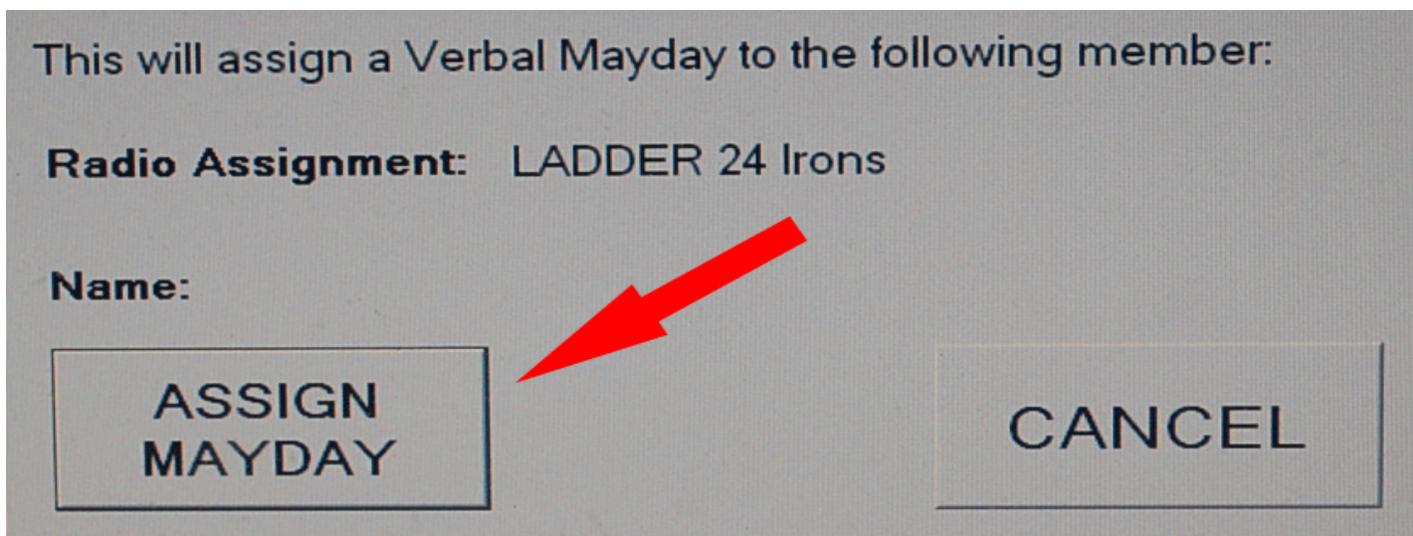


Figure 2- Assign MAYDAY

12.10 In the event a member transmits a MAYDAY for another member (e.g., unconscious member), the transmitting member shall:

1. Depress the Emergency Alert button (EAB) on their own handie-talkie. This will identify the member transmitting the MAYDAY on EFAS.

2. After the Emergency Alert activation, provide the Incident Commander with the information required for the MAYDAY transmission.

3. If possible, depress the EAB of the member in distress. The activation of the distressed member's EAB will identify them on EFAS. Notify the IC via handie-talkie prior to EAB activation of the distressed member.

4. Transmitting member shall reset (cancel) their handie-talkie Emergency Alert by depressing and holding the Emergency Alert button of their remote microphone for approximately 2 seconds. The distressed member's Emergency Alert shall remain activated until determined it is no longer required.

12.11 MAYDAY RESOLVED

12.11.1 Select the member's name. A dialog box will appear for that member.

12.11.2 Select the "MANUALLY ACCOUNT" button. Once cleared, the member's highlighted identity line will change from red (active) back to white in the "RADIO STATUS" area. The member's highlighted identity line will change from red (active) to yellow (cleared) and will remain in the "MAYDAYS" area.

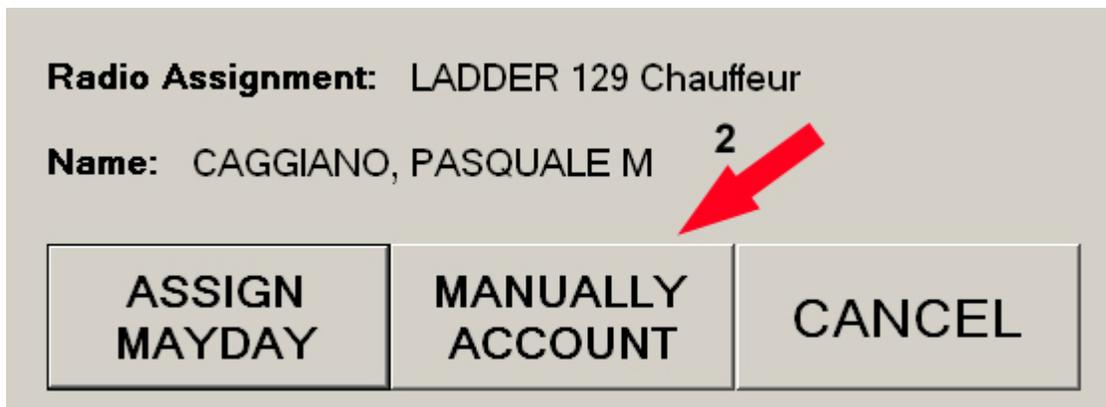


Figure 3

12.12 ELECTRONIC ROLL CALL

1. Select "BEGIN ROLL CALL" button located at the top of the EFAS screen.
2. This will bring up the "ROLL CALL" screen. The left column will contain all members "UNACCOUNTED FOR" at the beginning of the Roll Call.
3. When members key their remote microphone three times, their name will move from the "UNACCOUNTED FOR" column on the EFAS screen (left side) to the "ACCOUNTED FOR" column on the EFAS screen (right side). See Figure 4

4. If a member does not key their handie-talkie remote microphone, they will remain on the “UNACCOUNTED FOR” EFAS column and will need to be contacted.
5. If a member is confirmed accounted for but they do not have ability to click their handie-talkie remote microphone, you can manually account for the member. Select the member’s name in the “UNACCOUNTED FOR” column by utilizing the MDT touch screen. A dialog box will appear for that member, select the “MANUALLY ACCOUNT” button. See Figure 5

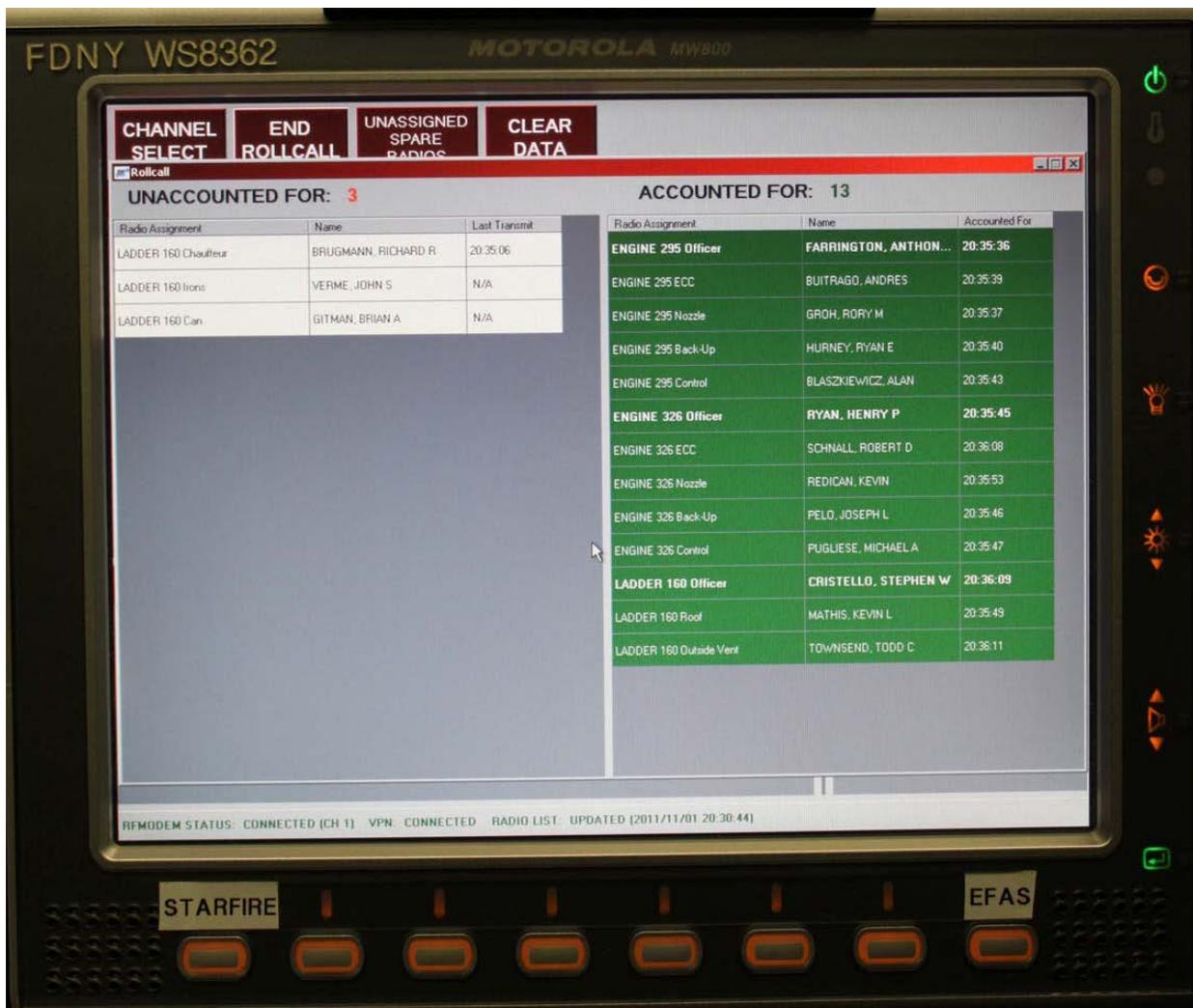


Figure 4

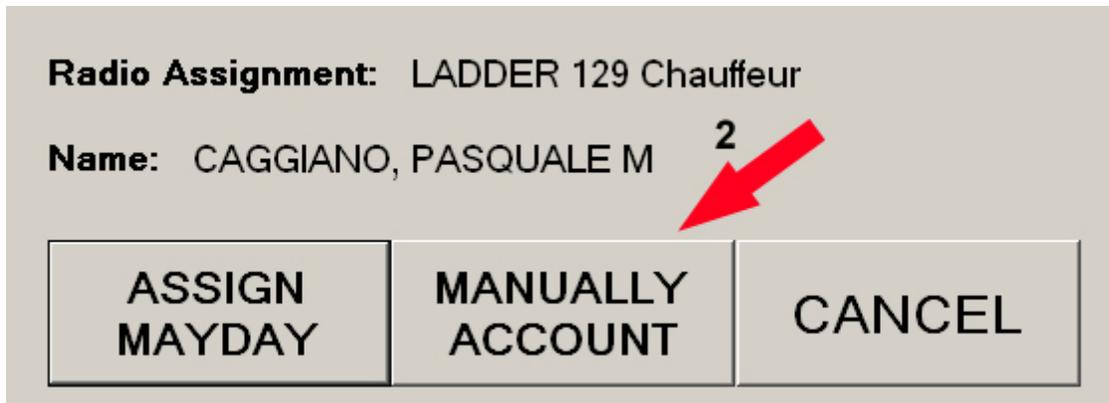


Figure 5

6. When the Roll Call is complete, select the “END ROLL CALL” button located at the top of the EFAS screen. A dialog box will appear, select the “END ROLL CALL.” button. See Figure 6 below

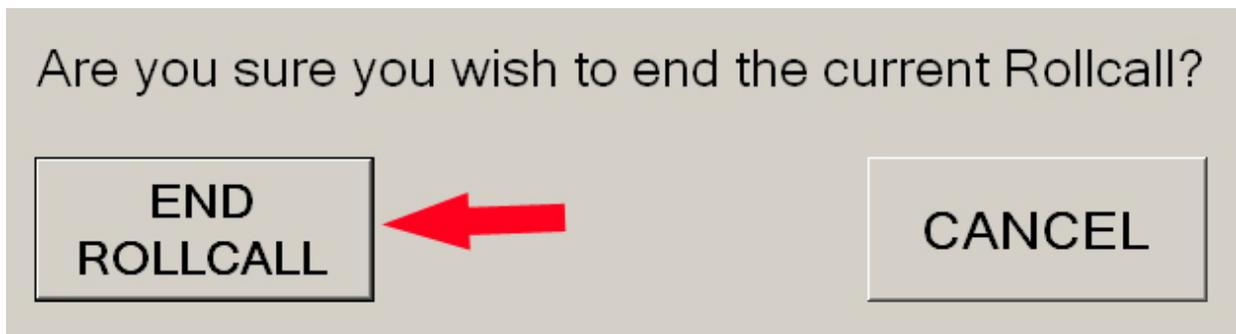


Figure 6

- 12.13 “NON ESSENTIAL PERSONNEL” shall be defined as any company **not assigned to the incident** but because of their proximity to the incident will show up on the EFAS screen as a result of utilizing their handie-talkie.
- 12.14 EFAS defaults to Tactical Channel 1; however, it has the capability of monitoring any of the 16 Channels. The IC shall assign an additional member to monitor EFAS for each channel in use e.g., secondary tactical, primary command, secondary command. A separate Battalion/EFAS equipped vehicle and EFAS trained member is required for each channel in use.
- 12.15 EFAS has the capability to convert the digital data designated by the spare radios. As a result, members who are assigned a spare radio will be identified by their Company and Riding position.

Radio Code Signals

- 10-1 Call your Quarters or Other Unit
- 10-2 Return to Quarters
- 10-3 Call Dispatcher by Telephone
- 10-4 Acknowledgment
- 10-5 Repeat Message
- 10-6 Stand By
- 10-7 Verify Address/Location
- 10-8 In-Service by Radio
- 10-9 Off the Air
- 10-10 Unit Location
- 10-11 Radio Test Count
- 10-12 Preliminary Report
- 10-14 Roster Staffed Engine Company
- 10-18 Return all Units, except 1 Engine AND 1 Ladder
- 10-19 Return All Units, Except 1 Engine OR 1 Ladder
- 10-20 Proceed at Reduced Speed
- 10-21 Brush Fire
- 10-22 Outside Rubbish Fire
- 10-23 Abandoned/Derelict Vehicle Fire (ADV)
- 10-24 Auto Fire

- 10-25** **Manhole or Transformer Fire or Emergency**
- Code 1:** Fire has extended from a manhole, conduit, or transformer into a building.
- Code 2:** Fire has blown one or more manhole covers, or smoke is issuing from a manhole under pressure.
- Code 3:** Smoke is seeping from a manhole.
- Code 4:** Fire or smoke condition from a transformer at any location. i.e., pole, vault, room, etc.
- 10-26** **Food on Stove**
- 10-27** **Compactor or Incinerator Fire**
- 10-28** **Subway or Railroad System - Fire, Emergency (non-medical) or Smoke Condition**
- Code 1:** Structural fire
- Code 2:** Non-Structural fire (e.g. train fire, rubbish on the tracks, etc.)
- Code 3:** Emergency (non-medical)
- 10-29** **Elevator Emergency**
- Code 1:** Occupied
- Code 2** Unoccupied
- 10-31** **Assist Civilian**
- All calls for assistance other than medical assignments, including a unit assigned to protect EMS by diverting or blocking traffic at a highway incident, good intention calls, calls handled by other agencies, any type of investigation, searches and complaints, and lock-outs. Chapter 4 Section 1.3 of the New York Fire Incident Reporting System (NYFIRS) lists incidents and situations codes.
- NOTE:** The 10-31 signal shall not be utilized for any incident/emergency involving evaluation of structural stability, any operation involving a rescue or mitigation effort, or any type of hazardous condition.
- 10-32** **Defective Oil Burner**
- 10-33** **Odor Condition**
- Code 1:** Odor of smoke.
- Code 2:** Any other type of odor.
- 10-34** **Sprinkler System Emergency**
- Code 1:** Defective sprinkler device or system (defective alarm valve, broken pipe, etc.)
- Code 2:** Unwarranted sprinkler alarm-Not defective (surge in pressure, people working on the system, etc.)
- Code 3:** Sprinkler has been activated by heat source not associated with an accidental fire

10-35 Unwarranted or Unnecessary Alarm System Activation

- Code 1:** Alarm system testing or servicing.
- Code 2:** Construction activities.
- Code 3:** Ordinary household activities
- Code 4:** Unnecessary other known cause. (e.g., alarms resulting from cigarette smoking in unauthorized areas etc.)
Unwarranted alarm (Defective condition of alarm device, low battery, etc.)

10-36 Vehicle Accident or Emergency

- Code 1:** Vehicle accident or emergency requiring washdown
- Code 2:** Vehicle accident, no injuries and no washdown
- Code 3:** Vehicle accident with injuries
- Code 4:** Vehicle accident, with or without injuries, with a trapped victim requiring extrication
- No Code:** Vehicle emergency other than described above

10-37 Medical Assignment Not Associated with Fire Operations

- Code 1:** Victim deceased.
- Code 2:** Victim/Patient is **NOT** breathing and requires resuscitation or may be suffering from a serious, apparently life threatening injury or illness.
- Code 3:** Victim/Patient **IS** breathing and suffering from a non-serious, apparently not life threatening injury or illness.
- Code 4:** Medical assignment where the unit is 10-84, has **no** patient contact and EMS is on-scene.
- Note:** Signal 10-45 with appropriate sub-code shall be transmitted in lieu of signal 10-37 for thermal burn injuries which occur as a direct result of heat from a flame.

10-38 Carbon Monoxide Response

Any type of Carbon Monoxide Response

- Code 1:** Detector Activation: Carbon Monoxide Investigation (low battery, defective detector, unwarranted alarm, etc.)
- Code 2:** Detector Activation: Carbon Monoxide **Incident** (CO Meter Reading of 1-9ppm)
- Code 3:** Detector Activation: Carbon Monoxide **Emergency** (CO Meter Reading of greater than 9ppm)
- Code 4:** **No** Detector Activation: Carbon Monoxide Incident or Emergency (Specify) e.g.: no detector present in affected area, detector present in affected area, but did not activate.

10-39 FD Standing By

10-40 Utility Emergency

- Code 1:** Gas Emergency (Gas main leak, Gas leak in structure, Defective gas appliance, etc.)
- Code 2:** Electrical Emergency (Wires Down Sparking Fixture, Short Circuit, etc.)
- Code 3:** Water Condition - any type of water leak or flooding condition
- Code 4:** Steam Leak - any type of steam leak

10-41 Fire Marshal Investigation Required (Specify Code)

- Code 1:** Occupied Structure or Vehicle
- Code 2:** Unoccupied Structure
- Code 3:** Unoccupied Vehicle
- Code 4:** Vacant Structure or Structures **not** intended for Dwelling Purposes.

10-42 Any Downed Tree Incident or Emergency

Provide description to dispatcher and if Parks Detartment or electrical utility is required

10-43 Any non-fire related rescue; any person(s) rescued/removed from a dangerous situation

NOTE: 10-43 is a disposition code, not a request for resources and shall not be transmitted in lieu of 10-60, 10-75 or other signals.

10-44 Request for Ambulance

10-45 Civilian DOA or Serious Injury (Fire Related ONLY)

<i>Patient Condition</i>	<i>Color Tag</i>	<i>Code Transmission</i>
Deceased	Black	Code 1
Life Threatening Injury	Red	Code 2
Non-Life Threatening Injury	Orange/Yellow	Code 3
Non-Serious Injury/Ambulatory	Green	Code 4

Notes: *Signal 10-45 shall not be used to indicate a fatality or injury to an on-duty member*
 Signal 10-37 with any code shall not be used at any fire operation.

10-46 Maritime Fire or Emergency

Code 1: Any fire in maritime environment (example: vessel, dock, pier)

Code 2: Emergency in maritime environment

Ex. Vessel in distress, person(s) in water removed by Marine personnel, hazard to navigation in maritime environment

10-47 Police Response

10-48 Police Response for Harassment

10-51 Suspension of Outside Activities

10-60 Major Emergency Response

Major Emergency Incident with the potential for multiple casualties, e.g. collapse of a private dwelling, derailment of a subway car.

Code 1 Large Scale Major Emergency Response – Enhanced 2nd Alarm

10-66 Missing, Lost, Trapped, or Seriously Injured Member and Additional Resources are Required

10-70 Water Supply Is Required:

A notification that the first arriving engine does NOT have a positive water source. Requires URGENT messages to dispatcher and HT transmission to all units on the scene.

10-75 Notification of a Fire or Emergency

10-76 Notification of a Fire in a High-Rise Building

A High-Rise Building includes all buildings 75 feet or more in height.

10-77 Notification of a Fire in a High-Rise Multiple Dwelling

10-80 Hazardous Material Incidents

The initial notification by field units of a hazardous materials incident. Transmission of the signal 10-80 will serve to warn responders to proceed with caution to avoid entering a restricted area. The FDNY Incident Commander will transmit the appropriate code after size up and evaluation of the incident.

10-80 No Code

An incident that can be controlled by the on-scene unit(s) and requires no additional resources. The Haz-Mat Battalion (HB01) and Haz-Mat Co. 1 (HM01) can be contacted via the dispatcher, 800 MHz radio, or cell phone for technical information if necessary. HB01 and HM01 may be requested to respond to the incident if necessary.

Guidelines for transmitting Signal 10-80 No Code include:

- Release is of a small quantity (e.g., gas leak in a stove).
- The material and its hazards have been identified.
- Firefighters' PPE provides adequate protection against the identified hazards.
- Special equipment and specialized training are not needed.

10-80 Code 1

An incident requiring additional resources and/or specialized equipment not carried by regular field units to assist the IC in assessing the hazards and identifying the resources necessary to manage the spill or release.

Units dispatched on a 10-80 Code 1 include:

- Haz-Mat Battalion (HB01)
- Haz-Mat Company 1 (HM01)
- Nearest available Haz-Mat Technician Unit (HMTU)
- Haz-Tac Conditions Officer
- Nearest available ALS/BLS Haz-Tac Ambulance

If people are contaminated, exposed or injured, or the incident involves other hazards, additional resources should be special called by the IC as needed. HB01 can be contacted for guidance as needed, or may recommend resource assignments to the IC based on preliminary and progress reports.

The Borough dispatcher shall make the following notifications upon transmission of Signal 10-80 Code 1:

- Deputy Chief
- FDOC
- EMS Operations
- Department of Environmental Protection (DEP)
- Department of Health (DOH) for Biological or Radiological incidents
- NYPD Operations

- 10-84** **First Unit to Arrive.**
- 10-85** **Fire Marshal requires emergency police assistance (specify reason)**
- 10-86** **Alcohol Resistant Foam Operation**
- 10-87** **High Expansion Foam Operation**
- 10-91** **Medical Emergency EMS – Fire Unit Not Required**
- 10-92** **Malicious False Alarm**
- 10-99** **Unit Will Be Operating for at least 30 Minutes**

PART TWO

EXPOSURE IDENTIFICATION

EXPOSURE IDENTIFICATION

1. The identification of buildings and subdivisions within buildings continues to be a problem for firefighting forces. The following outlines a system which will provide a simple and clear concept for building identification. This system uses a more practical approach, which will lead to improved on-scene communications
2. The system uses a series of numbers and letters to develop an identification code which is directly related to the building or occupancy the communicator is talking about. This system always uses as a reference point, the view as seen by a person standing in front of and looking at the fire building.
 - 2.1 Buildings separated by more than thirty feet from the fire building, should not be identified as exposures unless the volume of fire or complexity of the incident causes an exposure problem.
3. Numbers indicate direction (front, left, rear and right).
4. Letters indicate distance from the main fire building or fire.
5. Explanation of numbers:
 - 5.1 "0" - when used as the first digit, it indicates the FIRE BUILDING or FIRE AREA.
 - 5.2 "0" - when used in any other position "0" refers to a subdivision of the building which is identified by the number following the "0" or the letters following the "0".
 - 5.3 "1" - is used to indicate the street in front of the main fire building or the buildings opposite the front of the main fire building.
 - 5.4 "2" - is used to indicate any building or area to the left of the main fire building.
 - 5.5 "3" - is used to indicate any building or area to the rear of the main fire building.
 - 5.6 "4" - is used to indicate any building or area to the right of the main fire building.
 - 5.7 To enhance the description of a location within or around a building, and when viewed from the Exposure 1 perspective, the building corners can be further identified as follows:
 - ◆ The front left corner is the "1-2" corner.
 - ◆ The rear left corner is the "2-3" corner.
 - ◆ The rear right corner is the "3-4" corner.
 - ◆ The front right corner is the "1-4" corner.

6. Explanation of letters:

6.1 "A" - is used to indicate the second building or subdivision from the main fire building or fire area.

6.2 "B" - is used to indicate the third building or subdivision.

6.3 "C" - is used to indicate the fourth building or subdivision.

6.4 "D" - is used to indicate the fifth building or subdivision.

6.5 "E" - is used to indicate the sixth, "F" is the seventh, and so on down the alphabet.

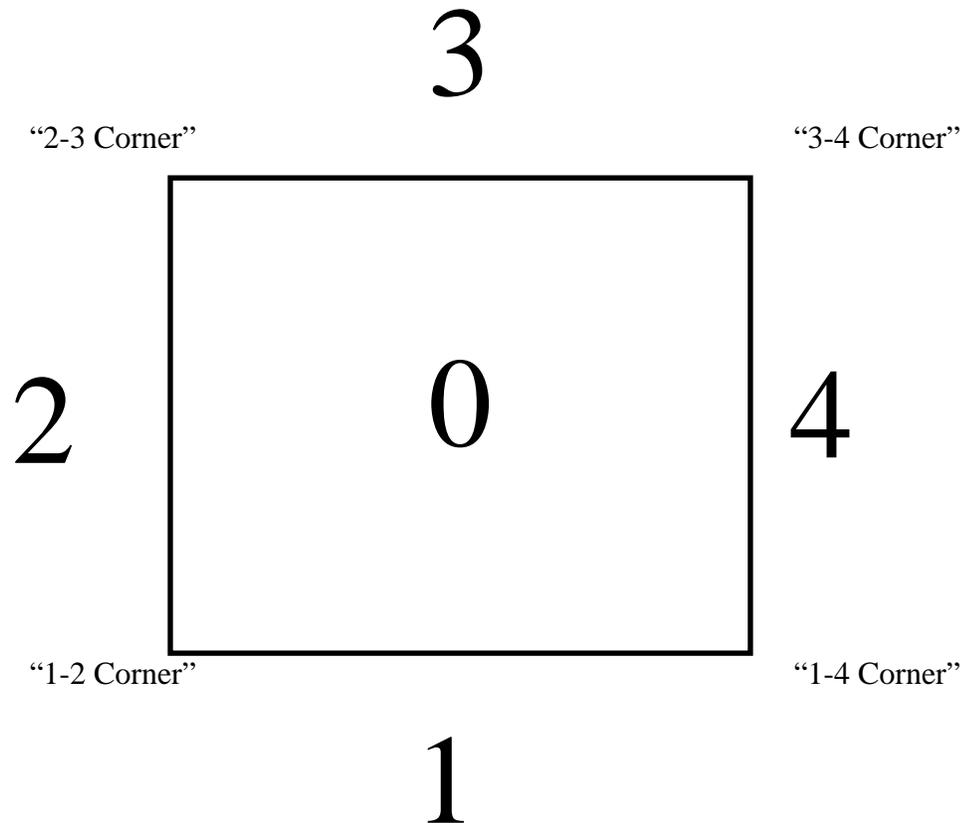


Illustration # 1

7. The following illustrations show how the exposure system is used:
- 7.1 Illustration 1, depicts a single building. The building is identified as "O", "1" is a street, "2" is a lot "3" is a lot and "4" is a lot. This indicates that the building is isolated.
- 7.2 Illustration 2 depicts a taxpayer with nine (9) individual stores, or nine subdivisions. The fire is located in the center store. The store to the immediate left of the fire store is identified as exposure "O-2", the next store on the left (two stores from the fire store) is "O-2A", the third store on the left would be "O-2B" and the fourth store would be "O2C". The first store on the immediate right of the fire store would be exposure "O-4", the second store on the right would be "O-4A", the third store would be "O-4B", and the fourth store would be "O-4C".

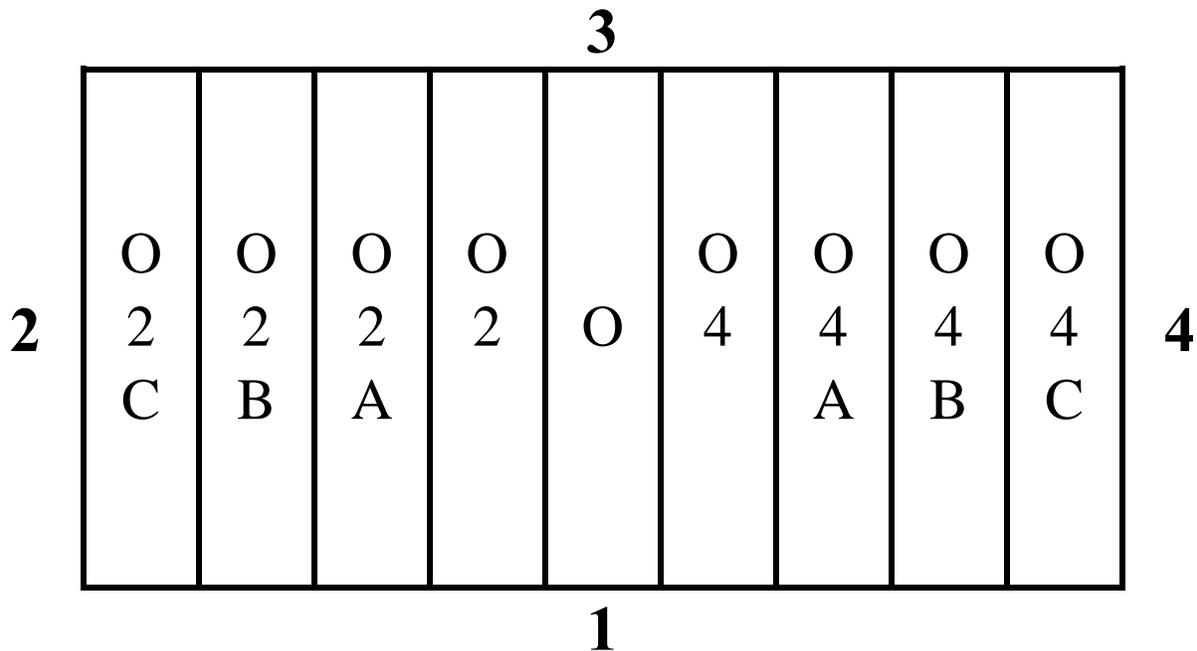


Illustration # 2

7.3 Illustration 3 depicts a more complex problem. It uses as a foundation the taxpayer shown in illustration #2. The fire building is identified as "0" and all subdivisions are identified by having their ID codes start with "0". The second character in the identification code is a number and indicates the direction; "2" indicates the left side and "4" indicates the right side. The third character is a letter and indicates how far away from the fire store the subdivision is located. Exposure "1", for this illustration is a street. The first building to the left of the fire building is exposure "2", the second is "2A". The buildings directly to the rear of the fire building are exposure "3". The building immediately to the right of the fire building is identified as exposure "4", the next building to the right is exposure "4A", than "4B", "4C", etc.

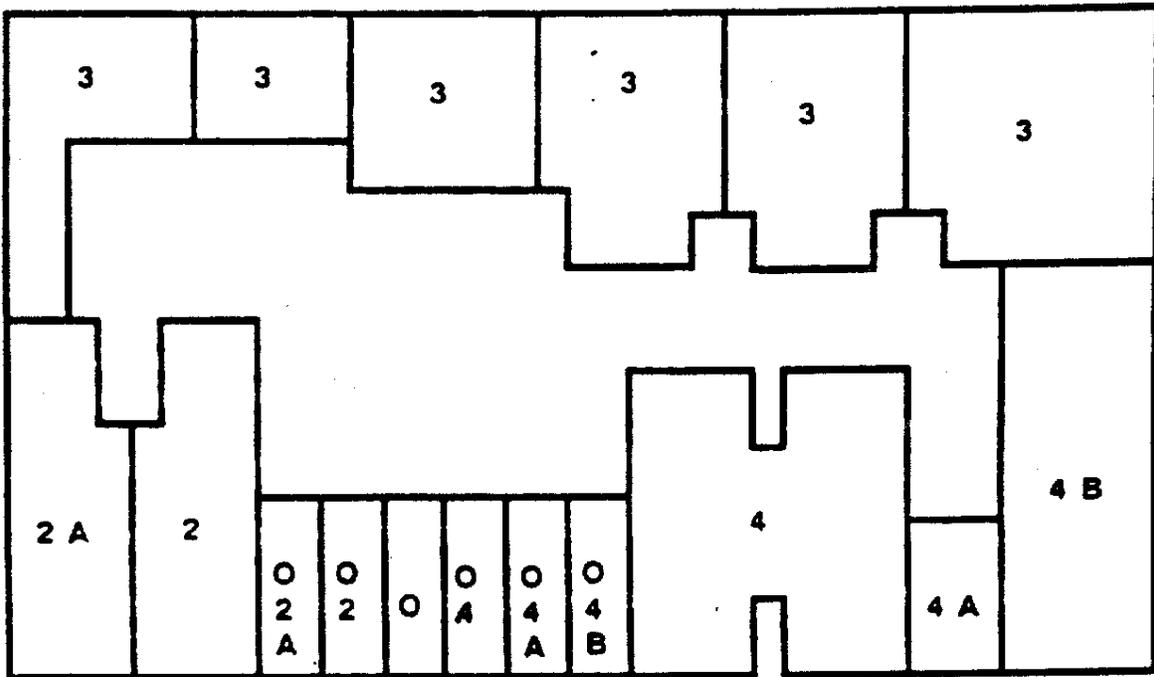


Illustration #3

Note: To eliminate any confusion in identifying rear exposures, all buildings in the rear shall be referred to as exposure "3". If operations on exposure "3" become too complex, the Incident Commander should create a sector and assign a sector officer to manage this area.

7.4 Illustration #4 shows how the system builds; it starts with a fire in the taxpayer, "O", that extends to the right and then out of the taxpayer and into the windows of the top floor of exposure "4". Exposure "4" is an "H-type" building and because of its size, we will mentally subdivide it into sections. Each of the arms of the "H" will be identified as WINGS. In this illustration the wing closest to the fire building is wing "A", the next arm is wing "B" and if there is a third or fourth wing they would be identified as wing "C" and wing "D". Wings are identified from left to right looking from the front of the building: If necessary each wing can be further subdivided from front to rear using the terms FRONT, CENTER, and REAR. The part of the building connecting each wing shall be designated the throat and shall be referred to as the throat between "A" wing and "B" wing etc.

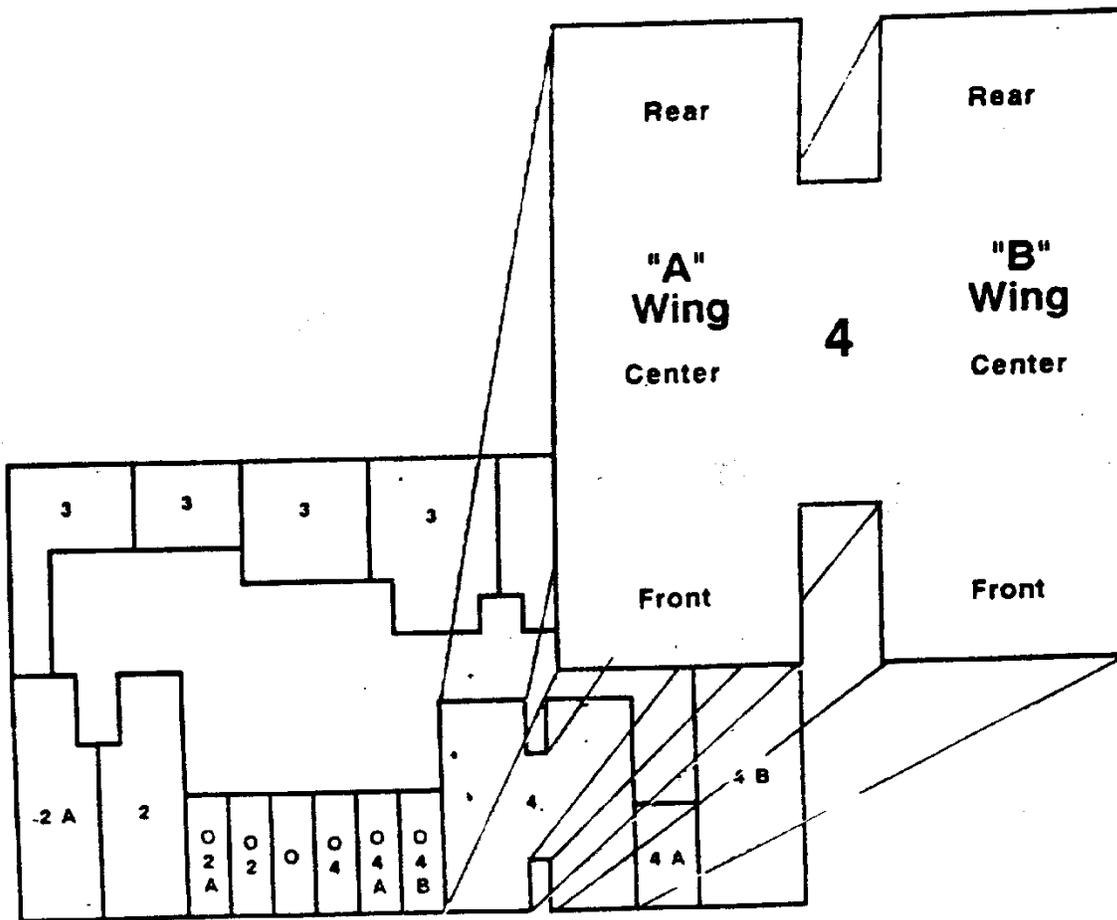


Illustration # 4

7.5 Illustration 5 depicts a fire that originated in the "H" building and has extended to the left into the taxpayer. It has advanced down the row of stores to the third store and threatens the fourth store. The "H" type building is identified as "O", the taxpayer is exposure "2" and the first store or subdivision of the taxpayer is identified as "2-0". The "2" indicates the first building on the left; the "O" following a number indicates that we are now referring to a subdivision. The second store is "2-OA", the third store is "2-OB", the 4th is "2-OC", the 5th is "2-OD", the 6th is "2-OE". The next building is a separate building, not part of the taxpayer and is identified as exposure "2A", then "2B", etc. The buildings opposite the fire building represent exposure "1" because either the separation is less than 30 feet or the intense fire creates an exposure problem.

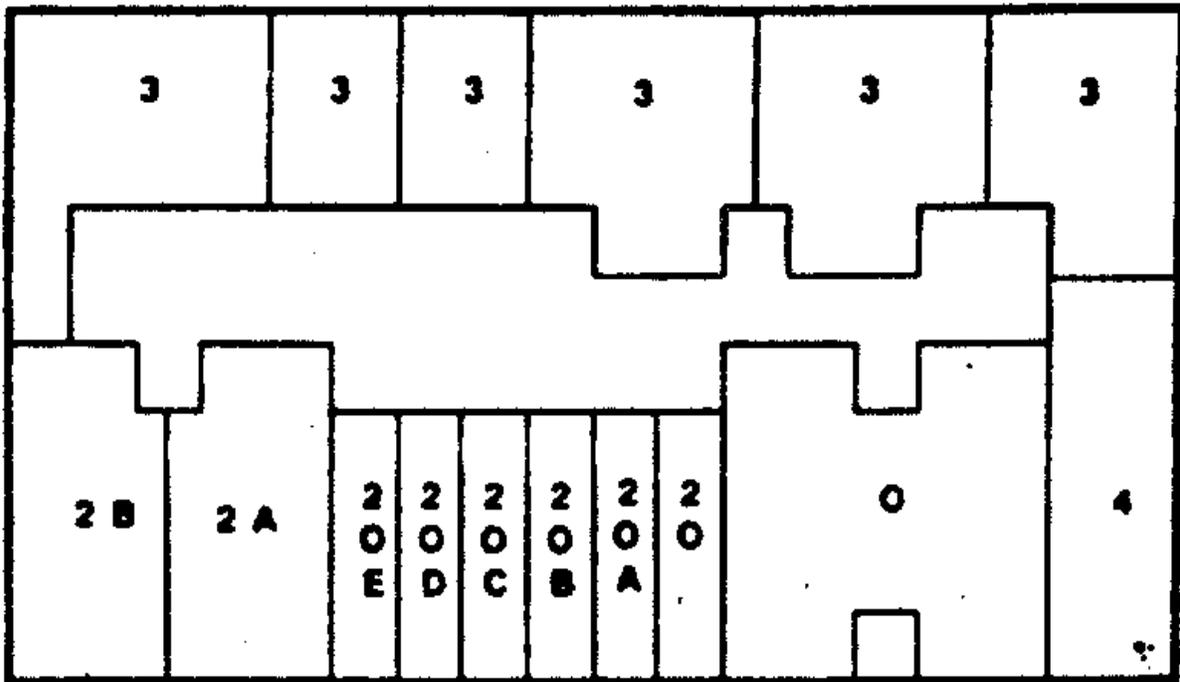


Illustration # 5

PART THREE

<u>SECTION</u>	<u>Handie-Talkie</u>	<u>PAGE</u>
1.	INTRODUCTION	43
2.	DESCRIPTION AND USE OF HANDIE-TALKIE.....	44
3.	SPECIAL FEATURES	54
4.	EQUIPMENT DISTRIBUTION AND ASSIGNMENTS.....	62
5.	MAINTENANCE OF PORTABLE RADIOS.....	62
6.	RADIO FREQUENCY (RF) CHALLENGES, INTERFERENCE AND DEADSPOTS.....	64

1. INTRODUCTION

After many years of use in the FDNY, the XTS3500 has reached its end of service life. Following an exhaustive evaluation process, a new radio with many additional features has been selected by the FDNY.

1.1 Portable Radios: (HT)

The Department has purchased the Motorola APX8000XE radio. This multi-band radio will provide access to every mode of voice radio communications currently used by the FDNY. The APX8000XE portable radio can communicate on VHF, UHF & 700/800 MHz. The multi-band capability greatly enhances the department's efficiency, increases intra and interoperability and overall safety of our members. This UL approved, non-incendive radio is being issued to both Fire and EMS.

1.2 New Features

1.2.1 **Voice Annunciation:** Announces zone and channel when powering up and changing channels.

1.2.2 **Multi-Screen View:** Top display and Main display for navigation of features.

1.2.3 **Recent/Mayday Retention:** Will hold the IDs of the last 15 transmissions.

1.2.4 **High Visibility LED on Remote Speaker Mic (RSM):** Operates on EAB activation and manually.

1.2.5 **Alpha-Numeric ID:** Identification of transmitting members. i.e.: LAD 12-OV, ENG 3-NOZ



Figure 1

2. DESCRIPTION AND USE OF HT

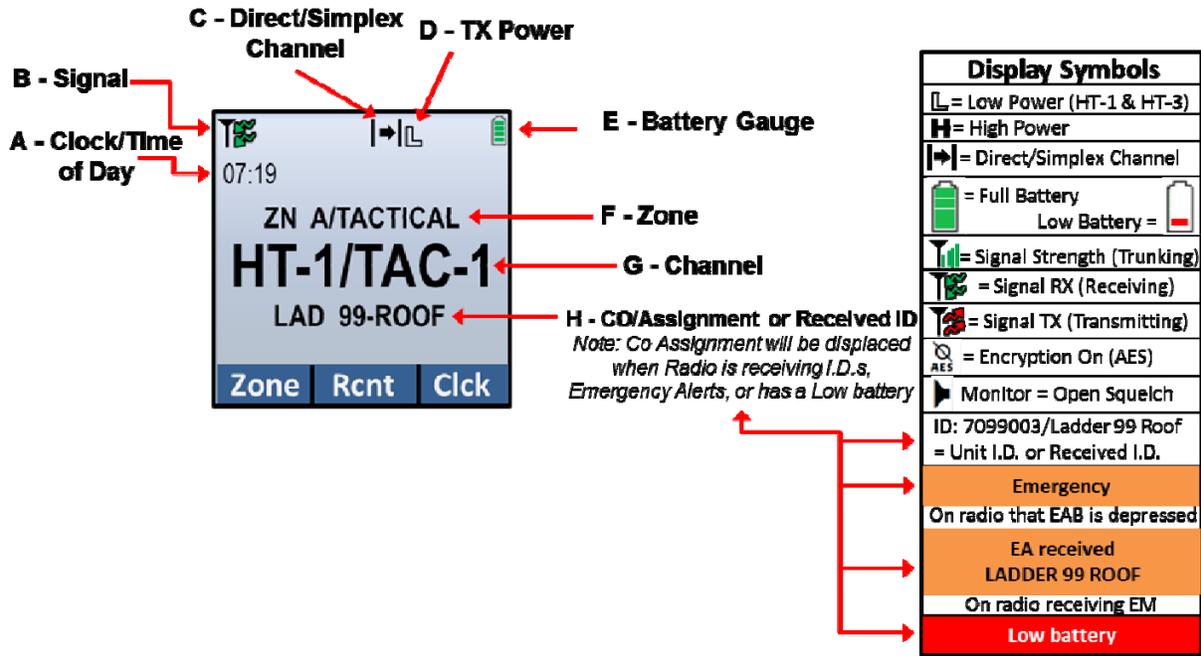
2.1 Motorola APX8000XE comes equipped with the following:

- 2 Watt and 5 Watt output
- 7" multi-band antenna
- Lithium-ion rechargeable battery
- Carrying case with an adjustable shoulder strap
- Remote Speaker Mic (RSM)

2.2 Two Displays

2.2.1 Main Display

Fig 2



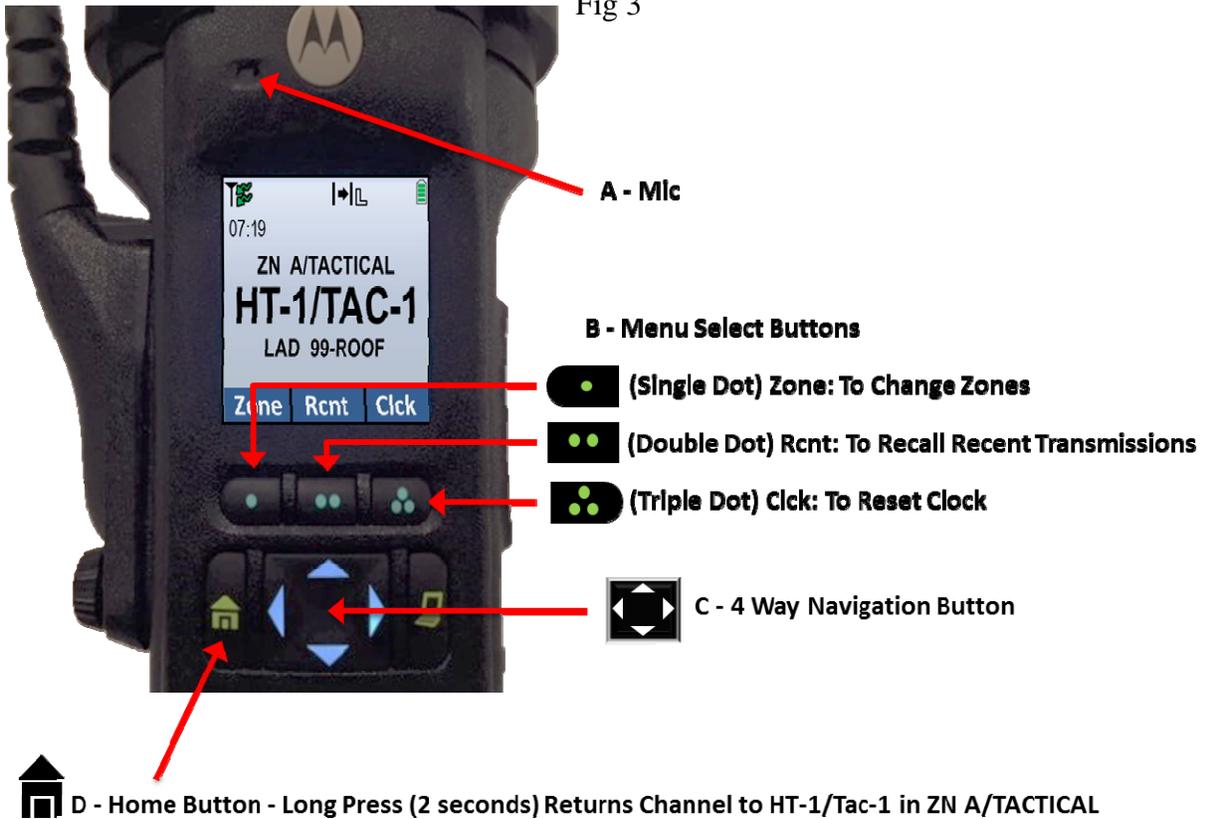
2.2.2 Main Display Features (Fig. 2)

Full color display, 4 lines of text up to 14 characters per line.

- A. Clock/Time of Day: Is only the time set on that HT and may not be accurate. (See Add. 6) Time of day is located in upper left-hand corner.
- B. Signal: Indicates whether radio is Transmitting , Receiving  or signal strength for Trunking 
- C. Direct/Simplex Channel: An  indicates a direct/point to point channel. No symbol (blank) indicates a Trunked/Repeated Channel.
- D. TX Power: An **H** or **L** on the display indicates high (5 Watt) and low (2 Watt) power level.
- E. Battery Gauge:  Indicates level of battery. Battery indicator is located in the upper right corner of the display.
- F. Zone: Indicates Zone member's HT is set to.
- G. Channel: Indicates channel member's HT is set to.
- H. Alpha-numeric Identification: By position i.e. LAD 99-Roof
Every portable radio has an assigned Internal Identification Code that is assigned to a specific unit and riding position. The assigned internal ID will be displaced when Radio is receiving IDs, Emergency Alerts or has a low battery. If an alphanumeric ID does not appear, then the numeric ID will be displayed. (See Addendum 4)

2.2.3 Front Controls

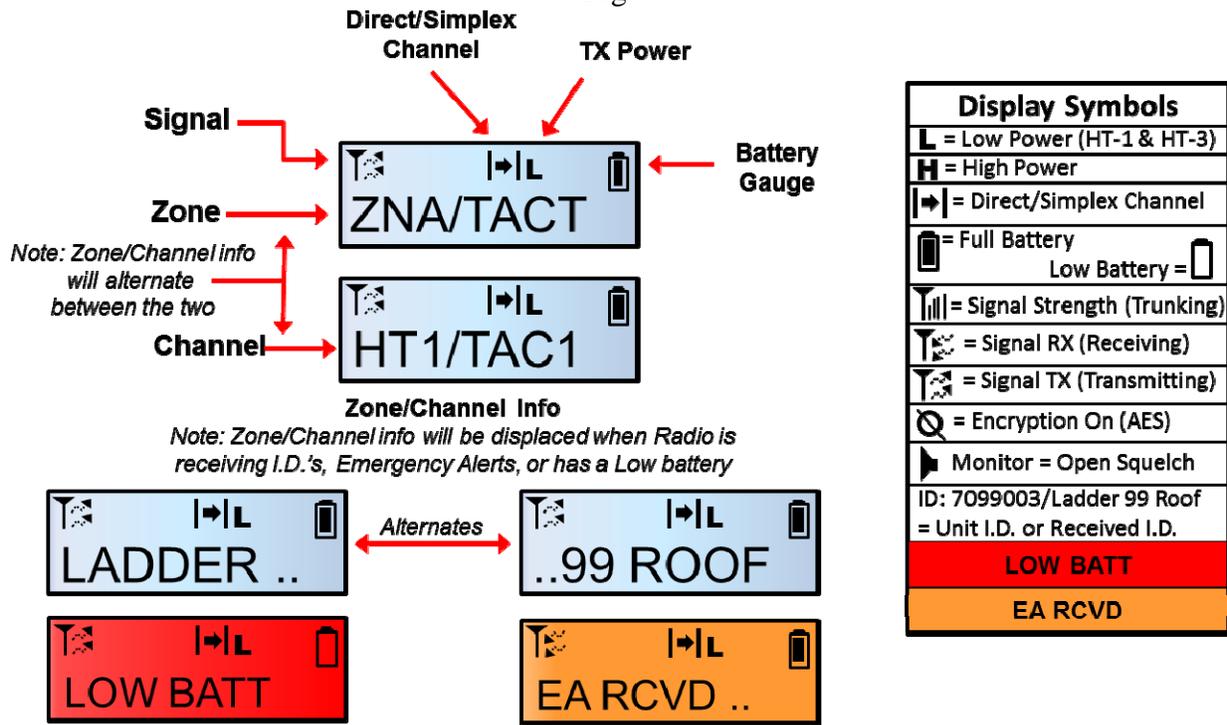
Fig 3



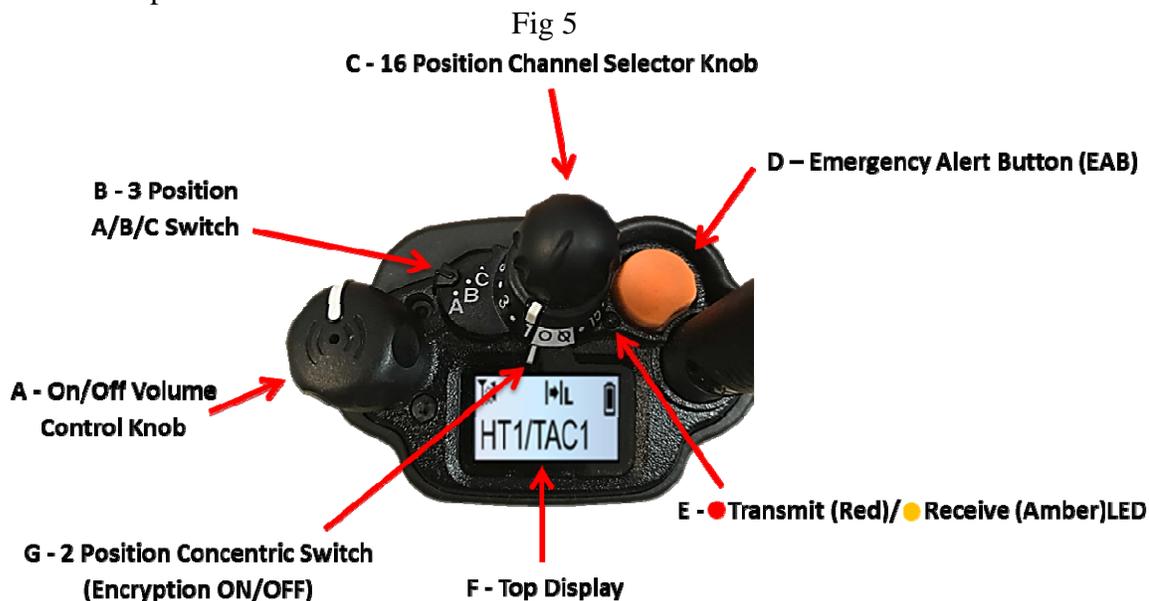
- A. Mic is located to the left above the main display.
- B. Menu/Select buttons
 - Single Dot: Zone - Enables changing zones.
 - Double Dot: Rcnt - (Recent) allows access to list of last 15 IDs received.
 - Triple Dot: Clck - (Clock) Allows access to internal clock application, to reset time.
- C. 4 Way Navigation Button: Allows navigation through different features on HT.
- D. Home Button: Pressing and holding the Home button for long press (2 seconds) returns the radio to the Tactical Zone A, HT channel 1. (**Note:** No matter what channel the channel selector is on, you return to Channel 1). If you wish to use a different channel, use channel selector knob.

2.2.4 Top Display

Fig 4



2.2.5 Top Controls



A. ON/OFF Volume Control Knob:

Radio ON: Rotate knob clockwise until a click is heard or felt. The radio will go through a power-up self-test.

If the power-up test is successful, a splash screen will appear on the radio display followed by the Home screen returning to last channel and zone selected when radio was on. The radio will return to the last channel that it was set to when it was powered off, no matter what position the channel selector knob is on. If the radio power-up test is unsuccessful an Error message will appear. Turn the radio off, check the battery, and turn the radio back on. If the radio still does not pass its self-test, it is defective. Follow procedure in Addendum 4 for placing radio OOS.

The Portable radio must be turned ON prior to donning the bunker coat. Volume must be adjusted for effective communications. The portable radio must be worn under the bunker coat to reduce damage and protect the unit from adverse weather conditions.

B. 3 Position Switch (A/B/C Zone Select):

Is used to toggle between Zone A, Zone B or Zone C. This also provides an easy method to return to tactical zone from any zone on the radio. Move A/B/C switch to any zone other than A and then return to A, and radio will return to Tactical zone.

C. 16 Position Channel Selector Knob: Used to select channel in selected Zone.

D. Emergency Alert Button (EAB):

The Emergency Alert Button (EAB) adjacent to the base of the antenna is used to activate the Emergency Alert.

- E. Transmit/Receive LED: Illuminates red light when transmitting and amber when receiving.
 - Solid Red - HT is transmitting.
 - Blinking Red (while transmitting) - HT transmitting at low battery condition.
 - Blinking Red (while not transmitting) - HT is in Emergency Mode.
 - Solid Amber - Receiving transmission.
 - Blinking Amber - HT is receiving a secured transmission.

- F. Top Display: See Fig 4

- G. 2 Position Concentric Switch: Used to activate encryption on designated channels.

2.3 Side Buttons

Fig 6
Side Buttons



A. Squelch Button: (Purple)

Depressing the squelch button momentarily opens the internal squelch of the radio for the duration of button actuation.

B. Push To Talk (PTT) Button:

Allows radio transmissions.

C. Side Button 1: (Single Square) has two modes.

- Short press (Momentary) - Illuminates both main and top displays for 20 seconds.
- Long Press (2 seconds) - Reverses orientation of top display.

D. Side button 2: (Double Square)

Depressing this button announces the Zone and Channel the radio is operating on and illuminates both displays.

2.4 Zone Selection:

The HT is provided with various zones. Each zone is a grouping of 16 channels. To change zones, the following steps provide easy access to any channel/zone desired:

Fig 7

Changing Zones

1. Depress Single Dot button beneath ZONE

2. 'Select Zone' screen will appear

3. Use 4 Way Navigation button to scroll up or down to view different zones

4. Depress Single Dot button beneath SEL (Select) to select highlighted zone

Use Channel Selector Knob on top of radio to select desired channel in chosen zone



Note: The additional channels, zones and frequencies are an enhancement to FDNY communications. These additional channels afford broader communication capabilities at the Company level, as well as provide enhanced situational awareness.

2.5 XE500 Remote Speaker Mic (RSM)

Fig 8

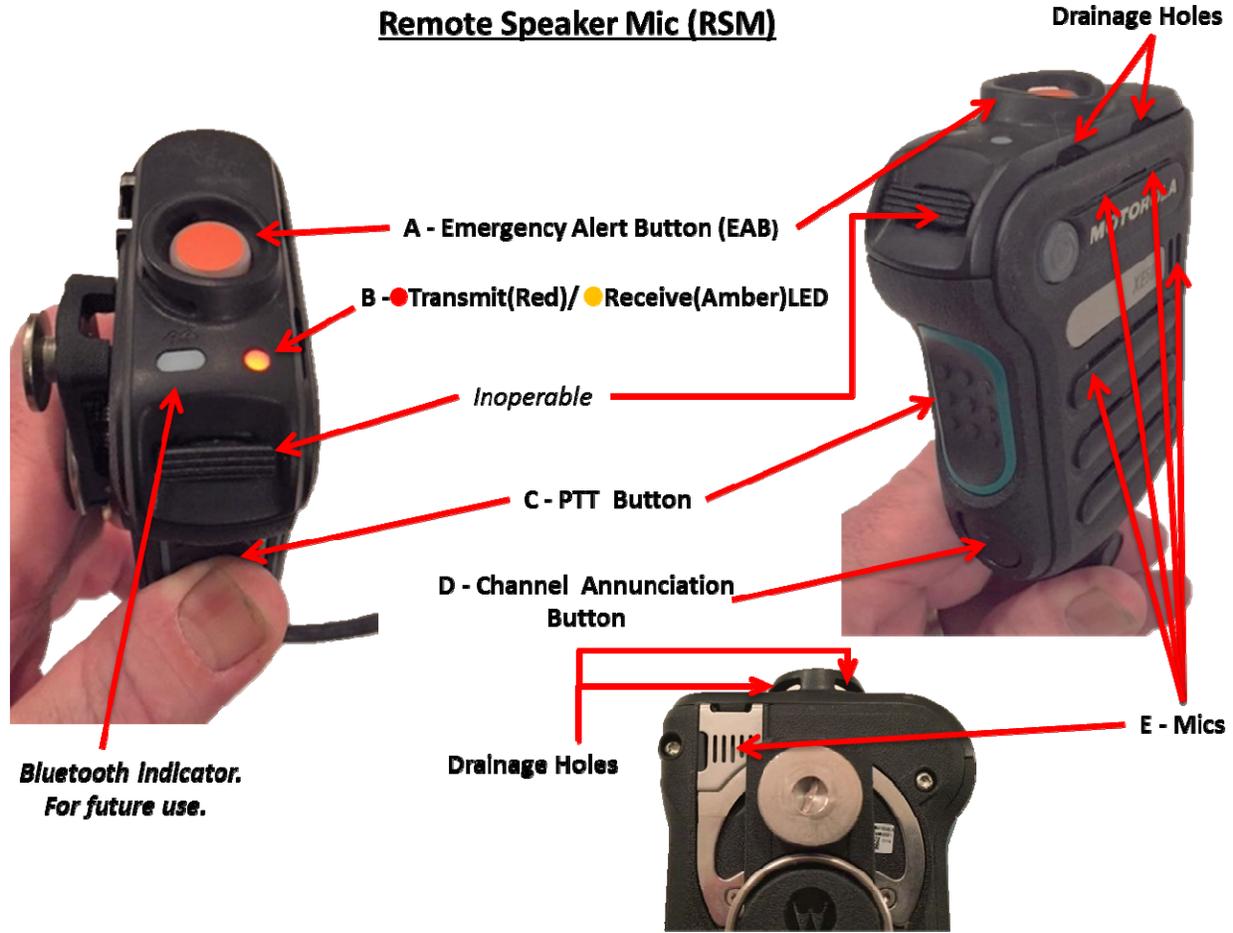
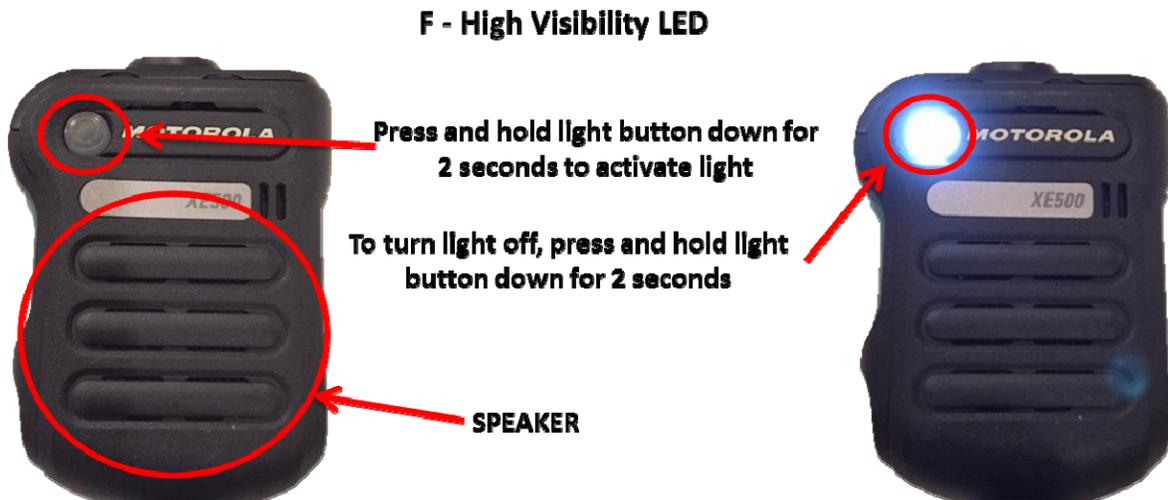


Fig 9



- A. Emergency Alert Button (EAB): Emergency alert button is used to activate emergency alert and has protective ring to reduce inadvertent Emergency alert activations.
- B. LED light on top is transmit/receive indicator:
 - Solid Red - HT is transmitting.
 - Blinking Red (while transmitting) - HT transmitting at low battery condition.
 - Blinking Red (while not transmitting) - HT is in Emergency Mode.
 - Solid Amber - Receiving transmission.
 - Blinking Amber - HT is receiving a secured transmission.
- C. Push-To-Talk (PTT) Button: The Remote Speaker Mic (RSM) includes a recessed PTT button located on the side.
 - Depressing the PTT button puts HT in the Transmit Mode - When the PTT button is depressed member should pause ½ second, allowing HT ID to be transmitted. When the PTT button is released at the end of a transmission, a tone will be heard through the microphone speaker. The tone level is proportional to the volume setting.
- D. Channel Annunciation Button: Depressing the button beneath the PTT button will announce the current selected channel.
- E. Mics: The RSM has 5 mics - 4 on the front and 1 on the back.
- F. High Visibility LED: A high visibility LED light is mounted in the front of the RSM for a visual indicator when the EA button is depressed. This LED light can also be used as a flashlight by depressing the light for 2 seconds. To turn off the light, depress the light for 2 seconds. The High Visibility LED illuminates 18.5 lumens at 120 degrees.

Fig 10

***Transmitting with RSM**

Gloved Hand – Do Not block/cover RSM Ports



Incorrect Hand Placement



Correct Hand Placement



NO SCBA Mask – Place RSM 1-2 Inches Away from Mouth



SCBA Mask – Place RSM DIRECTLY on Voicemitter

3. SPECIAL FEATURES

3.1 Water Resistance

The radio and the RSM are designed to be water resistant. Water resistance is highly dependent on proper use/connection and condition of the radio seal elements. Therefore, the radio should not be subject to unwarranted or casual submersion outside the function of firefighting or routine maintenance. (If radio becomes submerged, refer to Sec. 5 for proper maintenance).

3.2 Audible Tone at End of Transmission (a.k.a. Voice End Tone)

At the end of each transmission, the radio emits an audible tone to:

- 1) Inform the operator of the volume setting.
- 2) Indicate that the radio is functioning properly.
- 3) Signal the end of the transmission.

3.3 30 Second Time-Out-Timer

This feature cuts off the transmitter after 30 seconds of continuous transmission and is especially useful to correct the "stuck-button" problem. At the RSM, the radio emits a short audible warning tone at approximately 26 seconds and a continuous tone at approximately 30 seconds. This indicates that the transmitter has been shut off. The operator can re-key the PTT again if a longer transmission is required. This resets the Time-Out-Timer.

3.4 Voice Recognition

The RSM voice recognition feature captures the member's voice and reduces background noise, providing for clearer transmissions in noisy environments.

3.5 Emergency Alerts (EA):
Depressing Emergency Alert Button (EAB) until EA is activated, approximately 1 second, will cause the following actions.

3.5.1 Emergency Alert Activation:
Activation of the EA will cause the following actions on the members HT who depressed EAB.

Fig 11



3.5.1.1 **Audible Alerts:** When EAB is depressed, Audible Alerts are emitted.

Alert Tones: Alert tones are the audio signal transmitted to other HTs within range of the transmitting HT notifying others a member has activated his/her EA. This signal alerts members of a Mayday or Urgent situation. There are two types of alert tones; Impolite and Polite. The APX8000XE transmits One (1)-Impolite and Two (2)-Polite Alerts.

Impolite Alert - An impolite call is when the radio sends a transmission even when the channel is busy with other radio traffic, however it will NOT preempt any ongoing transmissions.

Note: Due to radio frequency (RF) anomalies, some radios may not receive the emergency alert. Proximity, concrete, steel, building construction, height, terrain and other factors can contribute to the individual member's radio ability to receive the transmitting member's EA.

Polite Alert - A polite call is when the radio sends a transmission when the channel is not busy with other radio traffic. Thereby, increasing the likelihood that other members will receive Emergency alert.

- Approximately 8 seconds after the impolite transmission, the Polite Alert is sent. Therefore, the Polite Alert may be more than 8 seconds after the Impolite Alert tone if other members are transmitting. The APX8000XE HT will transmit 2 Polite Alerts to attempt to reach as many members as possible.
- All 3 Alerts will be transmitted, regardless if members are transmitting or receiving messages. The Impolite Alert will go out first, followed by 2 Polite Alerts when the channel is clear.

Beacon Tone: Manual activation of a radio EA, will initiate an audible Beacon transmitted from that radio. This beacon is used to locate member that activated the EA. This audible beacon is emitted from members HT until it is reset by member.

Reset EA: EA may be reset by depressing EAB for 2 seconds, or by turning HT off and then back on.

3.5.2 Emergency Alerts Received

Activation of the EA will cause the following actions on the HTs that are receiving the EA.

Fig 12

Emergency Alert Activation - Receiving Radio

Main Display:

1. Displays EA received in Orange/Amber.
2. Displays identity of Radio Transmitting EA.
Either Alpha Numeric of new HT, or 7 digit ID of older models.
3. Holds display for approximately 8 seconds.



Top Display:

1. Displays EA RCVD in Orange/Amber
2. Alternates between, EA RVCD and Alpha numeric ID of radio transmitting EA.
3. Holds display for approximately 8 seconds.



Note: Older model HT's will only show 7 digit ID on APX8000XE HT's.

3.5.2.1 Transmissions received from member transmitting EA.

Emergency Call: Whenever a member who has transmitted an EA depresses the PTT button, members receiving such a transmission will observe Orange band with **Emergency call** appearing on Main display with Unit and Position. Similar information will scroll across the top display (Fig 12a). All transmissions from member will appear similarly until EA is cleared.

Fig 12a



3.5.3 Recall Emergency Alert (EA) and Recent transmissions.

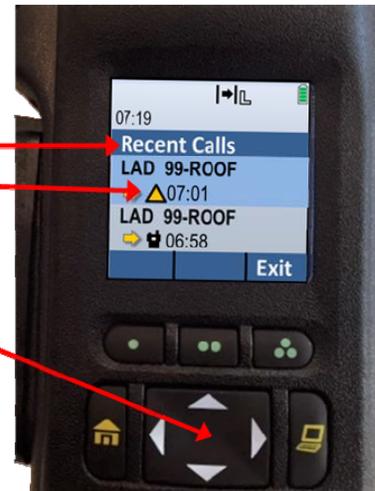
The IDs of the last 15 received transmissions (Recent Calls List) can be viewed in the following manner.

Fig 13

Recalling EA /Transmissions:



1. Depress double dot Menu button below Rcnt(Recent).
2. 'Recent Calls' screen appears.
3. The last 15 calls with radio ID will display from most recent to the previous 15 calls. Each call is time stamped. (Times not synced on radios)
4. Calls that display an Orange  were EA activated transmissions.
5. Use 4 Way Navigation button to scroll up or down to review the last 15 received transmissions.



NOTE: The Recent Calls (Rcnt) display is "static" it does not continue to populate PTT/transmissions/ID's or additional EA's while the Recent Calls(Rcnt) list is displayed. To view subsequent Recent Calls or EA's press triple dot button under Exit then go back to Recent Calls using the Rcnt double dot button

3.6 Backlight:

Depressing any button will illuminate both displays for approximately 20 seconds.

3.7 Channel Annunciation:

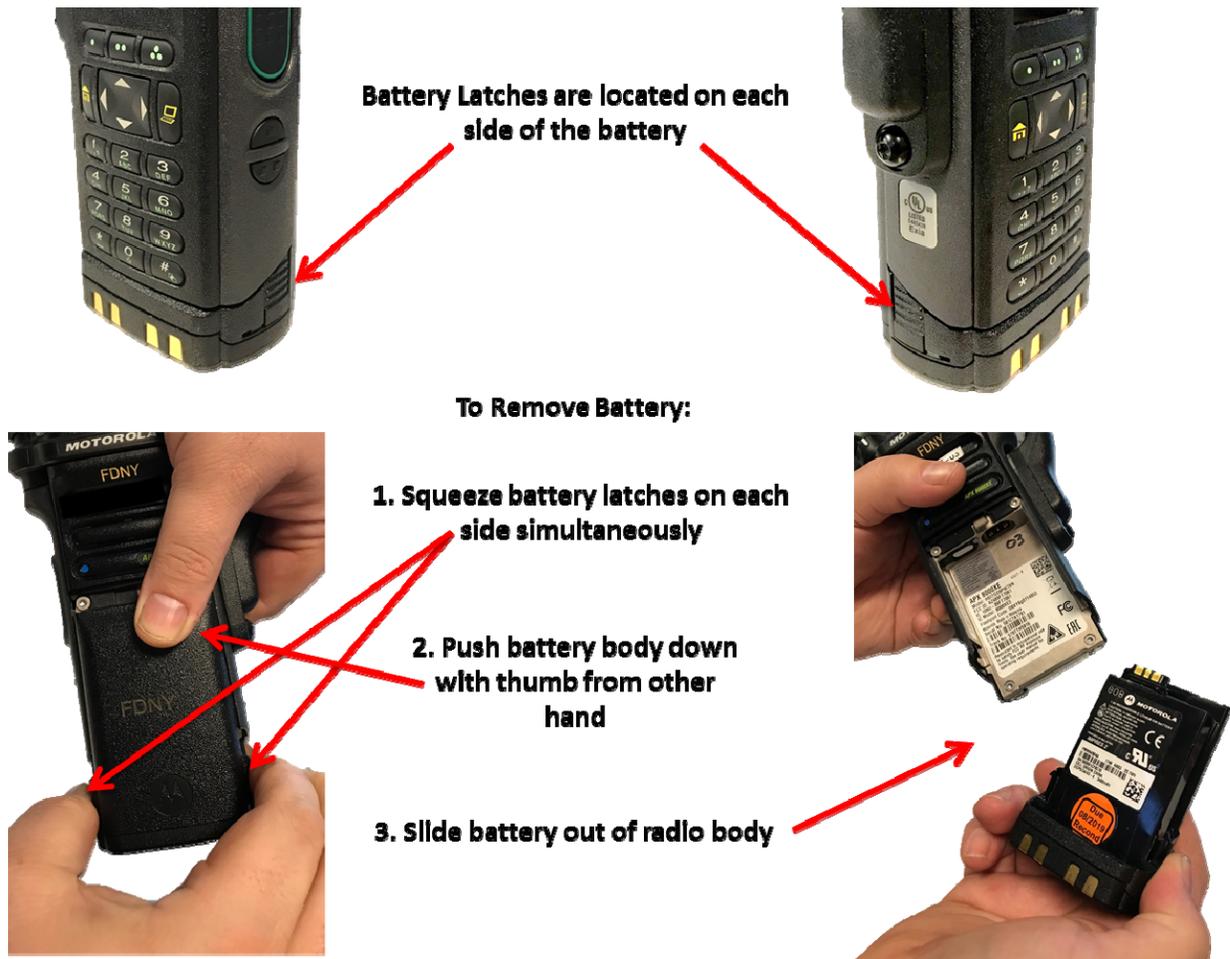
Channel annunciation will occur automatically when radio is turned on, and any time the zone or channel is changed. Member may confirm current channel they are on by depressing channel annunciation button on RSM just beneath the PTT button or the double square side button on the radio.

3.8 Batteries:

The APX 8000XE utilizes a Motorola Impres 2 lithium ion battery.

3.8.1 Removing battery:

Fig 14



3.8.2 Replacing Battery:

Fig 15

To replace battery:



1. Place battery into the slot on body of the radio



2. Slide the battery into position in the radio and ensure the battery latches are properly seated in the radio housing.



3. Push up firmly with the other hand until you hear the battery latches click into place.

4. EQUIPMENT DISTRIBUTION AND ASSIGNMENTS

4.1 The following shows the Alphanumeric designation as well as the 7 digit numeric ID for typical Units and Positions. Alphanumeric ID of HT will appear on main/top display and will also be displayed on screen of member receiving transmissions.

<u>Engines</u>	<u>Ladders</u>	<u>Rescues</u>	<u>Squads</u>	<u>Haz-Mat</u>	<u>BC Chiefs</u>	<u>DC Chiefs</u>
ENG 81-OFF (5081001)	LAD 46-OFF (7046001)	RES 3-OFF (1003001)	SQ 288-OFF (8288001)	HM 1-OFF (9001001)	BC 7-Chief (2407001)	DC 1-Chief (2301001)
ENG 81-ECC (5081002)	LAD 46-LCC (7046002)	RES 3-CHAUF (1003002)	SQ 288-Chauf (8288002)	HM 1-CHAUF (9001002)	BC 7-Aide (2407002)	DC 1-Aide (2301002)
ENG 81-NOZ (5081003)	LAD 46-Roof (7046003)	RES 3-ROOF (1003003)	SQ 288-ROOF (8288003)	HM 1-ENT1 (9001003)	BC 7-FAST (2407003)	DC 1-2 nd Aide (2301004)
ENG 81-BU (5081004)	LAD 46-OV (7046004)	RES 3-Hook (1003004)	SQ 288-Hook (8288004)	HM 1-ENT2 (9001004)	BC 7-DISPATCH (2407005)	DC 1-DISPATCH (2301005)
ENG 81-CONT (5081005)	LAD 46-FE (7046005)	RES 3-FE (1003005)	SQ 288-FE (8288005)	HM 1-BU1 (9001005)	BC 7-AUX (2407006)	DC 1-AUX (2301006)
ENG 81-DOOR (5081006)	LAD 46-CAN (7046006)	RES 3-CAN (1003006)	SQ 288-CAN (8288006)	HM 1-BU2 (9001006)		
		RES 3-OV (1003007)		HM 1-DCON1 (9001007)		
				HM 1-DCON2 (9001008)		

Note: Additional Unit ID #'s may be found in Addendum 4.

5. MAINTENANCE OF PORTABLE RADIOS

- 5.1 If the HT becomes wet at an operation, or has been submerged in water, remove the battery, dry HT and battery contacts before re-attaching battery to the HT.
- 5.2 If the remote speaker mic becomes wet, or submerged, water trapped inside the speaker grille and microphone can be removed by shaking the unit well.
- 5.3 The Field Communications Unit (FCU) shall carry a limited number of additional HTs with fully charged batteries for emergency use. HTs for emergency use shall be returned to the FCU as soon as they are no longer required.
- 5.4 Members should not remove or replace any accessories associated with the radio, including antenna and remote speaker microphone.
- 5.5 When HTs are sent for repair, they should be sent complete (radio, antenna, battery, and RSM) with defect and company number recorded on RT-2. Leather goods (cases and straps) should not be sent unless they need repair. (See addendum 4)
- 5.6 No items (keys, key fobs, etc.) shall be attached directly to the HT, case, antenna or RSM as this may cause interference with radio transmissions. Items may be attached to the HT strap; however, they must be secured in a manner that does not allow movement or contact with the HT, case, antenna or RSM.

- 5.7 Decontamination: Adhere to CFR-D manual Chapter 3 Section 15.6.
- 5.8 Functional Check, Inspection and Maintenance of the HT: including but not limited to radio, antenna, battery, RSM and cord shall be made (see Fig. 16):
- Immediately after the 0900 and 1800 hour roll calls.
 - After each use.
 - Members shall ensure that slots in radio charger are clear of dirt and debris prior to charging batteries. Wet batteries shall be wiped dry prior to charging.
 - No batteries with any physical damage shall be placed in a charger. They shall be placed out of service.

Fig 16

Maintenance and Inspection

1. Change Battery Every Tour.

Retrieve Battery from gang charger.



Check sticker to ensure battery not overdue for service. If overdue for service, exchange one for one at HT Depot. (See Addendum 1)

Insert Battery into HT and ensure clicks are heard and battery is seated properly.



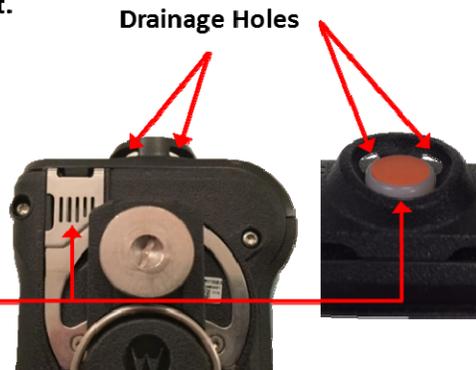
2. Ensure Remote Speaker Mic (RSM) Security Screw is hand tight.



3. Ensure antenna is hand tight.



4. Ensure Rear Mic and EAB are clear of debris.



6. RADIO FREQUENCY (RF) CHALLENGES, INTERFERENCE AND DEADSPOTS

- 6.1 Throughout the city, members will encounter areas that are RF (radio frequency) challenged. These areas include but are not limited to hospitals, prisons, big box stores, shopping malls, high rises, large OMD's, sewage treatment plants, power plants, tunnels and any structure of unique construction. The use of radio relay or alternate communications strategies shall be considered.
- 6.2 Members are reminded that while operating at routine alarm assignments and BI, if any of these areas are identified as RF challenged, they should be noted in the CIDS for the respective address.
- 6.3 Communication transmissions and reception can sometimes be improved by moving a few feet or turning one's body.
- 6.4 Some buildings throughout the city have been equipped with proprietary repeaters and amplifiers for their in-house two way communication needs. The potential exists for these systems to interfere with FD HT communications.
- 6.5 As with the previous handie-talkie models, unforeseen and isolated incidents of radio frequency peculiarities continue to be experienced which interfere with communications. This occurs due to proximity of radios, radios out of range or poor radio discipline.



BUILDING CONSTRUCTION

OBJECTIVE:	<ul style="list-style-type: none">• To introduce members to some of the different types of building construction and their relation to fire spread.• Familiarize members with basic building collapse.
CONTENTS:	<ul style="list-style-type: none">• Building illustrations• Construction features• Glossary of terms
FDNY SOURCE:	<ul style="list-style-type: none">• Firefighting Procedures:<ul style="list-style-type: none">○ Volume One: Books 1 – 6○ Volume Three: Book 3• Safety Bulletins<ul style="list-style-type: none">○ No. 85
OTHER REFERENCES:	<ol style="list-style-type: none">1. Brannigan, F. (1992). <i>Building Construction for the Fire Service</i>, (3rd ed.). Quincy, MA: National Fire Protection Association2. Captain Murphy, D. & Firefighter Molle, H. (2000, 3rd). More on gypsum roof deck systems, <i>With New York Firefighters (WNYF)</i>, p. 25.3. Dunn, V. (1988) <i>Collapse of Burning Buildings: A Guide to Fireground Safety</i>. Saddle Brook, NJ: Fire Engineering Books & Videos: a Division of Penn Well Publishing Company4. International Fire Service Training Association (1999) <i>Building Construction: Related to the Fire Service</i> (2nd ed.). Oklahoma: Fire Protection Publications, Oklahoma State University.5. International Fire Service Training Association (1998). <i>Essentials of Firefighting</i> (4th ed.). Oklahoma: Fire Protection Publications, Oklahoma State University.6. TenanetNet (2005). <i>NYS Multiple Dwelling Law</i>, Retrieved October 15, 2006, from http://tenant.net/Other_Laws/MDL/mdltoc.html

THIS PAGE WAS INTENTIONALLY LEFT BLANK

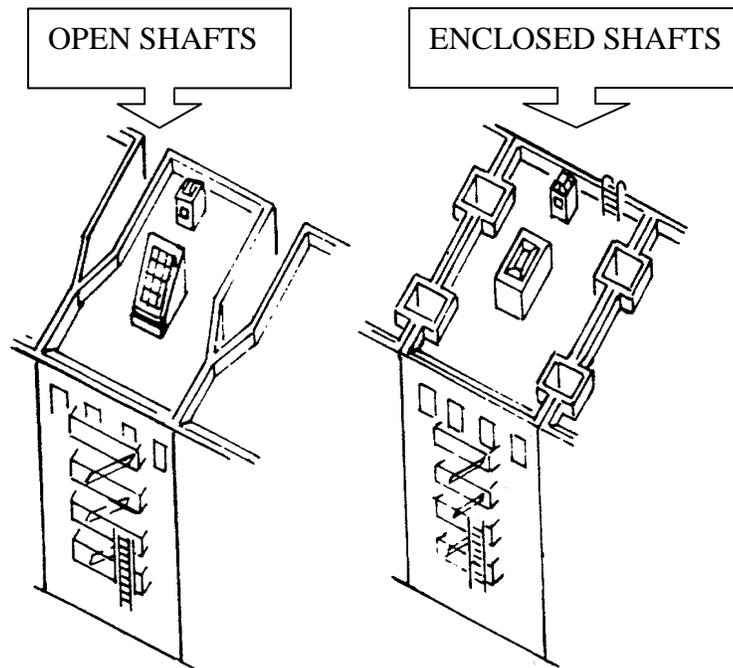
BUILDING CONSTRUCTION

<u>TITLE</u>	<u>PAGE</u>
<u>BEAMS</u>	1
<u>BUILDING CODES</u>	4
<u>COLLAPSE</u>	6
<u>BULKHEAD</u>	8
<u>FIRE ESCAPES</u>	14
<u>FRAMING</u>	17
<u>GYPSUM</u>	24
<u>LIGHTWEIGHT CONSTRUCTION</u>	26
<u>LOADS</u>	30
<u>ROOFS</u>	32
<u>STAIRS</u>	33
<u>STAIRWAYS</u>	34
<u>STRUCTURAL STEEL</u>	38
<u>TRUSSES</u>	43
<u>WALLS</u>	48
<u>WINDOWS</u>	49

THIS PAGE WAS INTENTIONALLY LEFT BLANK

AIR SHAFT

A space between buildings or between rooms within a building, provided for the purpose of admitting air and light to rooms.



**AUTO
EXPOSURE**

The extension of fire in or on the exterior of a building from fire originating in the same building

BASEMENT

A story partly underground but having at least one-half its height, measured from finished floor to finished ceiling, above the curb level.

CELLAR

A story having more than one-half its height from finished floor to finished ceiling below the curb level.

BEAMS

BEAM

A horizontal member used to carry loads perpendicular to its length.

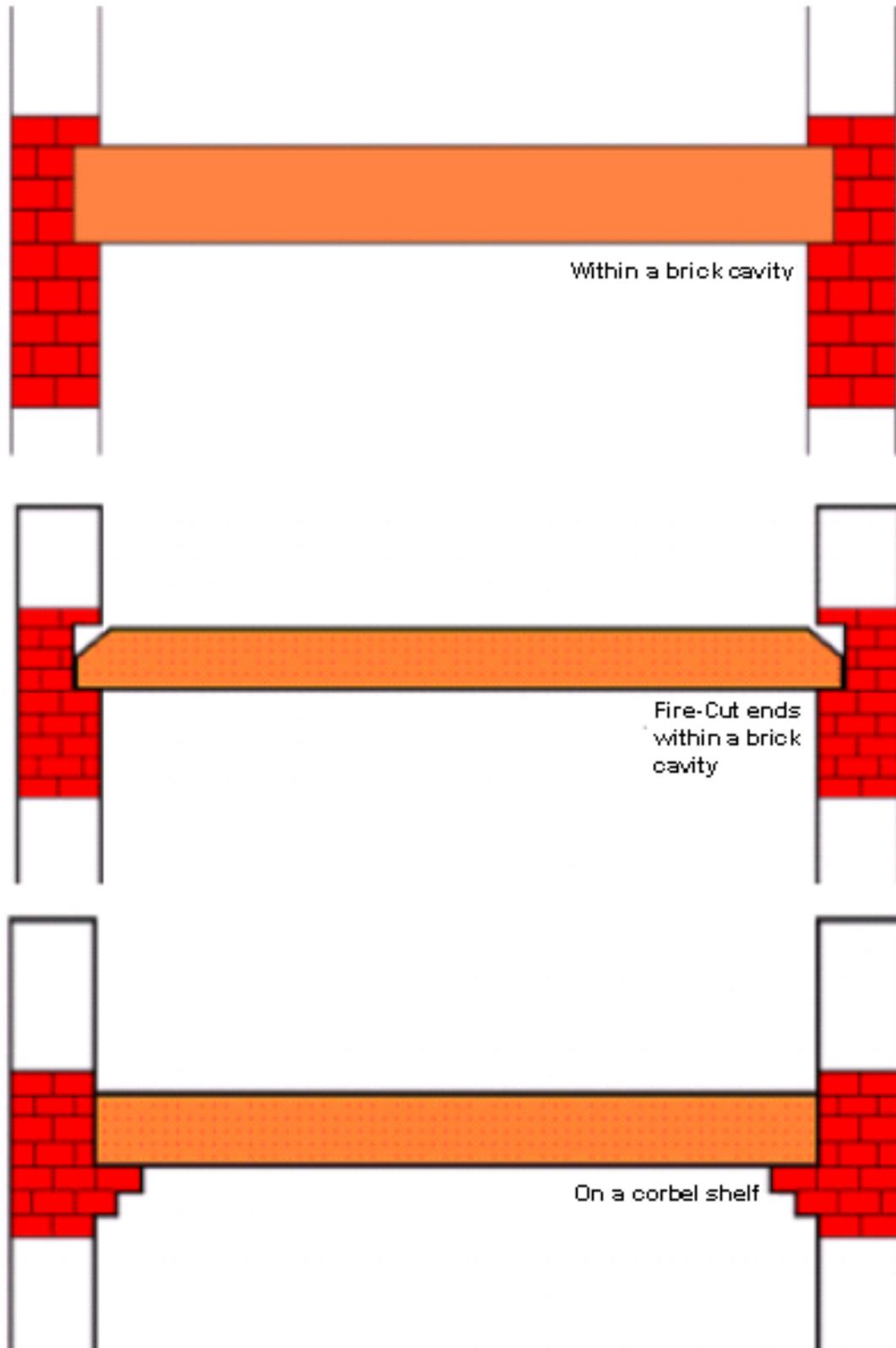
FIRE -CUT

A bevel cut at the end of roof beams in brick walls, leaving the beams free to fall if burned through without causing the walls to fall.

JOIST

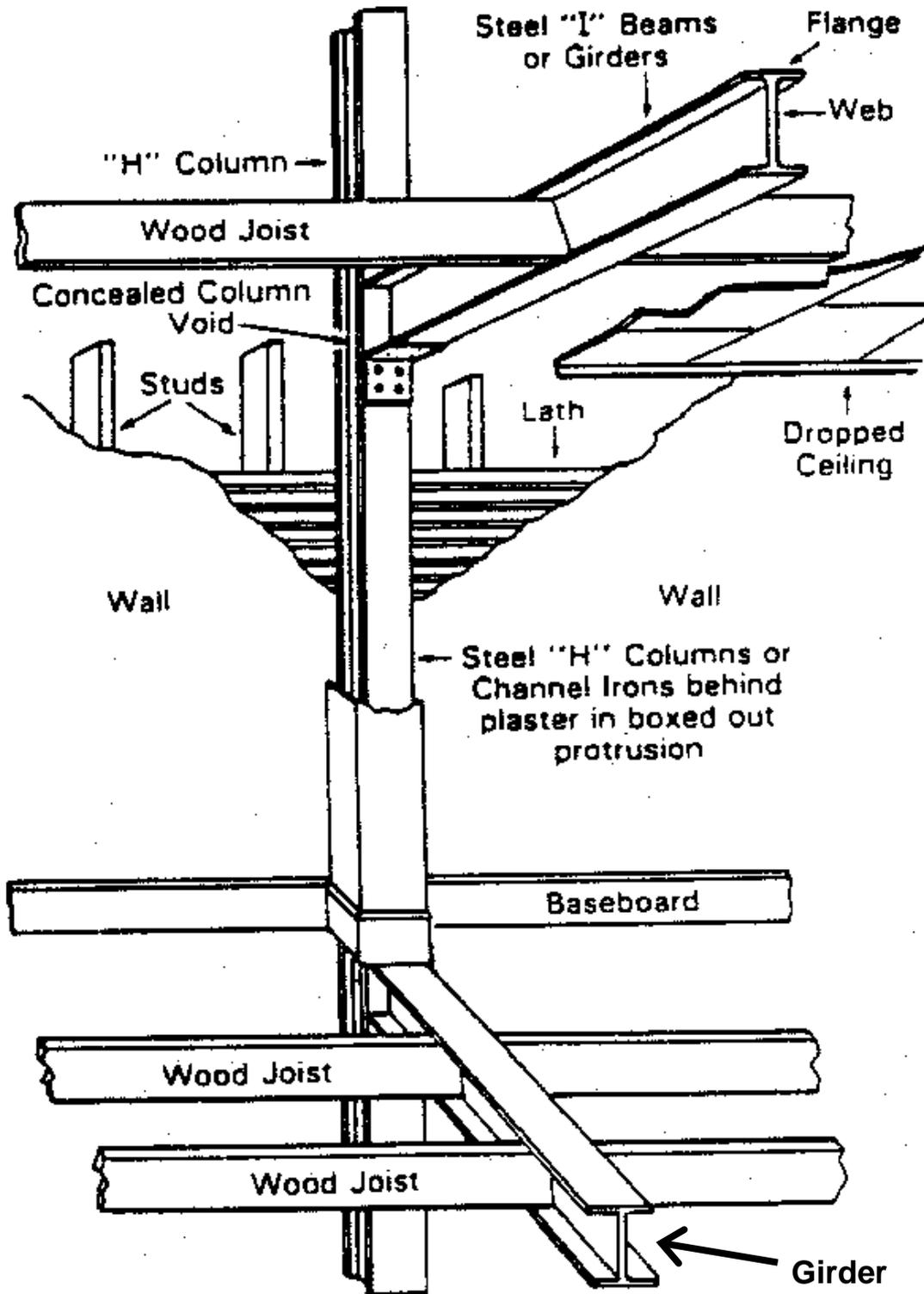
Closely spaced beams supporting a floor or ceiling.

Beams/joists can be supported by bearing walls in numerous ways:



Beams/joists can also be supported by other beams, known as girders.

GIRDER A horizontal structural member used to carry loads perpendicular to its length but larger in size to beam.



BUILDING CODES

1938 Building Code

Class 1:	Fireproof Structure
Class 2:	Fire-Protected Structure
Class 3:	Non-Fireproof Structure
Class 4:	Wood Frame Structure
Class 5:	Metal Structure
Class 6:	Heavy Timber Structure

1968 Building Code

Construction Group I - Noncombustible

I-A: 4 Hour Protected
I-B: 3 Hour Protected
I-C: 2 Hour Protected
I-D: 1 Hour Protected
I-E: Unprotected

Construction Group II - Combustible

II-A: Heavy Timber
II-B: Protected Wood Joist
II-C: Unprotected Wood Joist
II-D: Protected Wood Frame
II-E: Unprotected Wood Frame

CLASS "A" MULTIPLE DWELLING

A building housing three or more families in which residency is permanent in nature

CLASS "B" MULTIPLE DWELLING

A multiple dwelling which is occupied transiently.

FIRE PARTITION

A partition provided for the purpose of protecting life by furnishing an area of exit, or refuge, and having a fire resistive rating of at least three hours.

**1938 Building Code*

FIREPROOF CONSTRUCTION

A building in which the walls, floors, structural members and stairway enclosures are made of incombustible materials with fire resistive ratings as required by the Building Code,

FIRE RETARDING

any material or substance that is used to hold back the spread of fire for a rated period of time

FIRE STOPPING	the closing of all concealed draft openings to form an effectual fire barrier at floors, ceilings and roofs with brick, concrete, gypsum, asbestos, mineral wool, rock wool, metal lath with cement or gypsum plaster, or other approved incombustible materials.
FIRE WALL	<p>A wall provided primarily for the purpose of resisting the passage of fire from one structure to another or from one area of a structure to another, and having a fire resistive rating of at least four hours.</p> <p><i>*1968 Building Code</i></p>
RENOVATED BUILDING	<p>Any alteration to the original structural components, major or minor, that may effect fire fighting operations.</p> <p>“Alteration,” as applied to a building or structure, shall mean any change or rearrangement in the structural parts or in the egress facilities of any such building or structure, or any enlargement thereof, whether by extension on any side or by any increase in height, or the moving of such building or structure from one location or position to another.</p>
SINGLE ROOM OCCUPANCY	A multiple dwelling in which the apartments, which were formerly rented to families, are now rented as single rooms to unrelated people. These occupants use the kitchen and bathroom facilities in common.
VARIATION	Permission given by the Department of Buildings and/or Board of Standards and Appeal to construct a building in variation with the existing Building Code.

COLLAPSE

A collapse is one of the most dangerous operations a firefighter will encounter. The FDNY might be dispatched to a report of a collapse or one may happen during firefighting operations. Injured or disoriented people may require assistance, while others may still be trapped in the rubble.

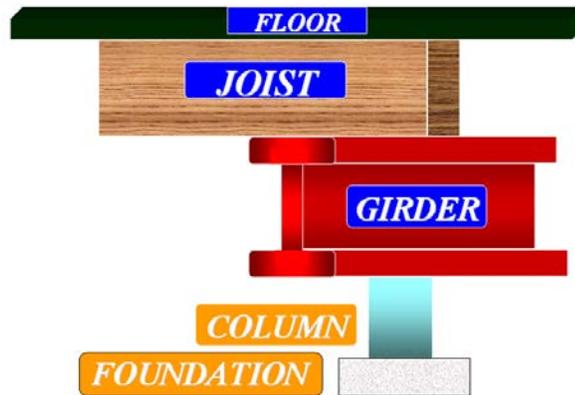
COLLAPSE ZONE The expected ground area a falling wall will cover when it collapses. It is at least the distance away from the wall which is equal to the height.

Horizontal Collapse Zone – width of the structure

Vertical Collapse Zone – height of the structure

PRIMARY STRUCTURAL MEMBER

A structure that supports another structural member in the same building, such as a bearing wall, a column, or a girder. The collapse of a primary structural member will often cause the collapse of the structural member it supports.



SPALLING

Loss of surface material when concrete (or stone) is subjected to heat. It is due to the expansion of moisture in the concrete. Explosive spalling occurs violently, throwing bits of concrete projectiles (Brannigan 331.).

CAUSES OF COLLAPSE

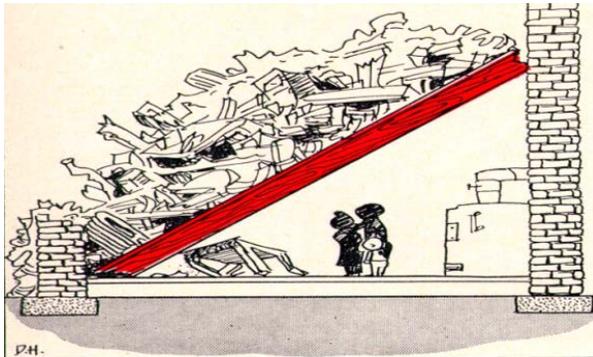
Structural Weakness:

- Accumulation of snow or rain on the roof
- Overloading of floors
- Backdrafts/Smoke Explosions
- Fires
- Excavations
- Improper Renovations
- Weather – earthquakes, winds etc.
- Impact load from a collision

WARNING SIGNS

- Plaster sliding or falling off of walls
- Prolonged burning
- Sagging floors due to excessive water
- Traveling cracks
- Walls/columns bulging out of alignment
- Sounds – e.g. creaking, rumbling, etc.

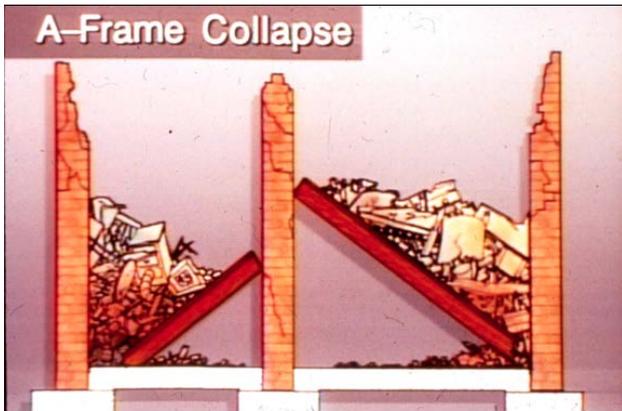
TYPES OF COLLAPSES



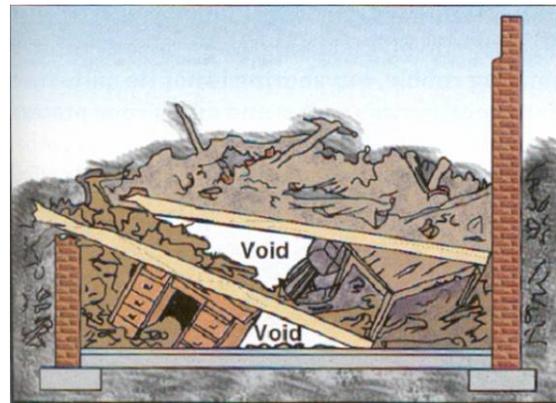
SUPPORTED LEAN-TO



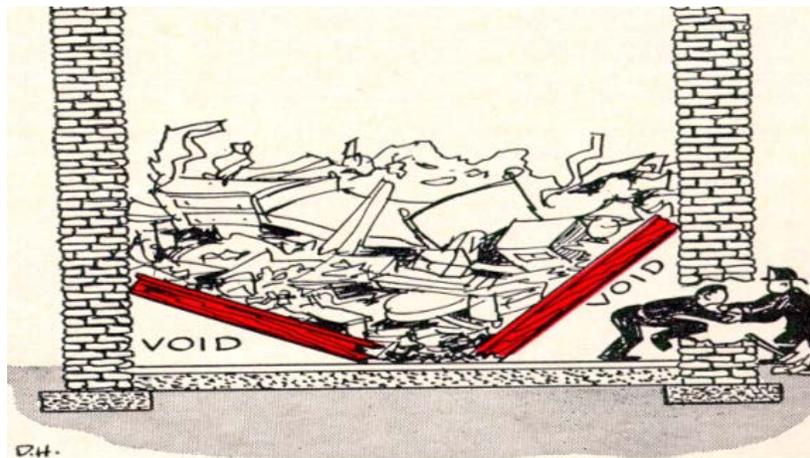
CANTILEVER COLLAPSE (UNSUPPORTED LEAN-TO)
GREATEST POTENTIAL FOR SECONDARY COLLAPSE



A-FRAME



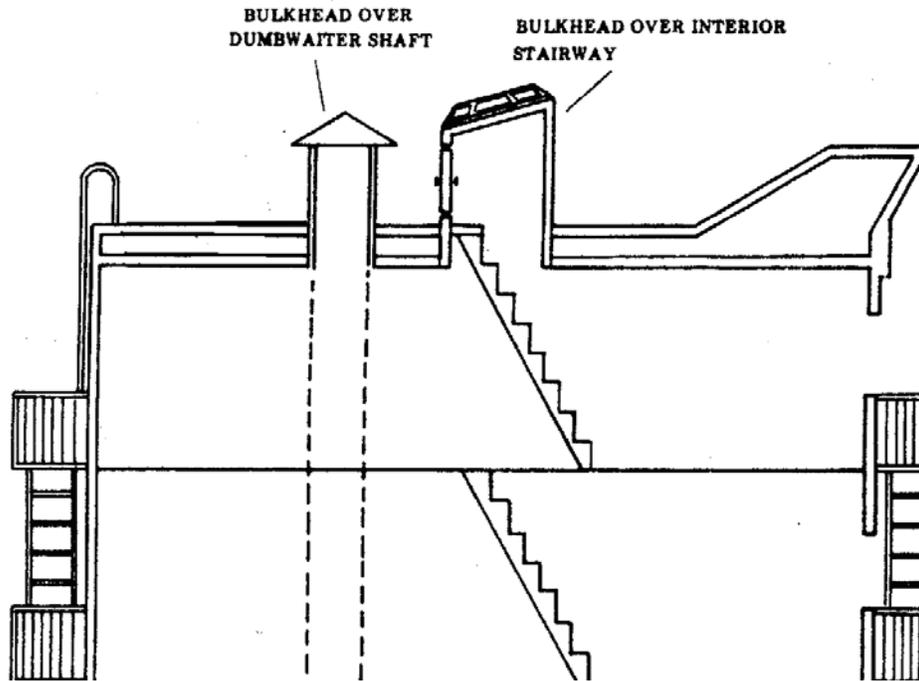
PANCAKE



V-SHAPED

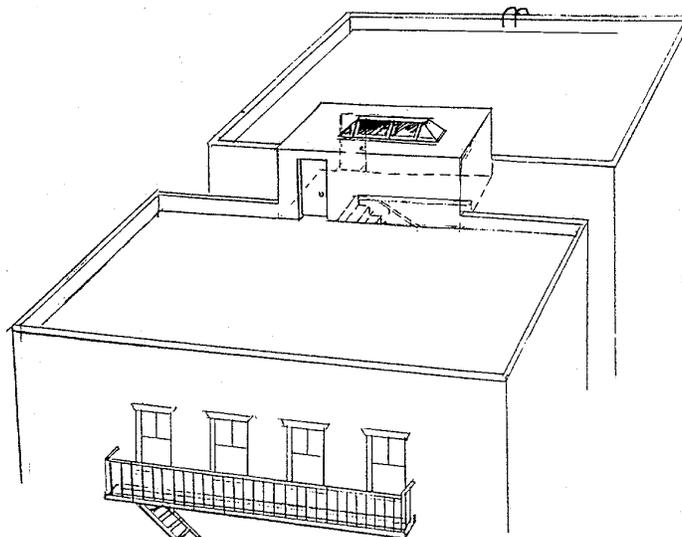
BULKHEAD

Any structure on the roof of a building enclosing stairways, tanks, elevator machinery or other accessories to a structure.



WALK THROUGH BULKHEAD

A structure at the uppermost portion of interior stairs that may isolate the front section of the roof from the rear. One must walk through the bulkhead to reach the other section of the roof.

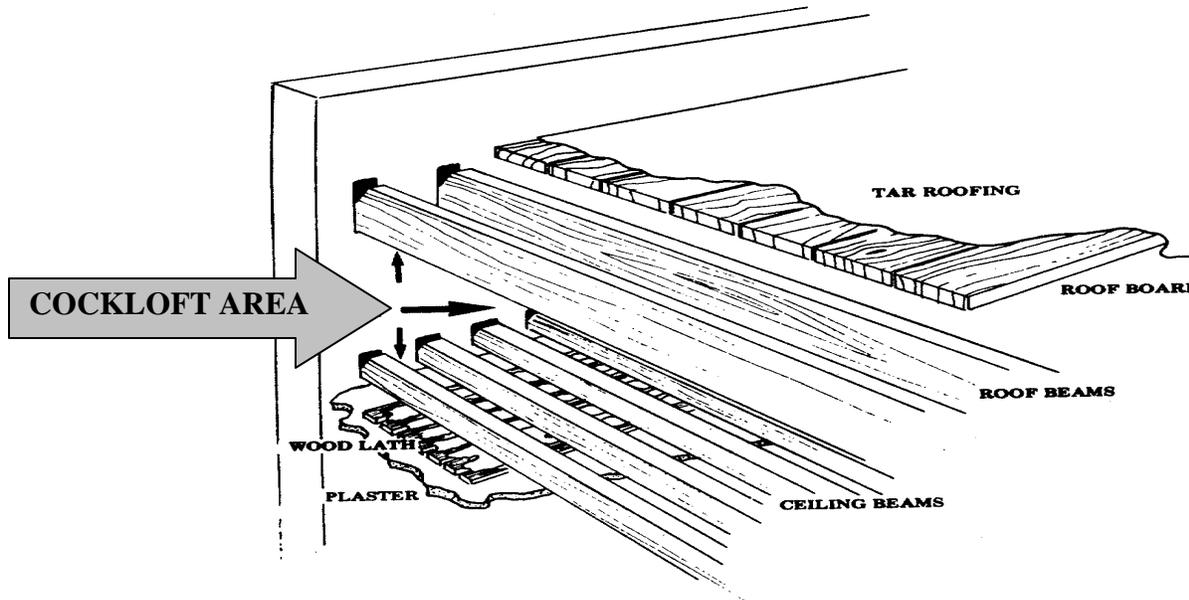


CANTILEVER a horizontal structural member supported on one end only



COAMING A raised frame around a floor or roof opening or scuttle to keep water from running in.

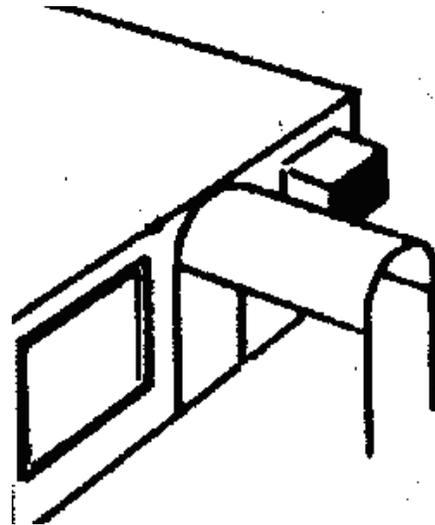
COCKLOFT The space between the roof and the top floor ceiling. Fire may enter the cockloft through recesses, voids and ducts.



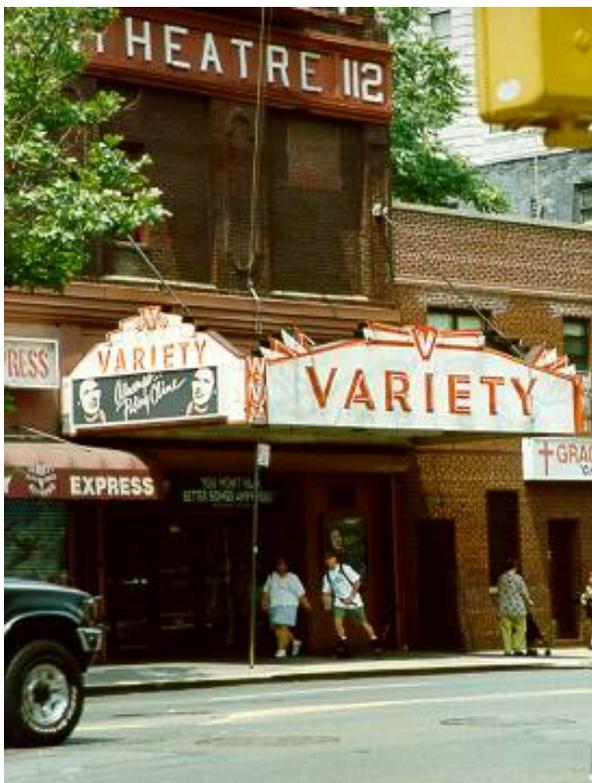
COMMON COCKLOFT Open all the way from one end of a row of houses or stores to the other end.

CORBELLING Course of brick built out from the face of a wall, as steps in reverse.
**See definition of parapet for illustration*

CANOPY A supported, roof like covering which projects from a wall as an ornamental feature.



MARQUEE A permanent hood which projects over an entrance to a building and is not supported by posts or columns.



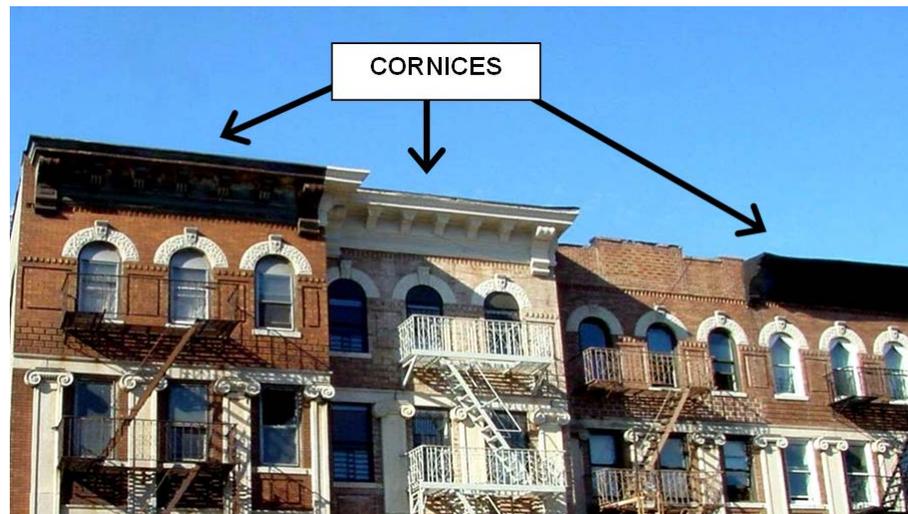
COLUMN

A vertical member in structural frame used to transfer floor and roof loads to the foundation.



CORNICE

Decorative trim at the roof line. Made of metal, wood or masonry, which tops the front wall & projects from it (Brannigan 194.).

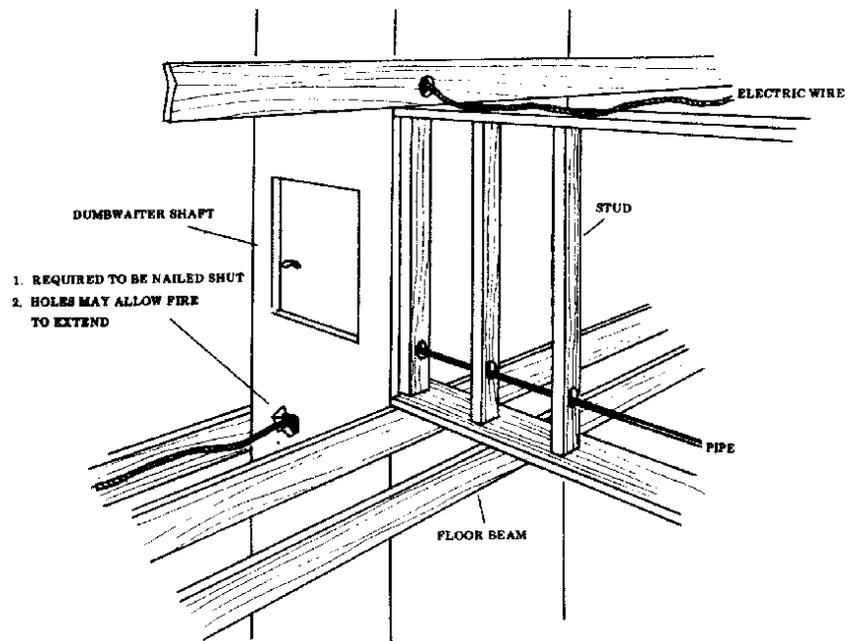


COPING STONE Top masonry tile or stone of a parapet wall, designed to carry off rainwater. Sometimes called a “capstone,” it weighs between five and fifty pounds (Dunn 18.).



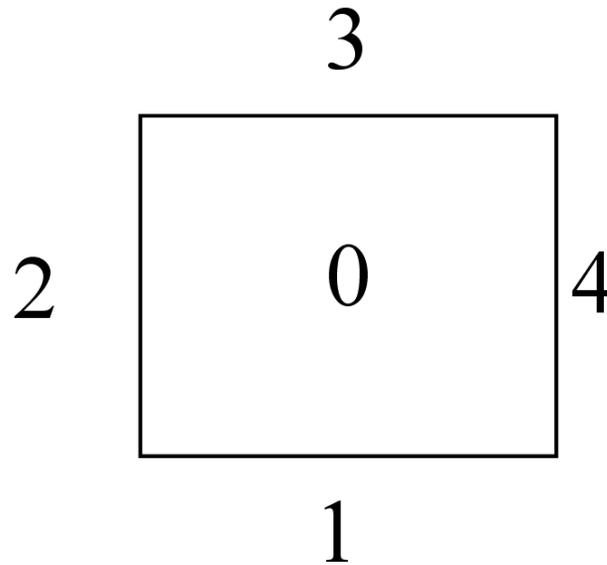
COMPACTOR A device for crushing garbage and trash into a small space prior to removal from the premises

DUMBWAITER A device for collecting garbage from apartments by means of a wooden car which is raised and lowered in a vertical shaft by means of a rope and a pulley. In most buildings having these dumbwaiters they are no longer used



EXPOSURES

A system of designating the areas or buildings which are adjacent to the fire building. When facing the main entrance to the fire building, exposure #1 is in front of the building, #2 is on the left, #3 is to the rear of the fire building and #4 is on the right.



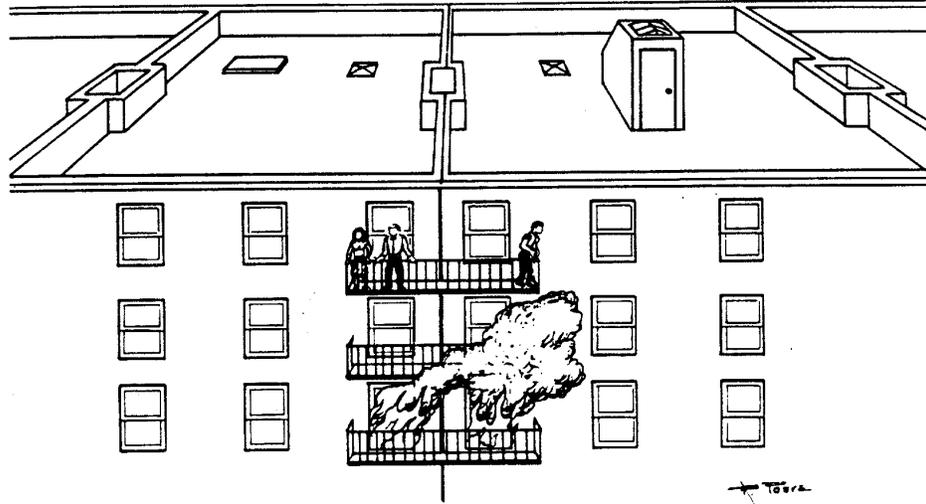
FIRE ESCAPE An emergency means of egress from a building consisting of metal balconies on the outside of a building connected by ladders to each other and to the ground. Some fire escapes have a ladder from the top floor balcony to the roof.

DROP LADDER A vertical ladder normally held in the "up" position at the second floor balcony of the fire escape by a hook. When this ladder is to be used, the hook is released and the drop ladder is lowered or dropped to the ground. Care must be exercised to make certain that no one is struck by this ladder when it is lowered or dropped to the ground.



**PARTY WALL
BALCONY**

A structure built as an emergency means of egress from a building which will afford lateral access to an adjoining building or apartment separated by a fire wall. They do not have ladders to ascend or descend from floor to floor or the roof.



**COUNTER
BALANCED
STAIRWAY**



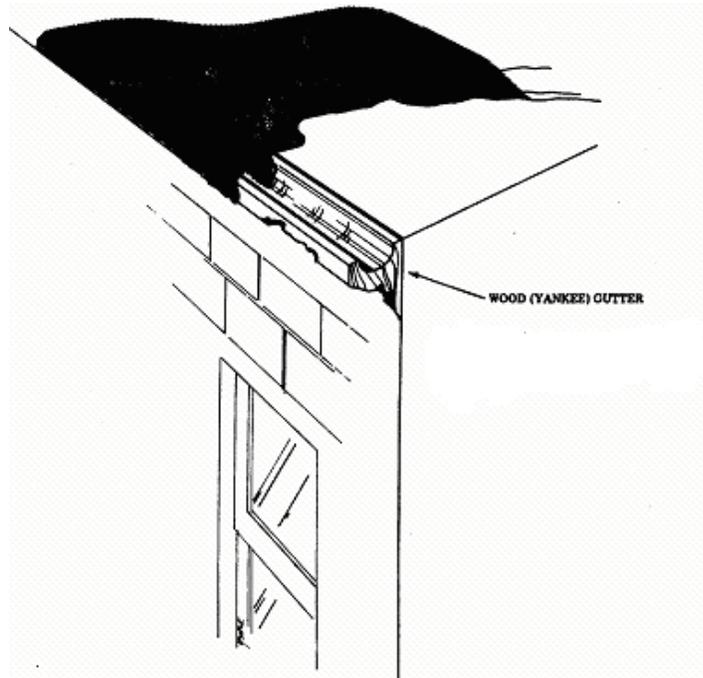
**GOOSENECK
LADDER**

A vertical ladder, the side rails of which are curved at the top. This type of ladder is sometimes used between the top floor balcony of a fire escape and the roof.



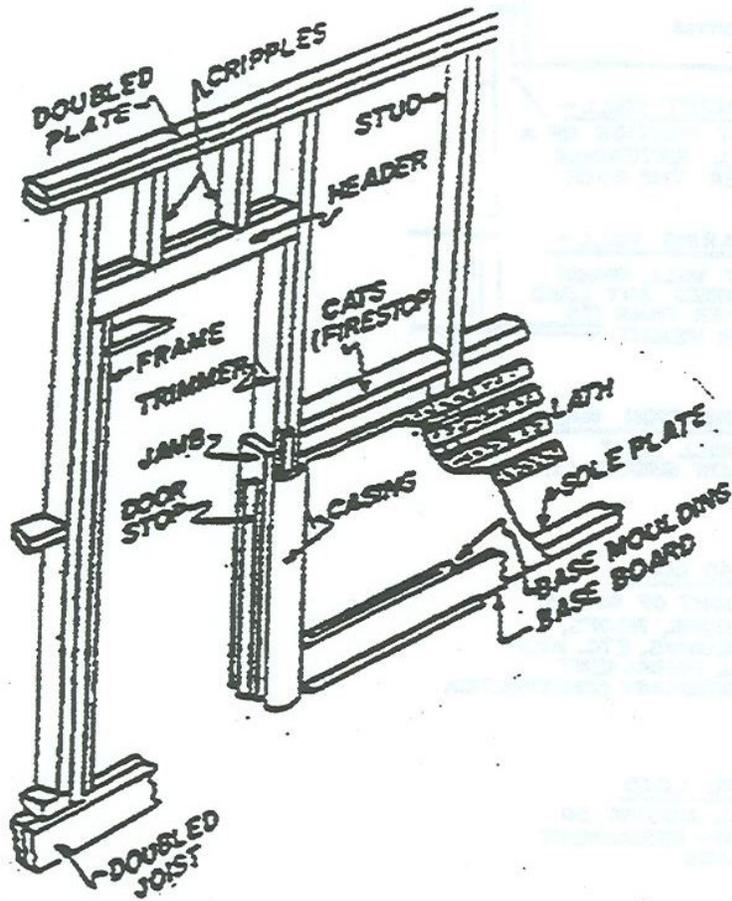
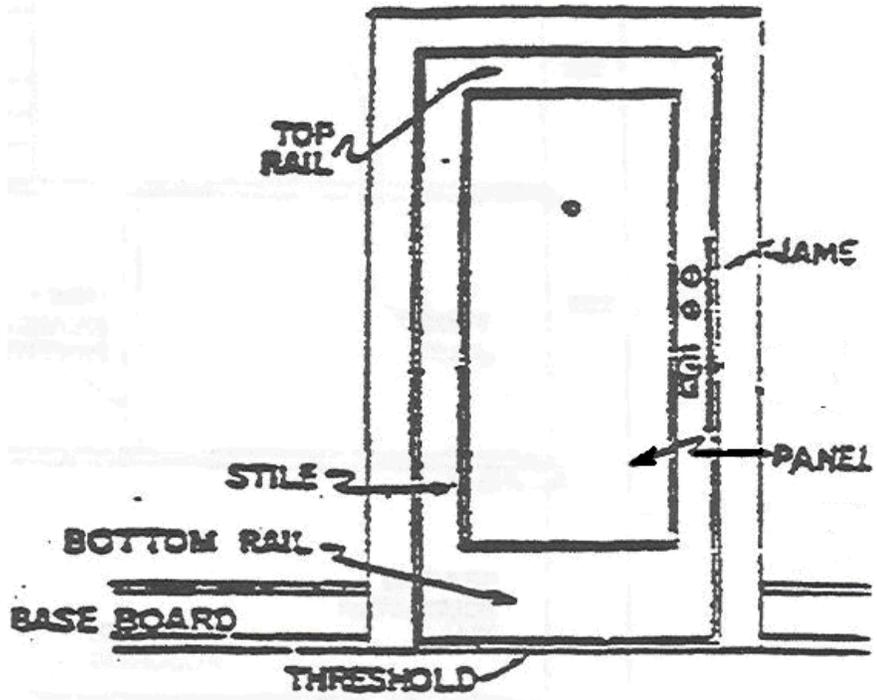
**WOOD (YANKEE)
GUTTER**

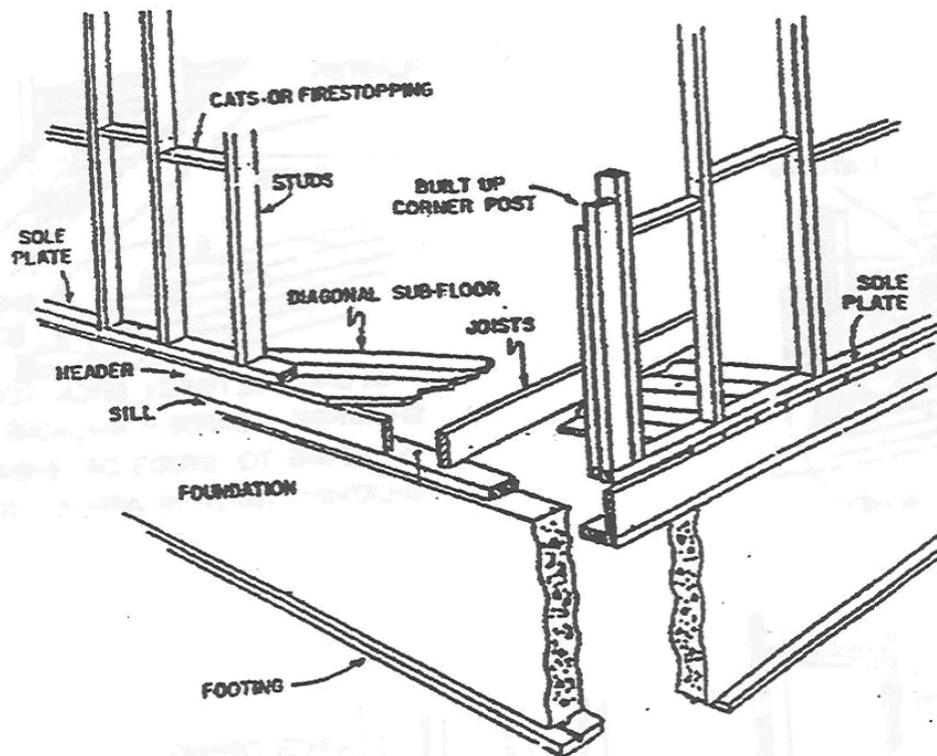
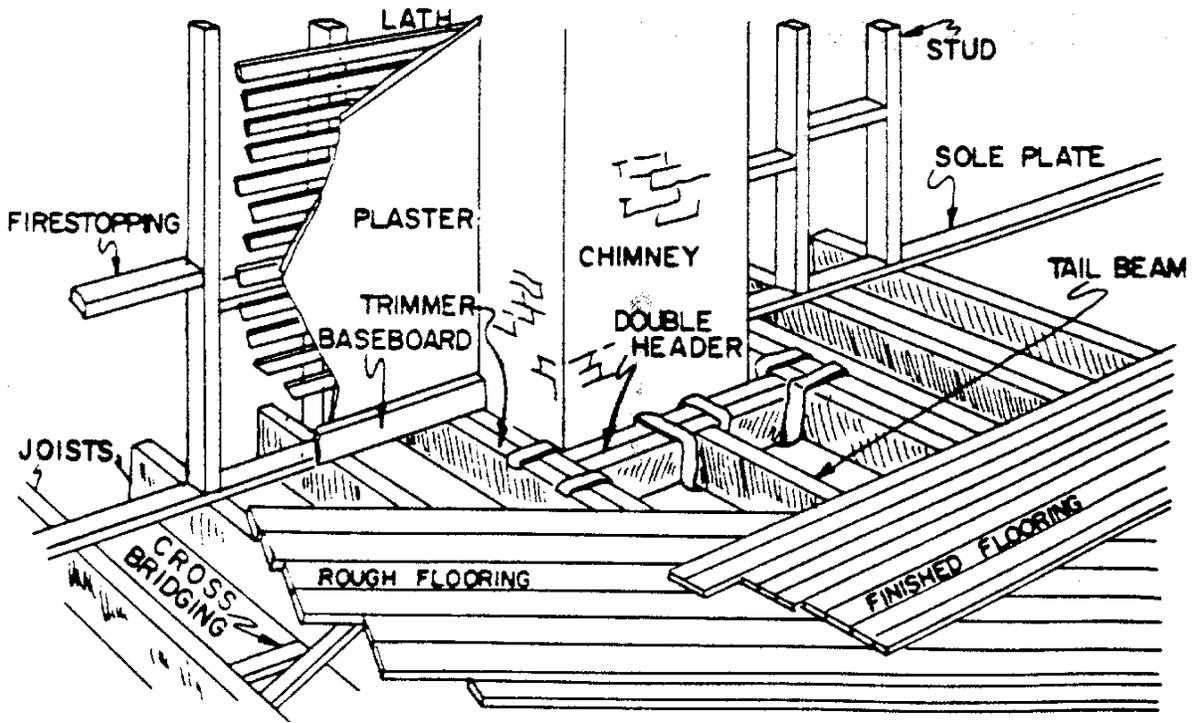
Found on most Brownstones. They can be dangerous, since they are made of wood and then tarred over many times. Usually rotted.



FRAMING

BAYS	The open area between either studs, in a wall, or beams in a floor or a roof
FIRE STOP (CATS)	A strategically located structural component designed to prevent the horizontal and/or vertical spread of fire in walls, partitions, floor, roof and other areas of a building.
HEADER	A beam which carries the ends of beams which are cut off in framing around an opening.
LALLY COLUMN	A vertical structural member consisting of a steel pipe filled with concrete.
LINTEL	<p>A horizontal building member, supporting the weight above an opening, such as a window or a door.</p> <p>When overhauling, lintels should not be removed, regardless of charring, as they support a considerable amount of brickwork.</p> <p><i>*See definition of parapet for illustration</i></p>
NOGGING	Brick filling between studs
RAFTER	Closely spaced beams supporting the roof and running parallel to the slope of the roof.
RIDGE	The horizontal line at the junction of the top edges of two sloping roof surfaces.
RIDGE BOARD (POLE)	The board at the ridge to which the rafters of both slopes of the roof are nailed.
SLEEPER	Wood strips imbedded in concrete to provide a nailing base for the under flooring
SOFFIT (EAVES)	The underside of subordinate structural members.
STUD	Vertical structural elements in a wall or partition arranged in rows and used for the support of lath, plaster wall board, etc.
TAIL BEAM	A beam which frames into the header instead of spanning the entire distance between supports.
TRIMMER	A beam at the side of an opening and carrying one end of a header.
FURRING (LATH)	A light frame of wood or metal strips applied to a surface to support plaster, stucco or other surfacing materials.



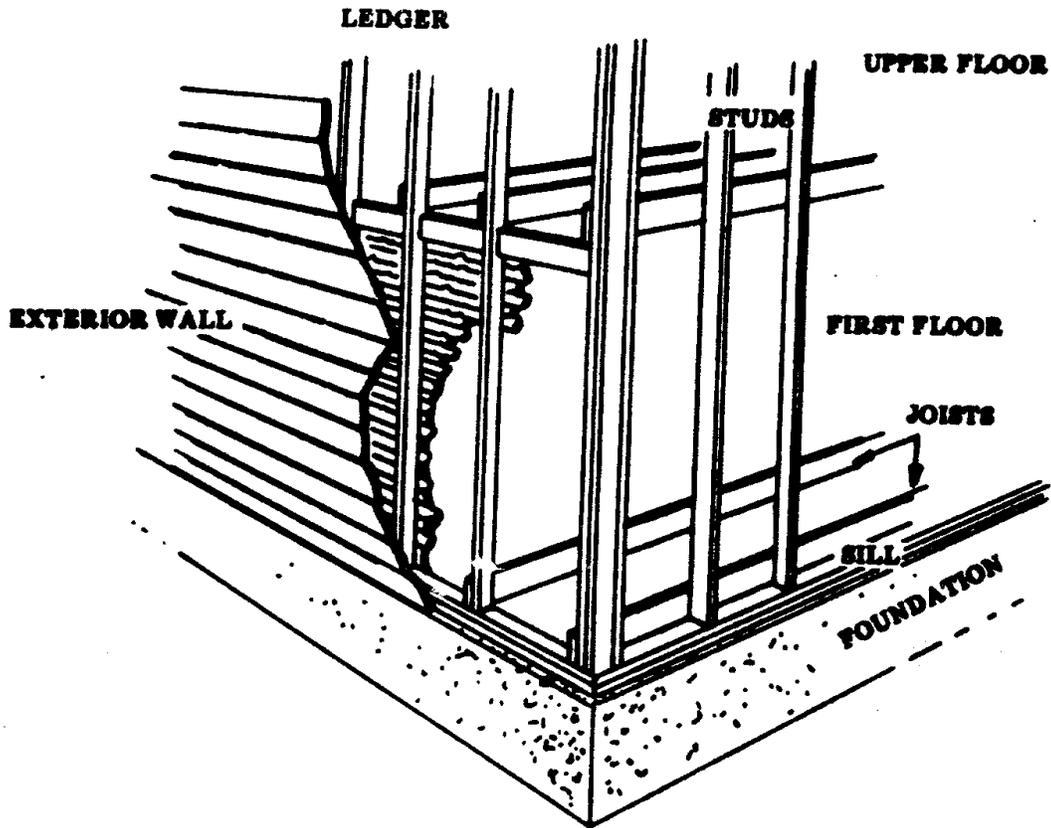


BASIC TYPES OF WOOD FRAMING

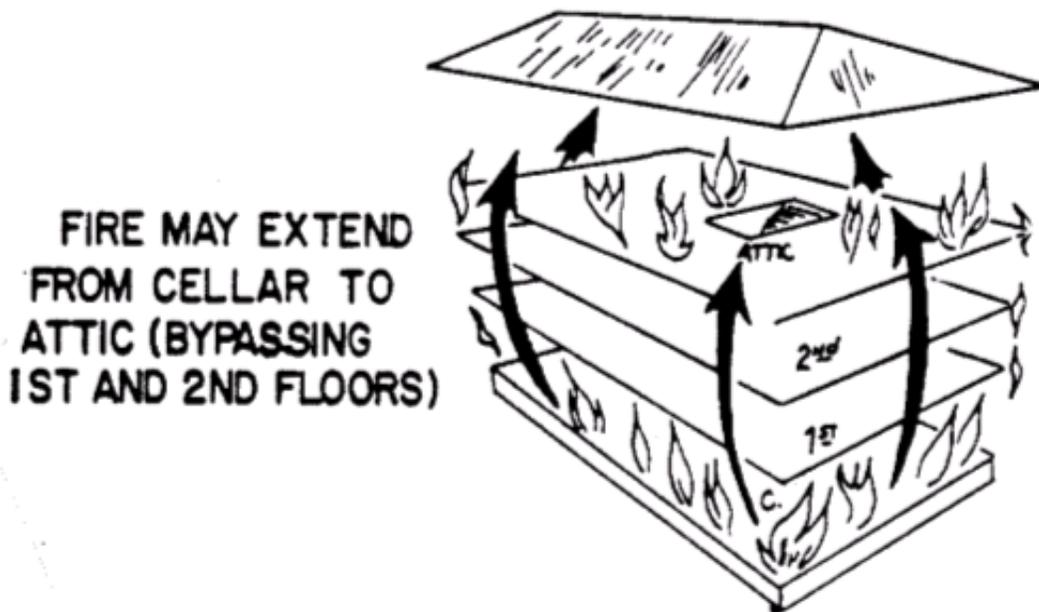
**BALLOON
FRAMING**

In balloon framing construction, fire can easily extend vertically. Studs and corner posts are continuous from the sill to the top plate. The side wall studs, at a point of the upper floors, are notched out and a 1 x 4 is fitted and nailed into the studs. This is known as the ledger board. The ledger board supports the floor joists of the upper floor.





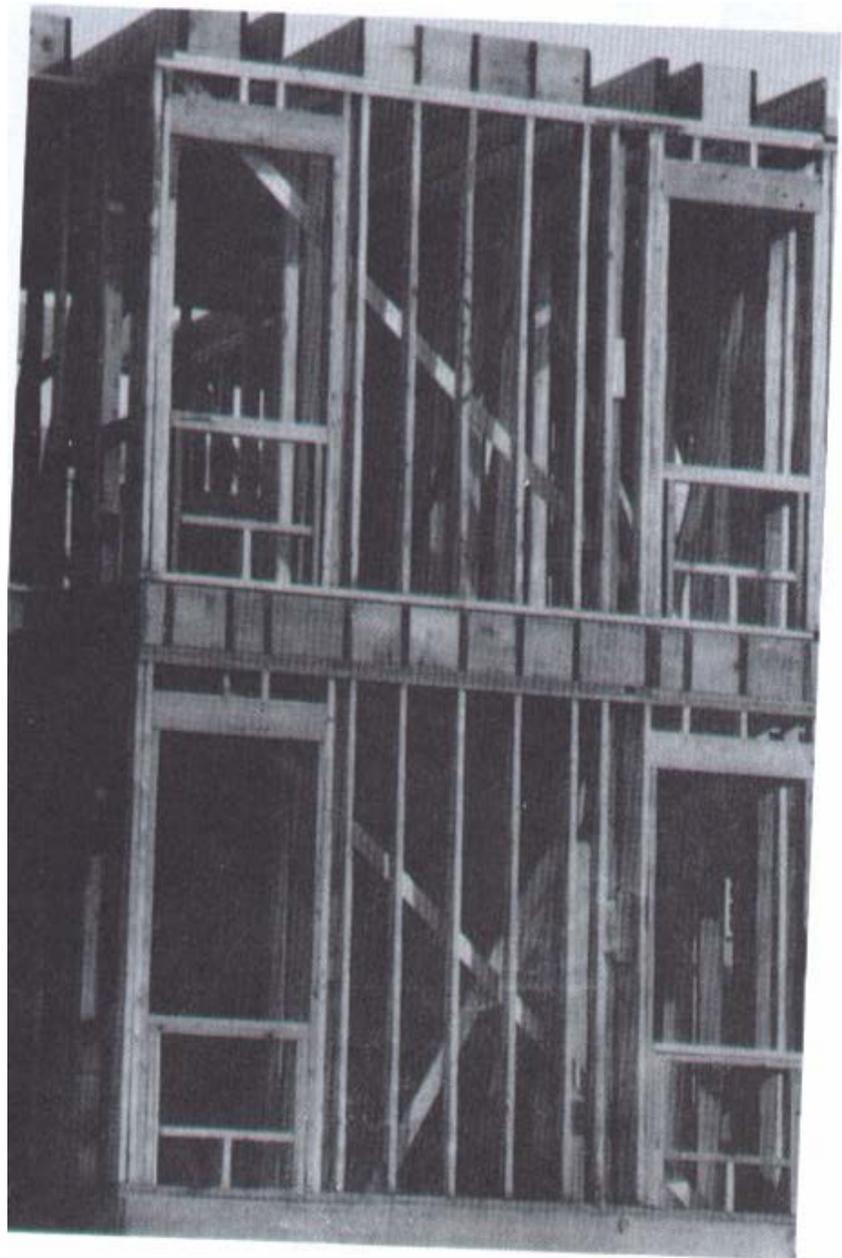
**BALLOON CONSTRUCTION
PERMITS FIRE EXTENSION**

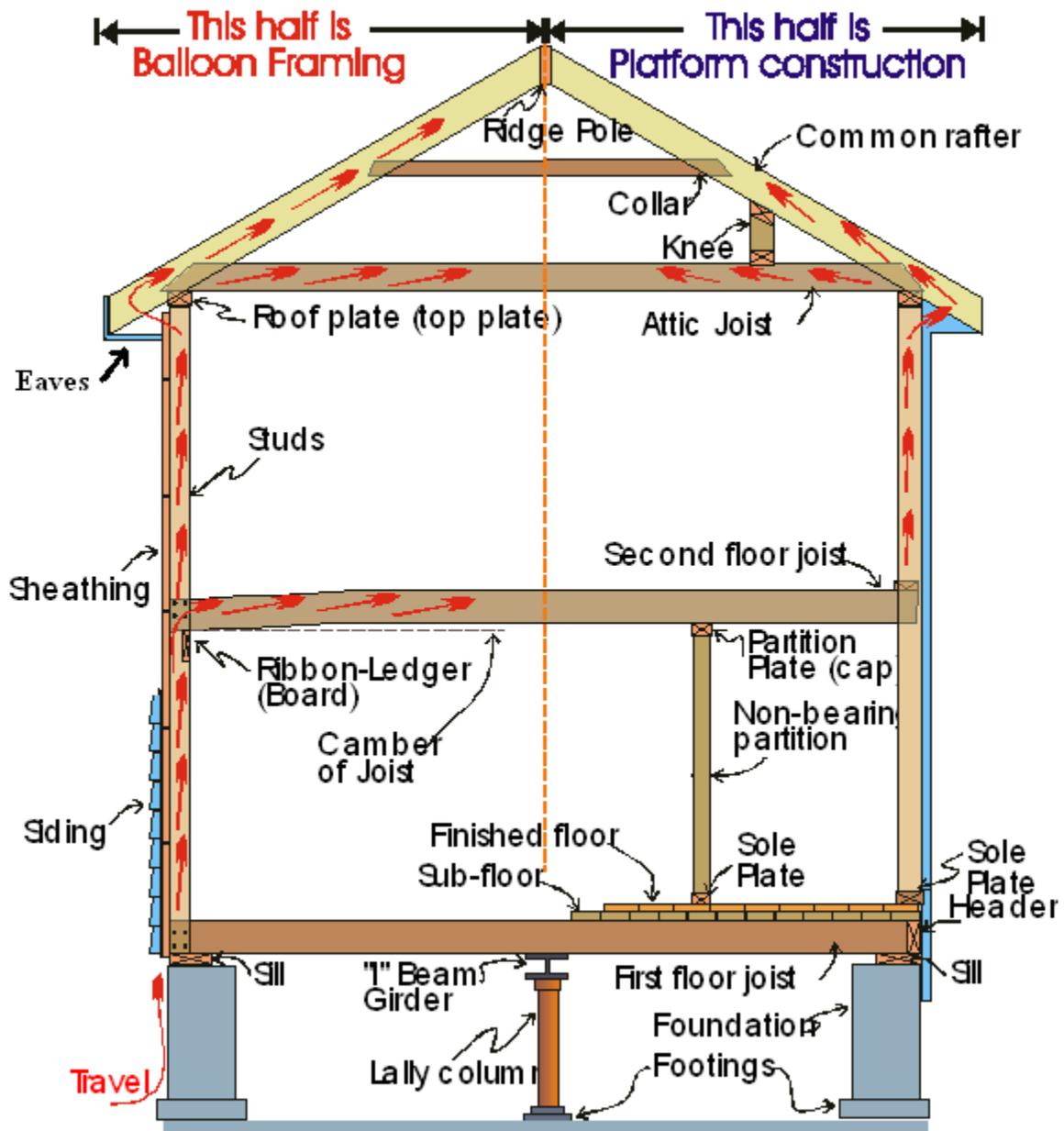


**PLATFORM
FRAMING**

Each level is completed separately. The floor beams and deck for the next higher level are constructed on top of the lower story.

From a fire protection standpoint, platform construction is superior to balloon, because there are no concealed wall voids extending for more than one floor level (Dunn).

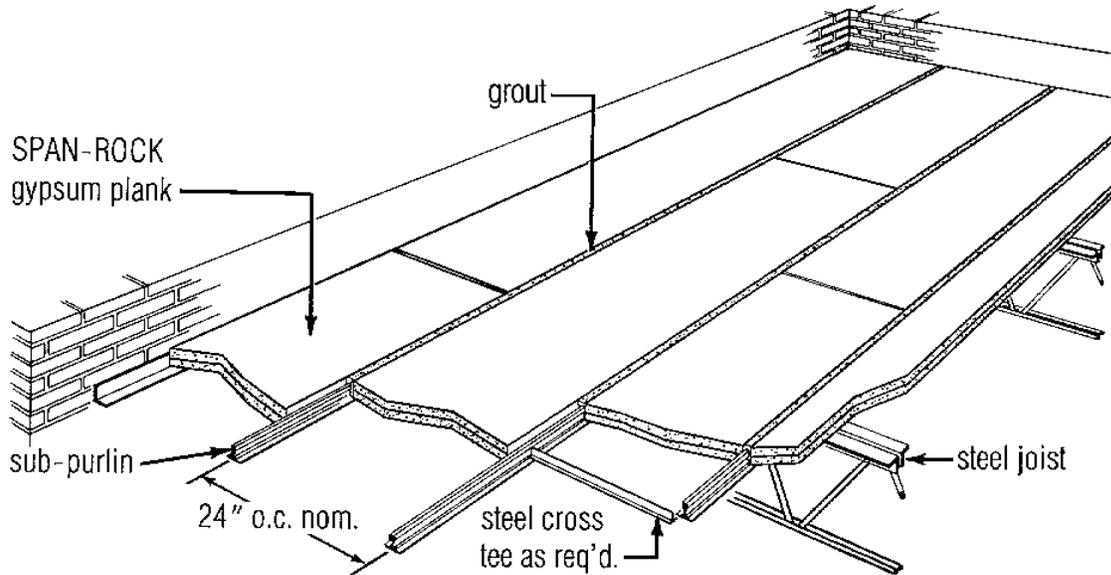




**GYPSUM PLANK
ROOF DECKING**

Gypsum planks are normally 2 inches thick, 2 feet wide and 8 feet long and factory-laminated of two gypsum panels. Each plank weighs approximately 135lbs.

GYPSUM PLANK DECKING SYSTEM

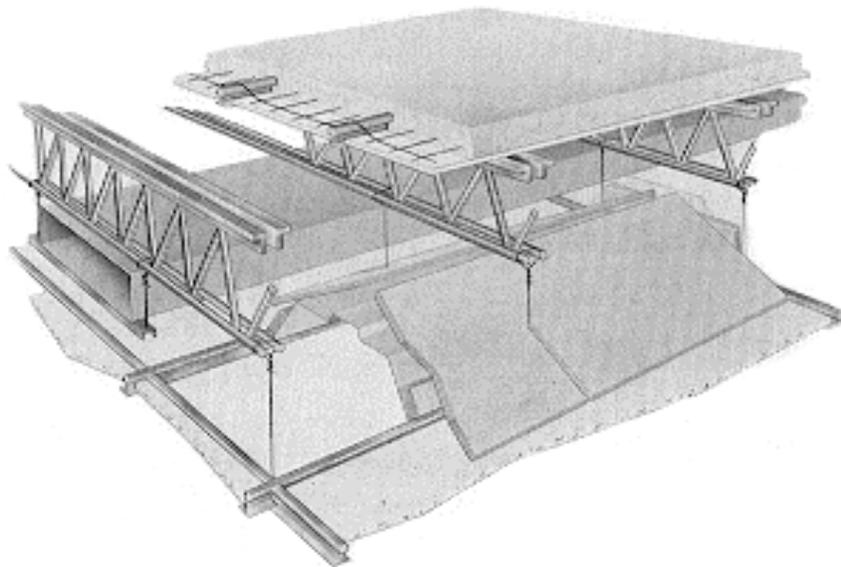


Construction details/flat roofs

**GYPSUM CONCRETE
ROOF DECKING**

Gypsum concrete is mill formulated and composed of calcined gypsum and wood chips or shavings. It is usually poured to a 2 inch thickness and weighs approximately 17.5 lbs. per square foot (280lbs compared to the size of a Gypsum plank).

GYPSUM CEMENTERY ROOF SYSTEM



Deck With Ceiling

SAFETY CONCERNS OF GYPSUM ROOF SYSTEMS:

- Gypsum plank and concrete decking is of lightweight construction which spans large wide spaces. The main drawback, from a firefighting operational stand point, is that this type of construction is extremely vulnerable to moisture causing a deterioration of the system.
- The above characteristic, along with truss construction, are conducive to an early collapse under fire operations. Members shall not be committed to roof operations when this type of roof construction is found.
- Interior firefighting operations shall be conducted from areas of safety due to the weight of such decking materials. Hose streams should be operated well in advance of members.
- The presence of a Gypsum Roof Deck will be indicated by a white powdery residue during saw operations. Upon this observation, members shall make immediate notification to the Incident Commander and proceed to evacuate the roof.



- However, a field unit discovered that white powdery residue will only be present on a roof not subjected to moisture. They further discovered that a gypsum roof that had been penetrated by moisture will produce a “brownish, clay-type substance,” that will fill the shroud of the saw during cutting operations.
 - It should be stressed that this condition exists in roofs that already are degraded by moisture.



LIGHTWEIGHT CONSTRUCTION

LAMINATED WOOD "I" BEAMS

Consist of a top and bottom chord and web. The chords are made of 2" x 3", 2"x 4", or two- $\frac{3}{4}$ " CDX or pressed plywood glued together. The web is usually made of $\frac{1}{2}$ " plywood.

Contractors may have bore holes to route electric, plumbing etc., compromising the strength of this beam. If not properly sealed, fire can extend from one bay to another.



METAL "C" JOISTS

are constructed of lightweight steel, approximately 1/16" thick, and may have predrilled holes for plumbing and electric lines. Cross braces may prevent twisting.



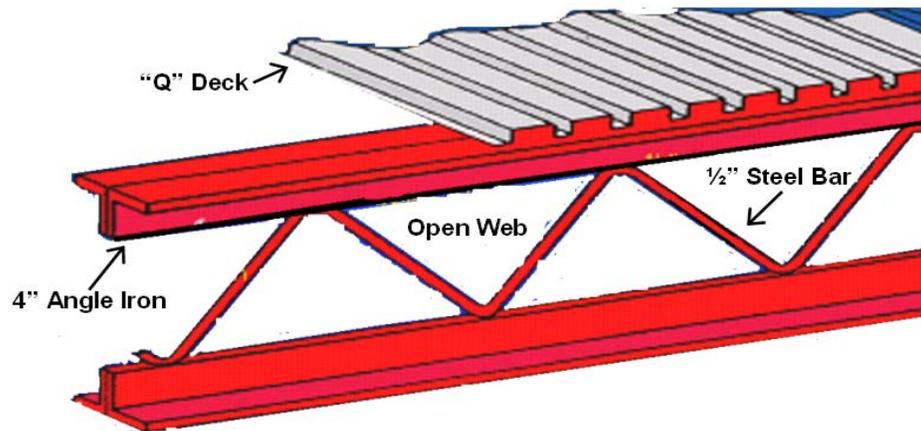
Metal "C" Joists Suspended by Teco Straps Supporting Concrete Floor

LIGHTWEIGHT WOOD TRUSSES

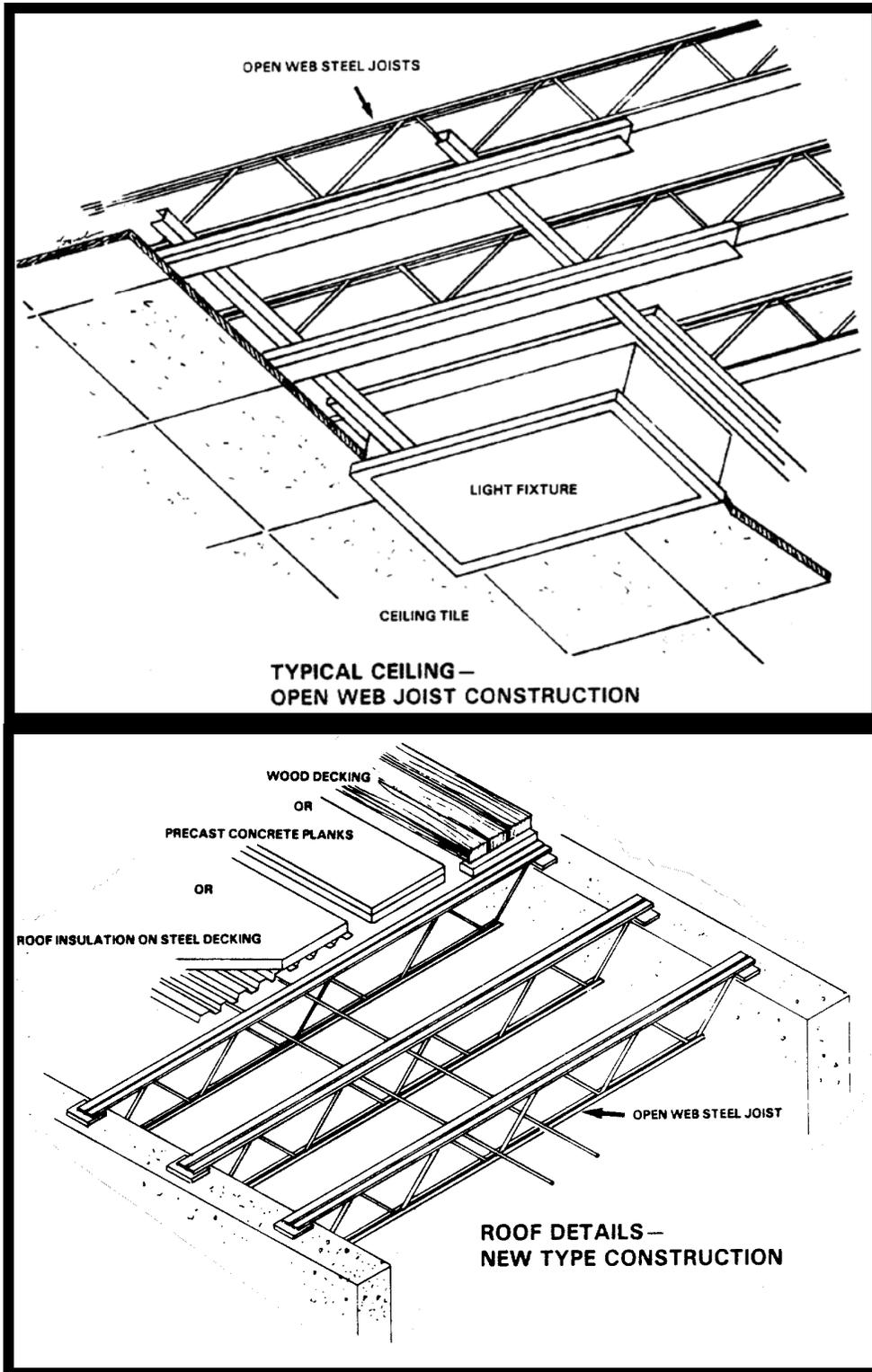
- Made of 2"x3"s or 2"x4"s, which are held together with sheet metal gang nails or gusset plates.
 - Gang nails (gusset plates) penetrate only ¼" to ½".
- When exposed to high heat, fire, or prolonged moisture, gang nails may pull away causing the failure of that truss. The failure of one truss may initiate a domino effect on adjoining trusses.
- When light weight wood trusses are used as joists, fire can spread horizontally unimpeded.
- Tests have shown truss failure rates are as low as 1 minute, 20 seconds. Failure of one truss can cause a structure to totally collapse.



OPEN WEB STEEL BAR JOIST



- ◆ No fire resistance rating, protection from fire depends on the ceiling finish and finish roofing.
- ◆ Used to span long distances (up to 60 feet).
- ◆ Unprotected open web steel joists are particularly vulnerable to elevated temperatures of a fire and may collapse after only 5 or 10 minutes.
- ◆ May be covered with various roof decks:
 - Solid wood
 - Cementitious roof plank (wood fibers chemically processed and pressure bonded with portland cement)
 - Pre-cast concrete or gypsum plank
 - Gypsum concrete (factory controlled mixture of gypsum and wood chips) poured over form boards and steel wire mesh; usually 2" minimum thickness.
 - Most common decking is corrugated steel, with the joists spaced from four to six feet apart.
- ◆ Roofs with this type of roof support system must **not** cut.
- ◆ Vertical ventilation should be limited to removal of skylights & scuttle covers if present.
- ◆ Emphasis should be placed on any and all horizontal ventilation points.

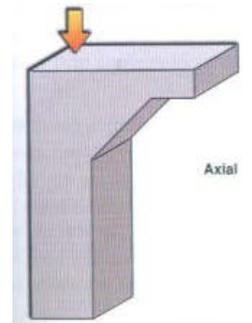


**ANY BUILDING WITH LIGHTWEIGHT CONSTRUCTION
SHOULD BE ENTERED INTO THE CIDS PROGRAM.**

LOADS

AXIAL LOAD

is a force perpendicular to the supporting member. An axial load is straight and true and is evenly applied to the bearing structure.

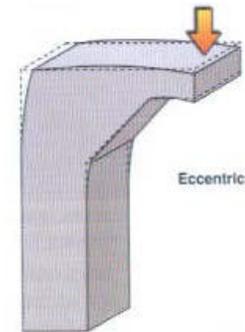


DEAD LOAD

the weight of all permanent stationary construction entering into a structure and includes the weight of walls, floors, roofs, structural members, etc.

ECCENTRIC LOAD

is a force whose resultant is perpendicular to the supporting member but does not pass through the center of the mass. The load is not evenly applied to the supporting or bearing member.



LATERAL LOAD

are loads that are exerted outwardly on a horizontal plane. These forces may take place during a collapse or an explosion. Walls are not usually designed to withstand severe lateral loads.

LIVE LOAD

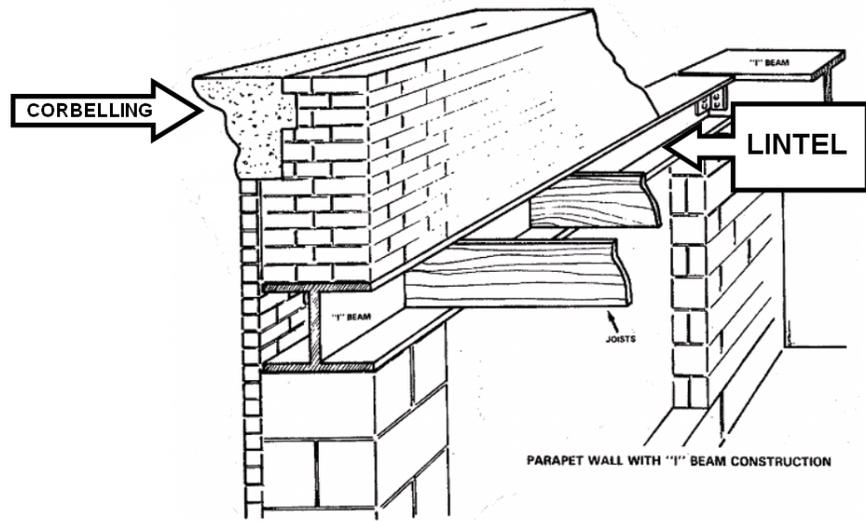
All loads other than dead loads. These loads are not permanent or stationary and include the weight of merchandise, office fixtures, furnishings and all free standing material and persons.

IMPACT LOAD

Are loads delivered, in a short time, on structural members and produce stresses on structural members that may not have been provided for in design and may cause collapse.

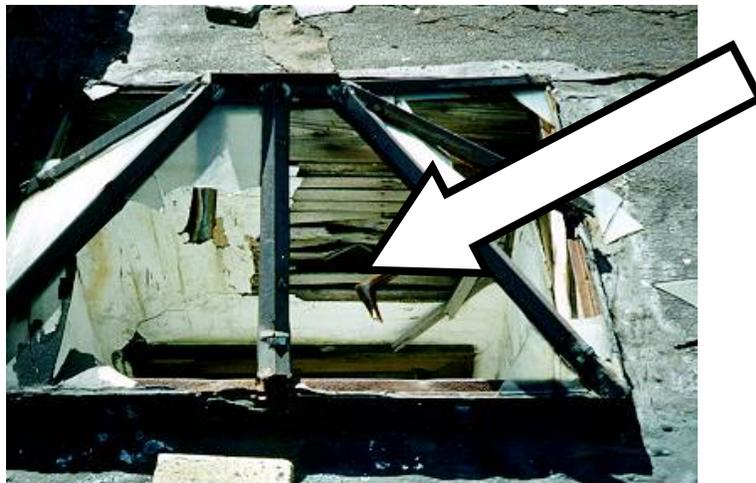
PARAPET

That portion of a wall continued above the roof line.



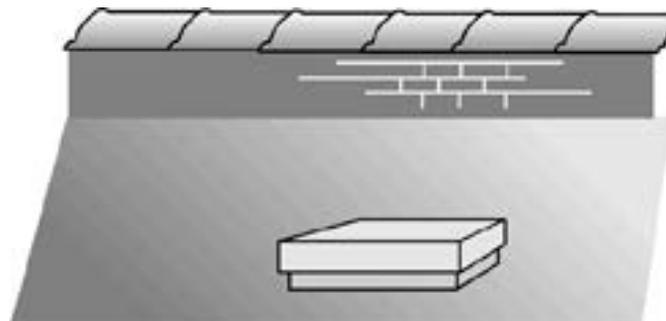
RETURN

The interior surface of a scuttle or skylight between the roof and the top floor ceiling



SCUTTLE

An opening in the roof or a floor of a house fitted with a lid.

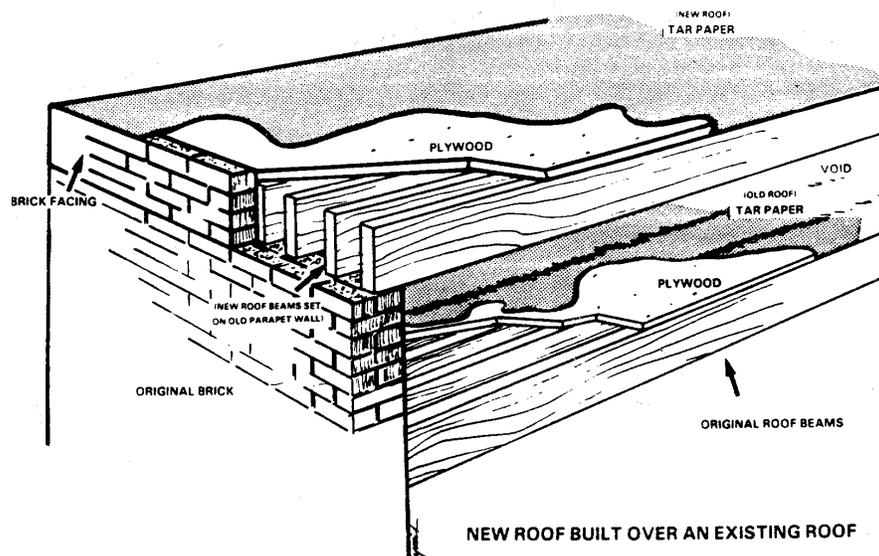
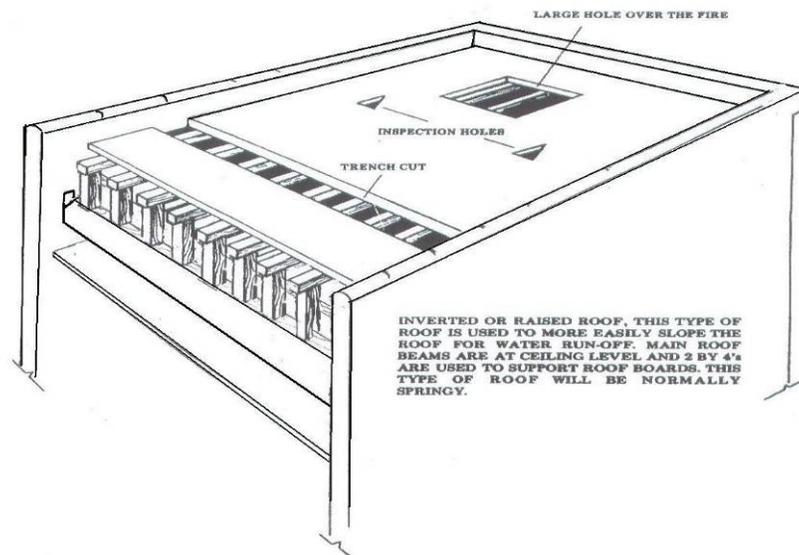


ROOFS

BUILT UP ROOF is the roofing material applied in sealed water-proof layers on the structural members of the roof.

MEMBRANE ROOF Roofing material in roll form, consisting of asphalt materials, (bituminous) polymers of plastics and synthetics for strength. Thickness can vary. Roofs covered with this type of materials are susceptible to ignition and rapid flame spread when exposed to flame.

RAISED (INVERTED) ROOF A roof which is raised above the roof beams and supported by 2 x 4"s. The extent to which it is raised varies so as to provide proper drainage on the roof. The result is a large open cockloft where fire can spread easily.



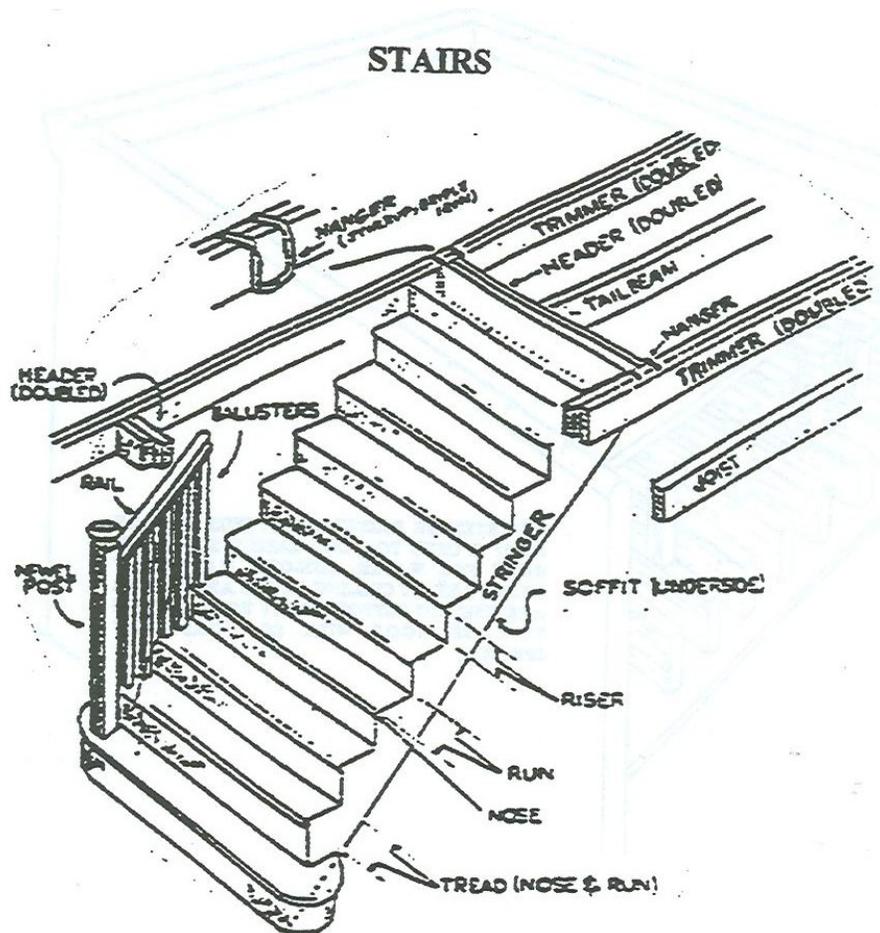
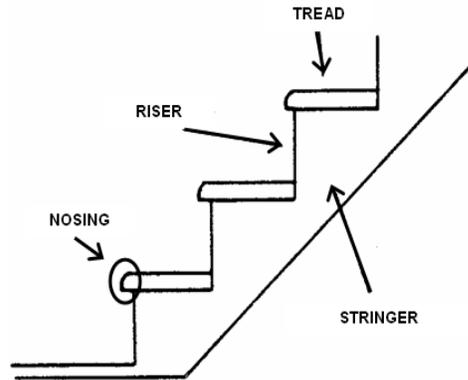
STAIRS

TREAD: the horizontal part of a step on which the foot is place.

RISER: the vertical part of a step which extends from the tread of a step to the nosing of the next higher step

NOSING: that part of the tread which extends past the riser.

NEWEL POST: Vertical post at each landing supporting handrails



STAIRWAYS

ACCESS STAIRS

A stairway, usually open, serving a number of floors of a common tenant. Also known as convenience stairs.

ATTACK STAIRWAY

A fire stair being used by the Fire Department to gain access to the fire area, where the door between the stairway and the fire area is being maintained in an open position.

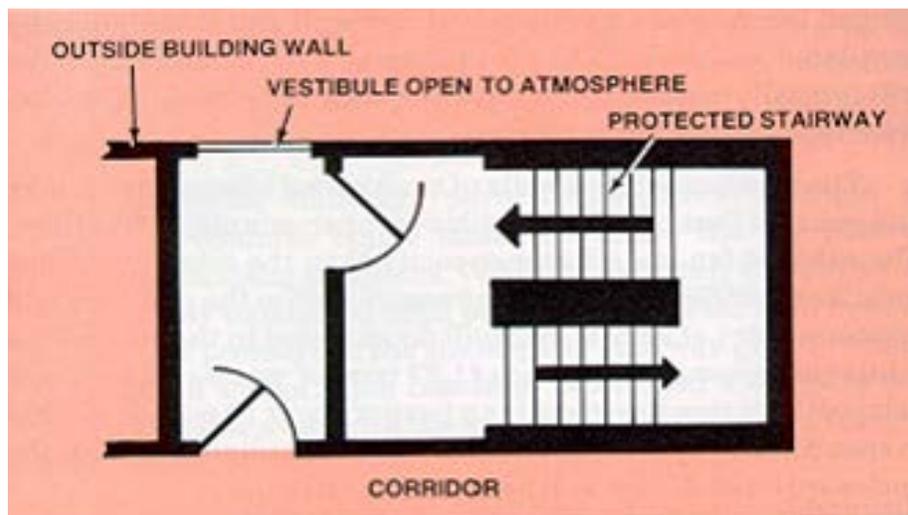
EVACUATION STAIRWAY

Fire tower or a fire stairs, designated by the Fire Department or a pre-existing building fire plan, that is remote from the fire area and used for the evacuation of the building occupants. A fire tower is the preferred evacuation stairs.

FIRE TOWER

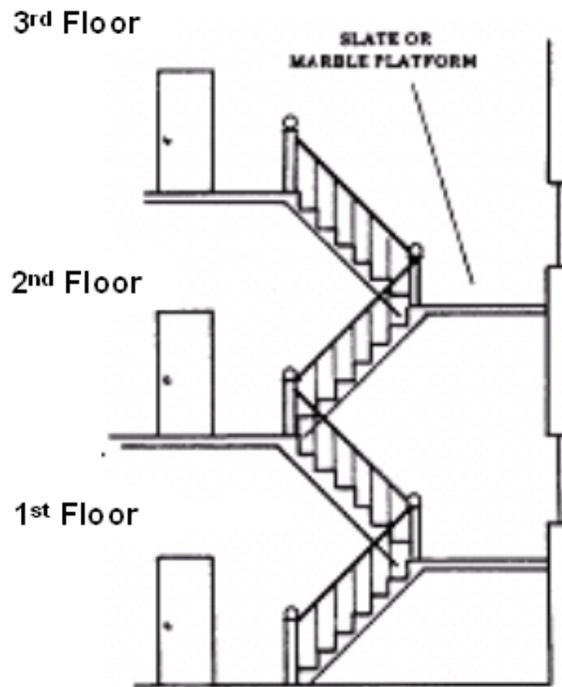
An enclosed stairway connected at each story by an outside balcony or fireproof vestibule vented to the outside.

- ◆ Required by NYS building code in high-rise buildings, built between 1938 and 1968.



**RETURN
STAIRS**

Breaks up the stair climb at the middle of the stair rise with an intermediate landing; here, the climber reverses direction before starting the second half of the stair rise.



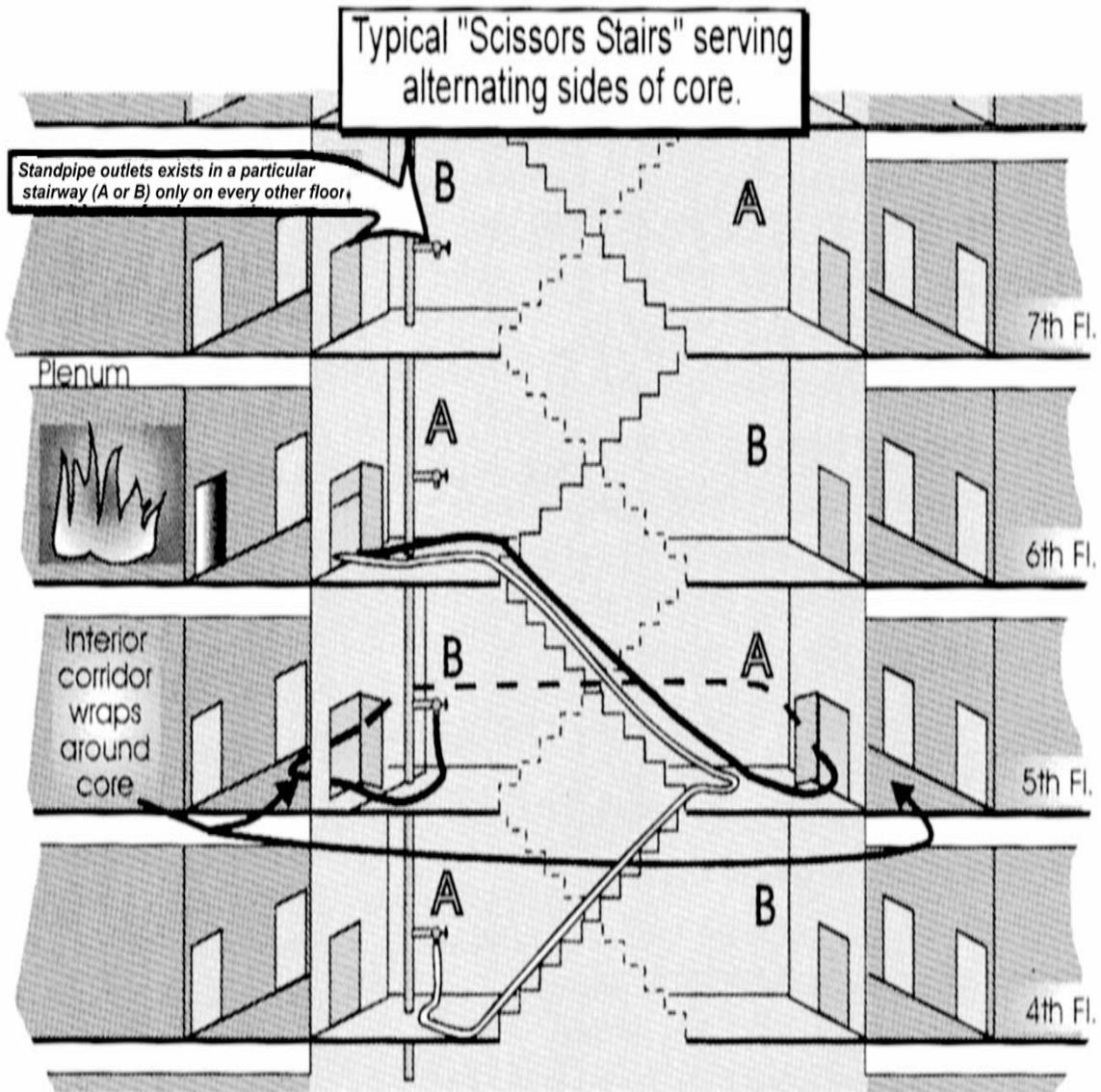
TERRAZZO

A polished floor covering made of small marble chips set in several inches of cement. A terrazzo floor is a collapse hazard: it adds weight to floor beams, conceals the heat of a serious fire below, and, because it is watertight, allows water to accumulate and build up to dangerous proportions. In 1966, A fire burning in a cellar below a terrazzo floor burned away the floor beams, although little heat and smoke penetrated the floor itself. The floor suddenly collapsed, killing 12 firefighters (Dunn 32).



**SCISSOR
STAIRS**

Two stairs constructed side by side in the core of a building in which their doors alternate the point of exit to opposite sides of the core.

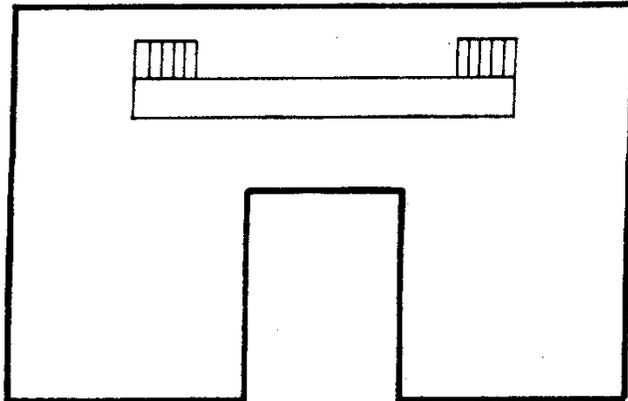


LAYOUTS - STAIRWAYS AND PUBLIC HALLS

TRANSVERSE STAIRS

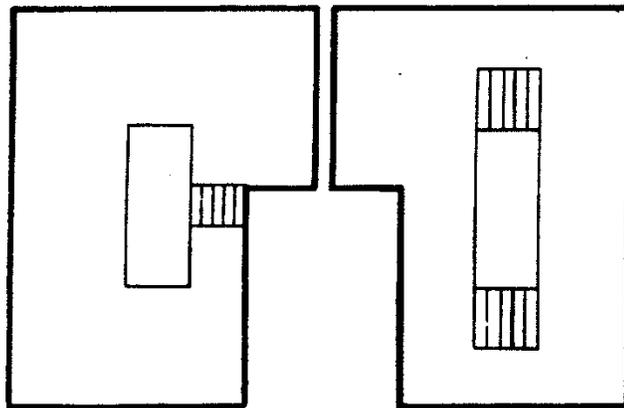
Located at points remote from each other but a person can go from one stairway to another via public hall on all floors of the building.

An asset to fire operations



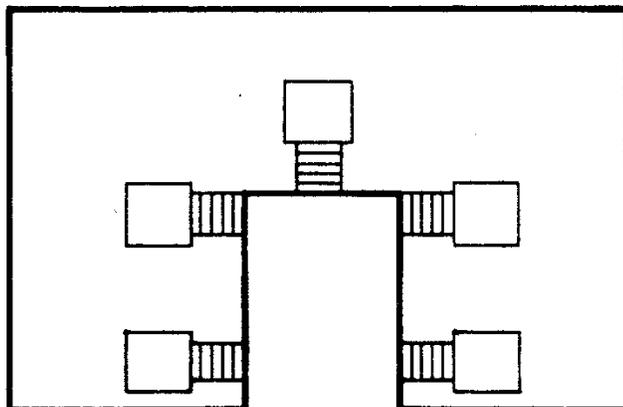
WING STAIRS

These stairs, one or two in a building, are located in each wing. There is no connection to the other wing. The diagram represents half a building showing each type.



ISOLATED STAIRS

Usually have individual entrance.
Floor landings are limited. No connection to other.



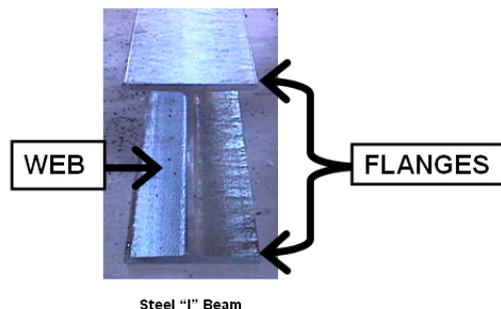
STRUCTURAL STEEL

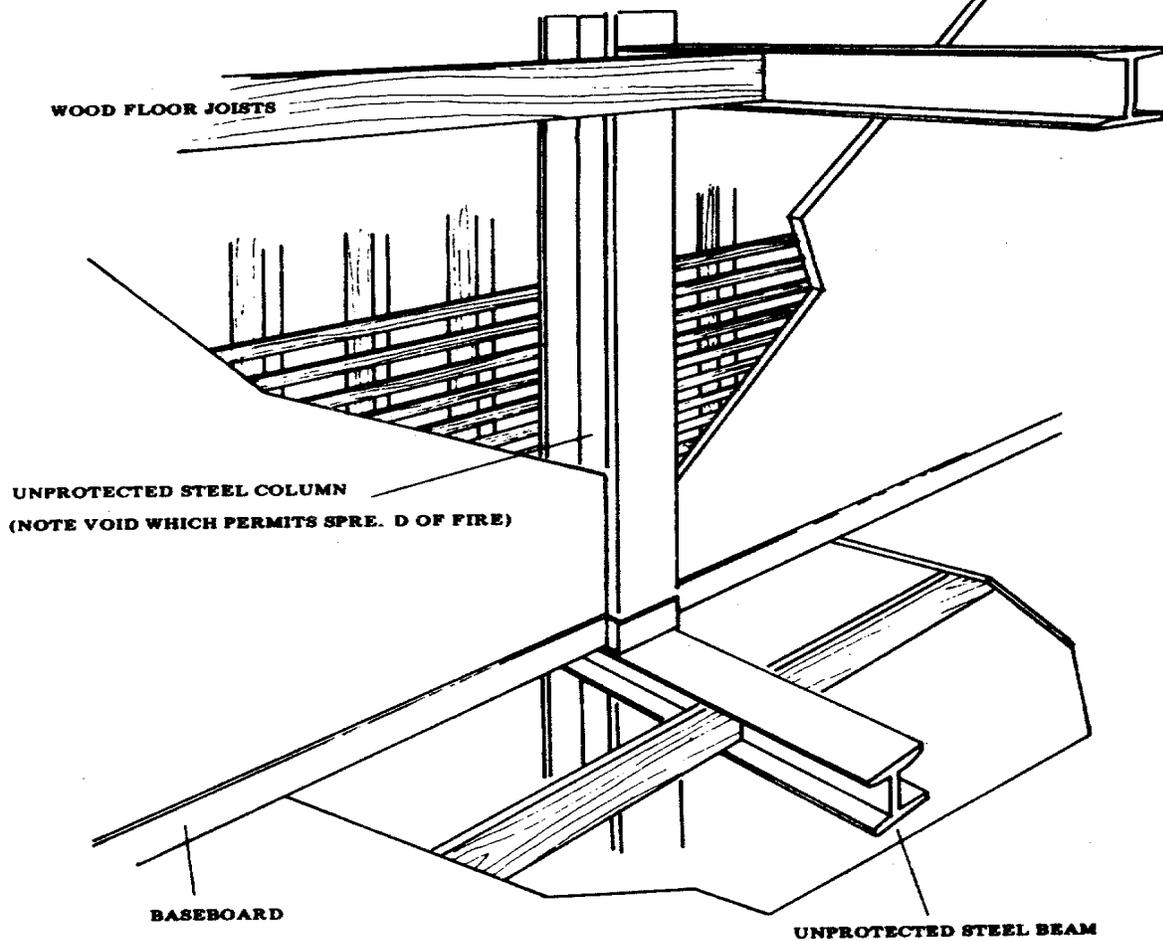
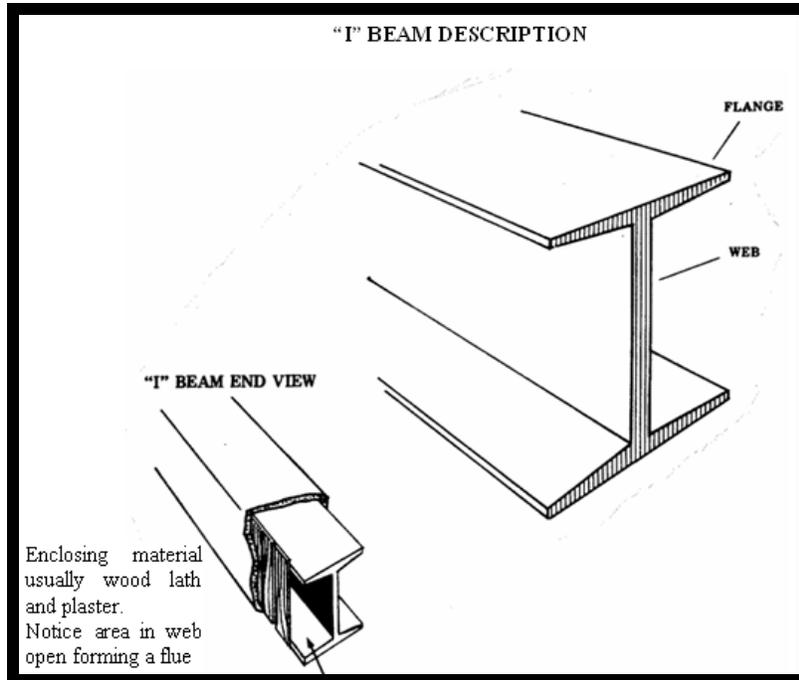
Older buildings generally only have two structural elements to support the structure, masonry and wood. The introduction of a third element, steel, had the following advantages:

- ◆ It allowed girders to support floors instead of a costly bearing wall of brick
- ◆ The consistency of steel structural characteristics allowed a fairly exact amount of failure to be determined, thereby eliminating costly overbuilding required by the use of safety factors when using less predictable materials such as masonry and wood.
- ◆ And finally, the ability of steel to be connected permitted the coupling of several building sections, e.g. the “H” type design of residential housing.

Structural Steel creates three concerns to the fire service:

1. Steel when heated expands, and substantial elongation can occur at a fire. This elongation can cause a wall to bulge, move, or even collapse if the steel is set within the wall.
2. Steel when heated to higher temperatures during a fire may fail. Floor beams supported by such failing steel will fall to the floor below.
3. Steel columns or girders, generally in an "I" beam shape, transmit fire and heat. The "I" beam or channel rail, as it is sometimes called, when in the form of a column located in the inner framework of a building may extend from the first floor up into the roof space or cockloft area. The space between the enclosing wood framework and "I" beam, when in the form of a vertical column, leads up into the cockloft and many times spreads to this roof space.





"I" beams will absorb heat from the fire at a rate dependent on many factors, such as, the temperature of the fire, the extent of the fire, and the mass (weight and size) of the beam. A large, heavy "I" beam will be able to absorb more heat and its temperature will rise more slowly than a lightweight beam.

Because of the conductivity of the steel, this temperature will diffuse into the beam causing its expansion. An average 50 foot long steel beam, heated uniformly over its length to 970F will extend in length approximately four inches. A longer "I" beam will expand a proportionately greater distance, and as the temperature increases, the rate of expansion increases. At 1000 F a 100-foot long beam will have extended in length nine-and-a-half inches.

When these steel beams are heated from 1000 F to 1500 F, their yield strength drops dramatically and they start to soften and fail. This temperature can be reached in five to ten minutes at a fire and it is only a matter of time at an uncontrolled fire (thirty minutes for the smaller beam sections), until these beams can be heated beyond their strength limitations.

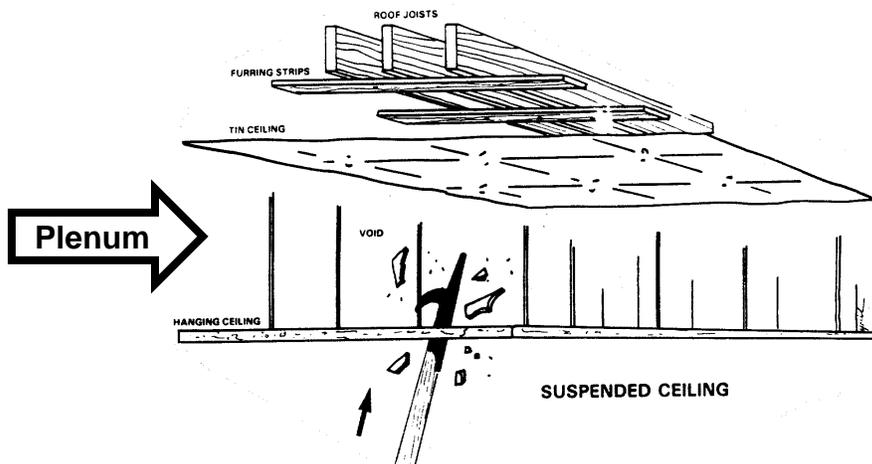
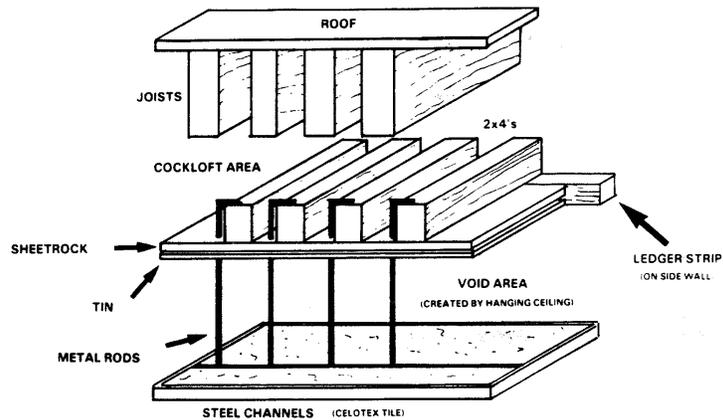
There is a false impression that hot steel beams or columns cooled by hose streams will crack or fail. Tests have shown that cooling a steel member will cause it to regain its strength and load carrying ability, and under normal circumstances, there should be no hesitation in cooling these members. If the beam has already sagged under the weight of floors or roof, firefighters should not be allowed in the possible collapse zone, whether these beams are cooled or not. The steel will contract to its original length as it is cooled and if the beam has sagged, this shortening may pull the end of the beams off their supports or twist the beam allowing the joists to drop.

**UNPROTECTED
STEEL**

Steel structural components of a building which do not have any fire resistive covering such as concrete, brick, asbestos, etc.

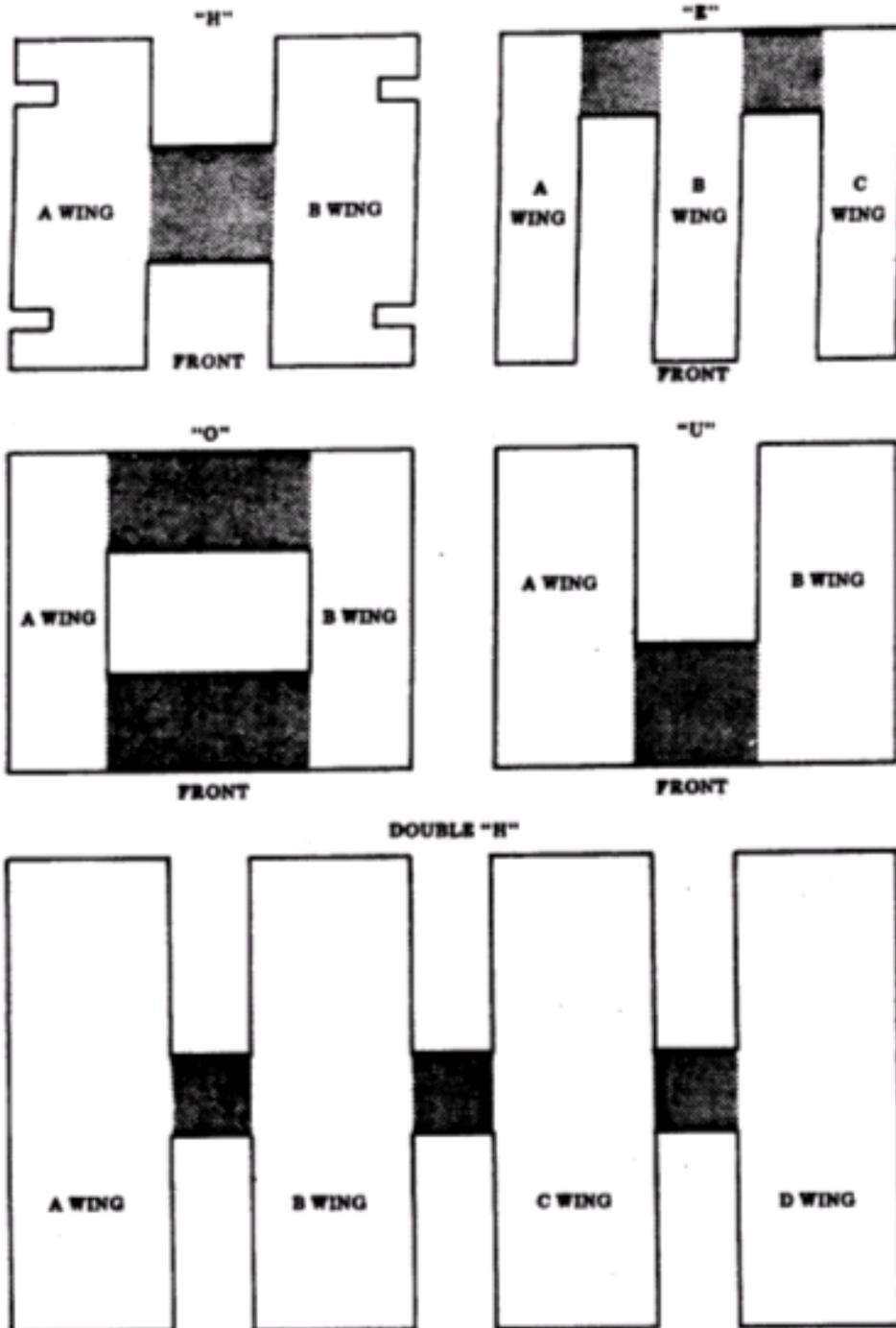
SUSPENDED (DROP) CEILINGS

- They are suspended by light wood strips, steel wire or steel bars, all of which are quickly affected by fire.
- Suspended ceilings offer their own collapse potential when loaded with water or weakened by fire and are sometimes blown down by a backdraft in the cockloft.
- Special care must be exercised when these ceilings are constructed of heavy wire lath and plaster or tin, as these ceilings often fail and fall in one piece over the entire area of a store.
- Besides inflicting injury, these ceilings can trap members beneath, if they fall intact.
- These ceilings should be "punched" with a hook for water detection, to check construction and fire conditions.
- Multiple layers of tin, sheetrock or tiles may have been affixed together on supports which were not intended to carry such weight.
- A slight amount of water or fire can cause failure and the weight of such a ceiling increases chance of entrapment and injury.
- When initially pulling suspended ceilings members should be in a safe area in case of total failure.
- Light fixtures offer another hazard as they may swing down if the support breaks at one end.
- The void area created by suspend ceilings is referred to as the "*Plenum*," which may allow for fire travel. Also, in this area are installed pipes, wiring, air handling ducts and recessed lighting fixtures.



THROAT Part of a building that connects the wings of the building.

VARIOUS TYPES OF LARGE MULTIPLE DWELLINGS

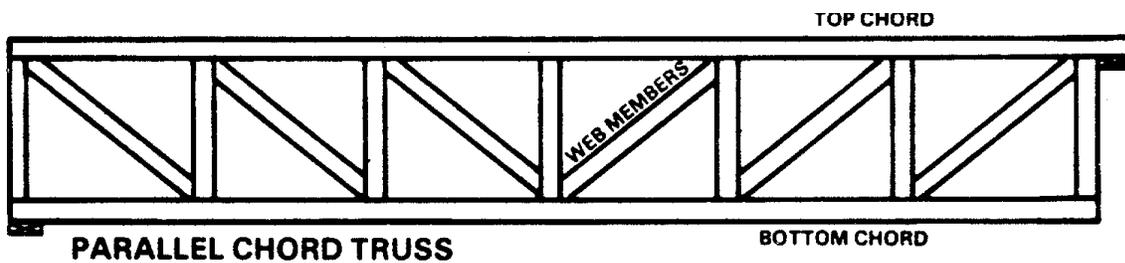


"THROAT" - ALL CROSS HATCHED AREAS

TRUSSES

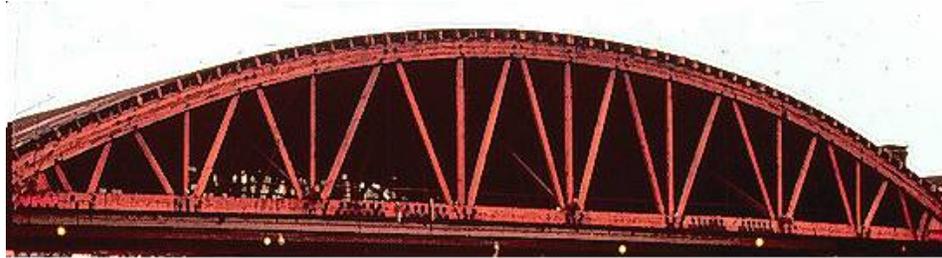
“BEWARE OF THE TRUSS”

- Truss roof construction is used to span large areas, free of support columns, and can be made of wood or steel. Most roof trusses are designed just to provide the span and support of the roof system.
- Basically, the truss is composed of two major members, chords and webs. There is a top and bottom chord connected by shorter members called webs. The webs are placed vertically and diagonally, forming triangular configurations with the chord members. There are many variations but all are essentially the same; a combination of interdependent components used to span large distances through the use of smaller pieces fastened together.

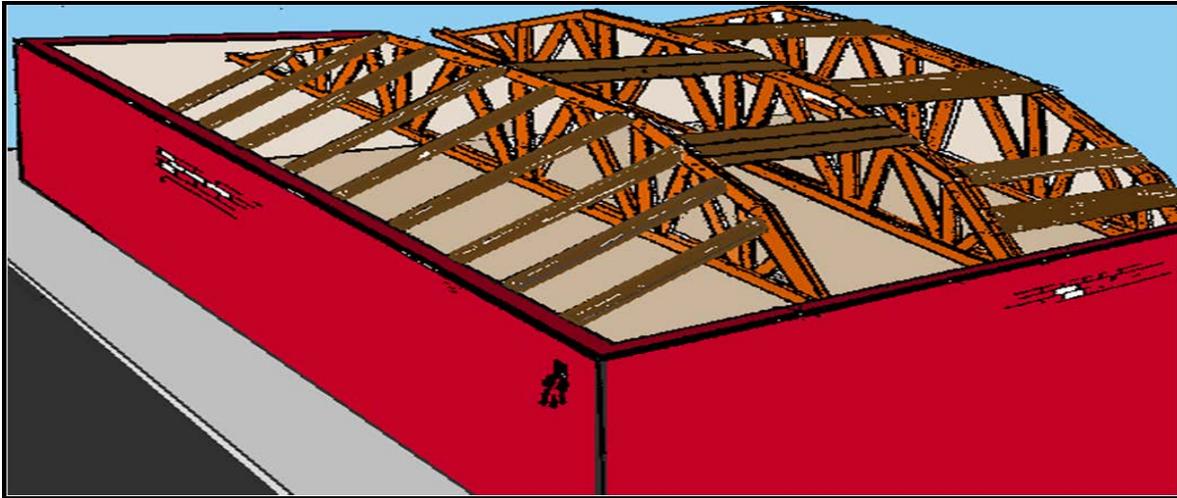


- In any truss frame, every part of the truss is important to its stability. The failure of any element may lead to the failure of the entire truss. Because of the wide spans and the interdependence of trusses, one with another, the failure of a truss may have serious consequences far from the point where the initial failure occurs.
- Truss roofs are not designed nor constructed to be used as a Fire Department working platform. Early collapse of the roof must be anticipated in a heavy fire condition and members should not be committed to roof operations.
- Members operating on the roof must immediately inform their officer and Incident Commander of the type of roof system and the presence of any heavy equipment.
- Members should also be aware that light-weight wood trusses and wood I-beams are being used as floor supports, creating the same potentially dangerous collapse conditions within the interior of the structure.
- Truss construction should be suspected on all new or renovated taxpayer/commercial structures as well as all large span building spaces. When found, these structures should be the subject of a CIDS card.

BOWSTRING TRUSS



- ◆ Can be made of heavy timber or metal or a combination of both.
- ◆ Wooden bowstrings are found in older commercial structures in NYC, e.g. supermarkets, bowling alleys, lumberyards, auto storage garages, and in buildings that originally housed such occupancies.
- ◆ Characteristic hump-like roof profile – the longer the span, the higher the bow.
- ◆ This easily recognized silhouette, if not obscured by signs, built up parapets or smoke conditions, gives notice of truss construction. Other types of truss construction are not as easily discerned from the exterior of the building.
- ◆ Trusses may be spaced 10 or 20 feet apart with roof beams installed between the trusses to support the roof coverings.
- ◆ Also, in the older wooden truss roof buildings, there is a possibility of rotting at the ends of the trusses where they rest on the walls, due to water leaking through the roof covering. To prevent this leakage, building owners, may place a small section of roofing at an angle between the wall and the roof to form a trough for drainage.
- ◆ Wood truss roofs appear to fail without warning. The roof does not sag or get "spongy." Steel trusses tend to "stretch" when losing their strength because of elevated temperatures, but wood tends to "snap".
- ◆ Trusses are composed of smaller and lighter weight members and they span greater distances than the conventional roof beam construction. Fire will affect them more rapidly.
- ◆ If a serious fire involves the roof portions then firefighters should not be committed to cut such roofs. Fire conditions must be closely monitored and the firefighters on the roof must be removed when roof stability is in doubt.

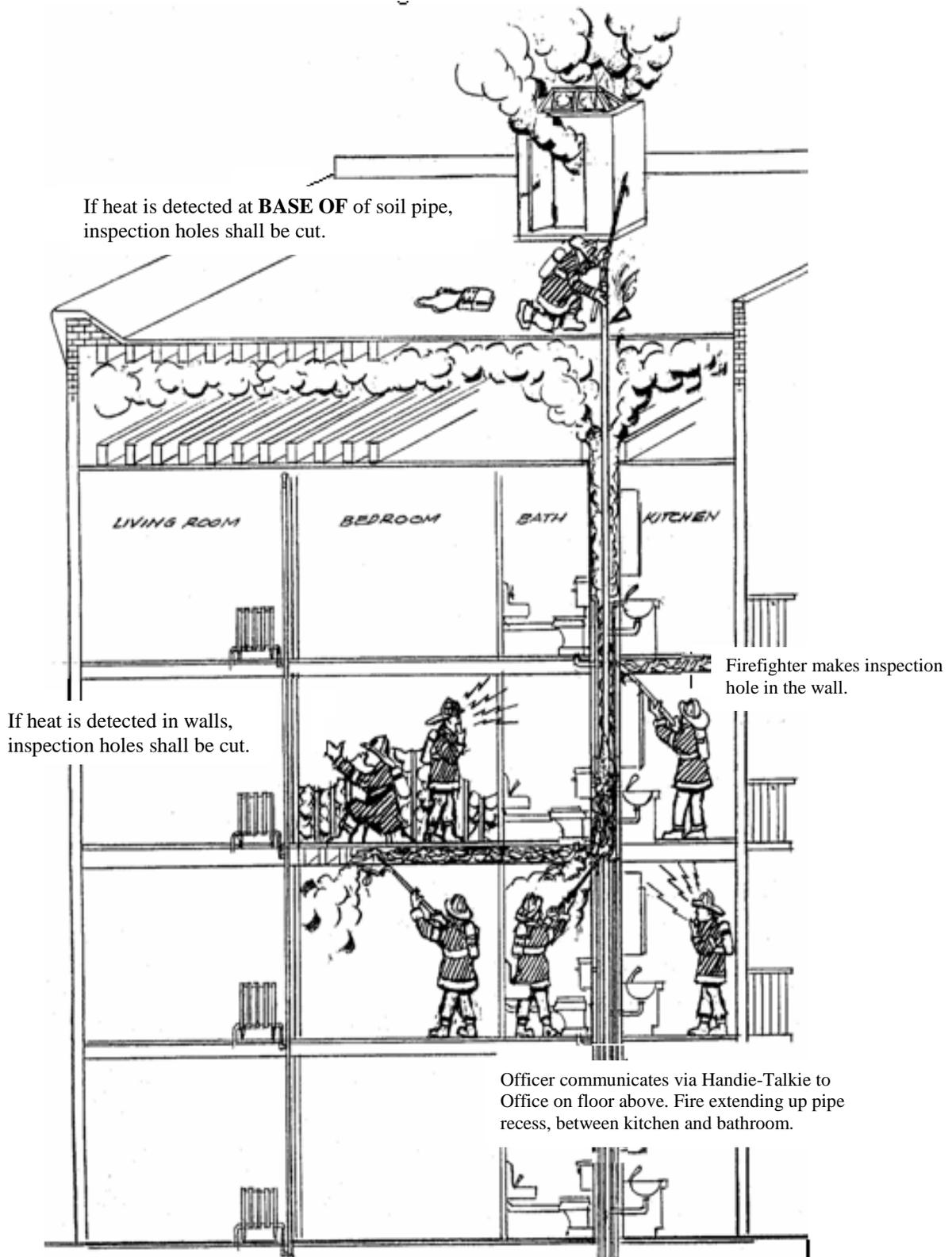


**VERTICAL
VOIDS**

Created by pipe recess (water & vent pipes), channel rails, electrical conduits, dumbwaiter shafts, etc. Can spread fire throughout the building by convection or burning embers dropping down these voids and starting a fire on a lower floor.



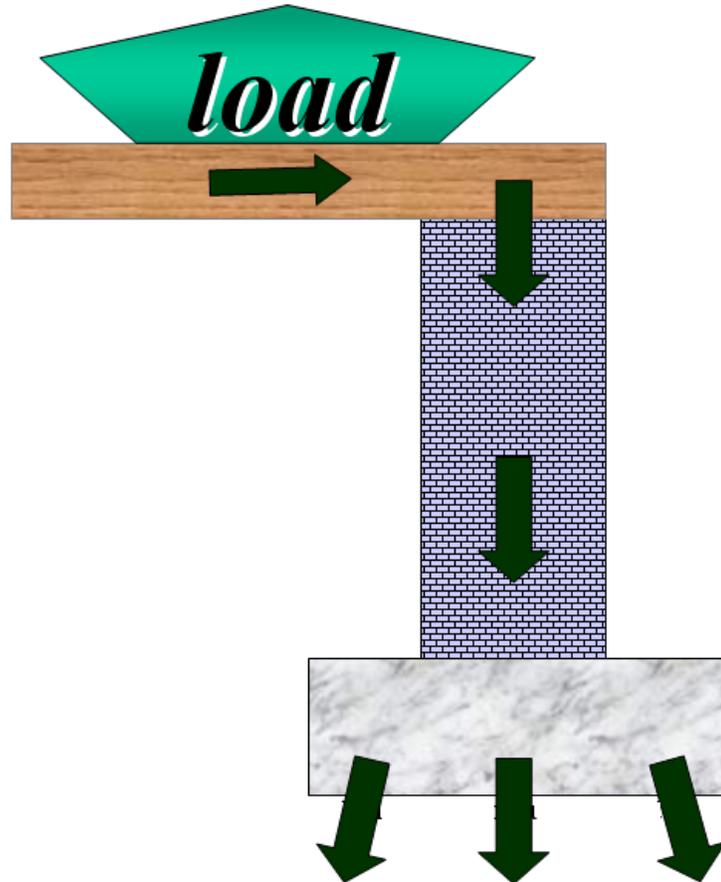
Soil pipe, water pipe and electrical line found in a rear closet.



WALLS

BEARING WALL

A wall of a building which carries any load other than its own weight.



KNEE WALL

A wall used to box out a finished attic. This creates large voids and occupants usually store combustibles behind it.

PARTITION

A non-bearing wall one story or less in height

VENEER WALL

Single thickness of masonry or brick—designed to improve exterior appearance of the building, it lends no structural support.

MORTAR

A material composed of sand and cement (and possibly other additives) used to build brickwork.

WINDOWS

WINDOW BARS

- The location of window security bars will vary. However, it is not uncommon to find these installations on all floors and all sides.
- The construction of these bars will vary from thin aluminum child guards to heavy wrought iron and steel.
- Some bars may be set in mortar or brick. Others may be bolted or screwed into the wooden frame of the window or door.
- Civilians may become trapped with no means of escape.
- Firefighters may become trapped when going above the fire for a search.
- Window bars are heavy and difficult to remove.



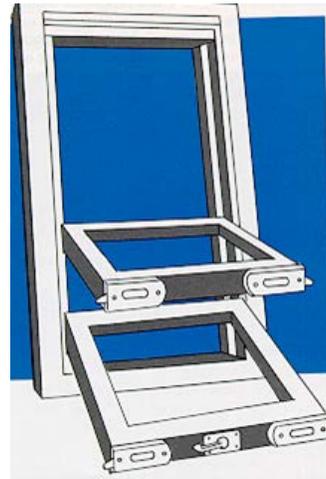
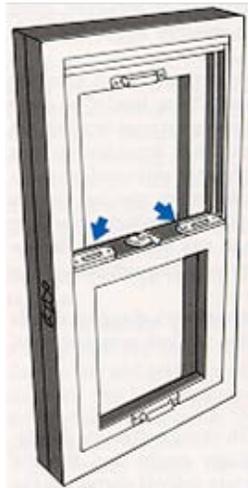
CASEMENT WINDOWS

A metal framed window which opens outward. This type of window is usually found in high rise multiple dwellings.



**ENERGY
EFFICIENT
WINDOW
(EEW)**

A window designed to maintain air tight insulation, and will contain more than one pane of glass with an air tight space in-between.



SPECIAL NOTE ON ENERGY EFFICIENT WINDOWS

EEW'S HAVE A MAJOR IMPACT ON THE VENTILATION PROCEDURE

These windows maintain their integrity longer than ordinary single pane windows in a fire environment with the following effects:

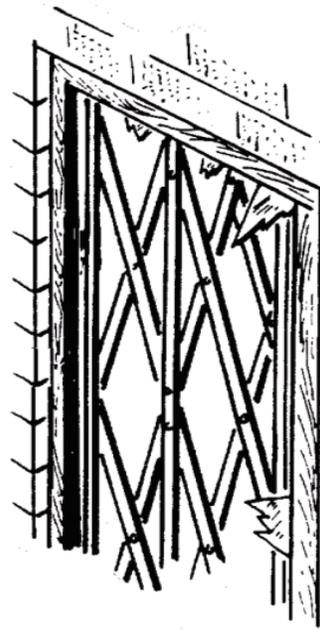
- A. High heat buildup in fire apartment and floor above.
- B. Possibility of a backdraft/flashover.
- C. Difficult to vent properly.
- D. Cause rapid extension.
- E. Discoloration due to high heat is not readily apparent.
- F. Difficulty in determining the fire apartment, room or floor area.

Energy Efficient Windows can cause extreme heat and smoke conditions to develop in the fire apartment and apartment above the fire. The potential for flashover and backdraft is increased. Uncontrolled horizontal ventilation can seriously jeopardize member safety.

Fire showing out failed Energy Efficient Windows is indicative of high heat and fire in an advanced stage.

**WINDOW
GATE**

A folding gate placed at a window to prevent intruders from entering. The type that is approved by the Board of Standards & Appeals does not have any locks.





BUILDING DESCRIPTIONS

OBJECTIVE:	<ul style="list-style-type: none">• To introduce members to some of the different types of building construction and their relation to fire spread.• Familiarize members with basic building collapse.
CONTENTS:	<ul style="list-style-type: none">• Building illustrations• Construction features• Exposure identification• Glossary of terms
FDNY REFERENCE:	<ul style="list-style-type: none">• Firefighting Procedures:<ul style="list-style-type: none">○ Volume One: Books 1-6○ Volume Three: Book 3

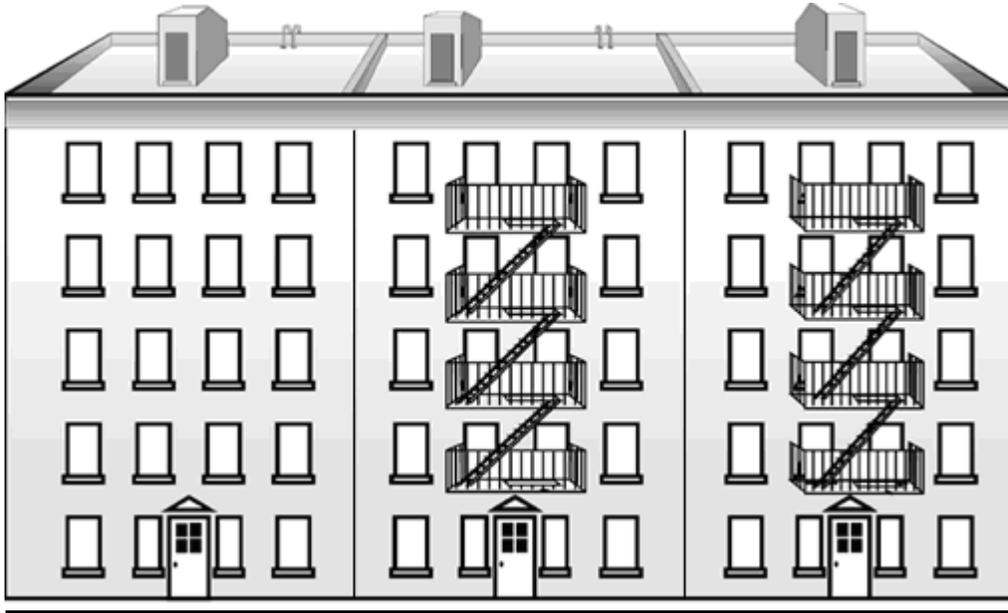
9

It is almost impossible, when arriving at a structural fire, to tell the age of the building, nor is that so necessary. It is sufficient to know the general features of the building and this can be accomplished at a glance if the classification of the building is known.

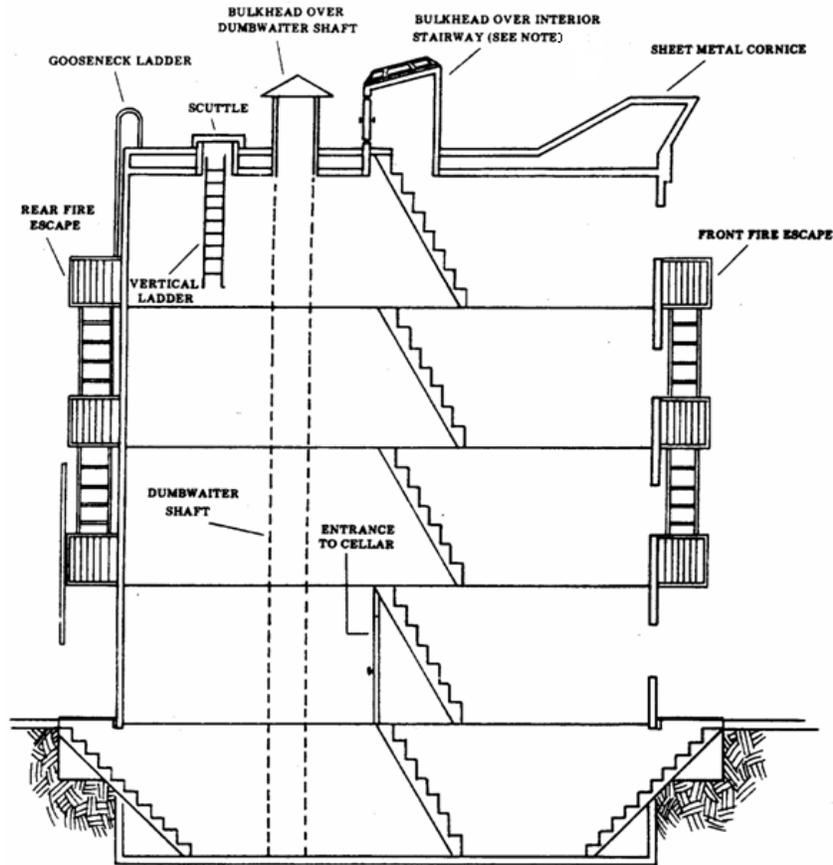
The types of buildings included in this book are:

- Multiple Dwellings:
 - ◆ Fireproof
 - ◆ Non Fireproof
 - Old Law¹ Tenements (built before 4/12/1901)
 - New Law Tenements (built between 4/12/1901 & 4/18/1929)
 - Other non-fire proof multiple dwellings built after 4/13/1929
- Brownstones
- Row frames
- Private Dwellings
- Taxpayers (Commercial Dwellings)
- High Rise Office Buildings

¹ It is not intended to describe and date each law that affects the listed types of multiple dwellings; namely, Old Law Tenement, New Law Tenement, newer non-fireproof multiple dwelling or fireproof multiple dwelling.



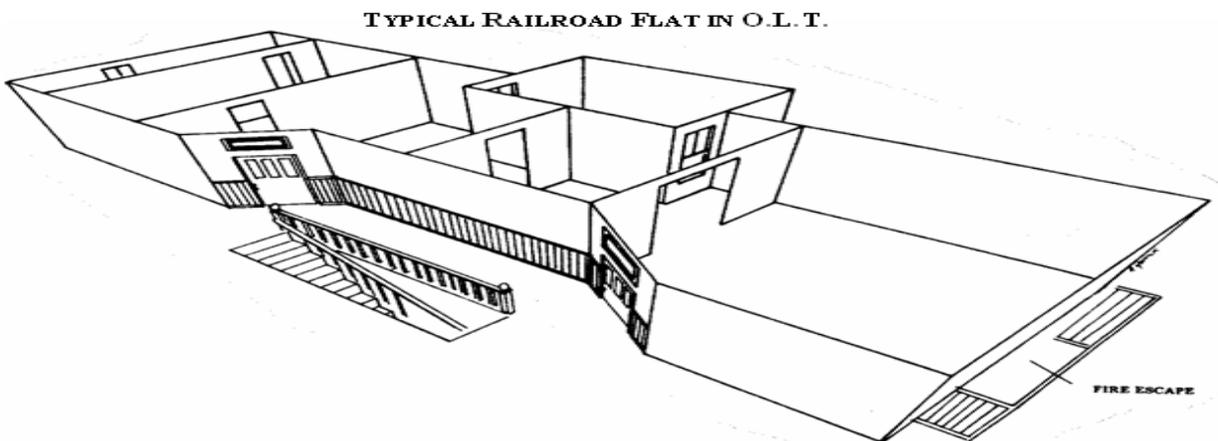
OLD LAW TENEMENT



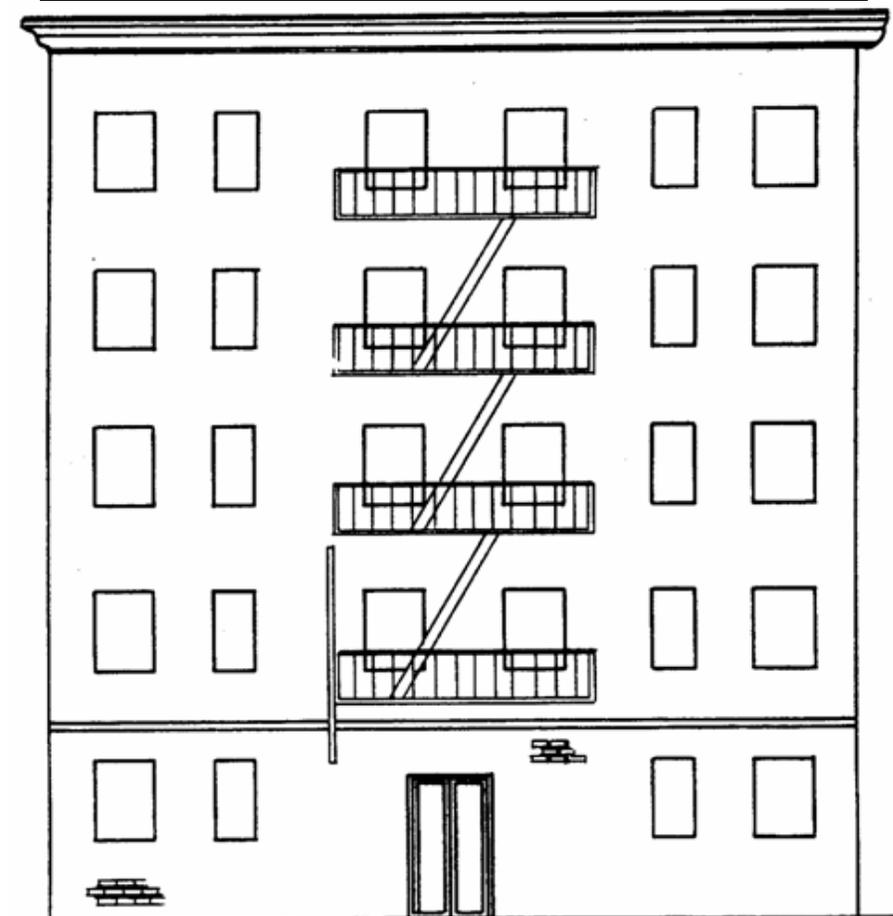
NOTE: O.L.T.'s usually having an interior stairway going up to the roof, but sometimes there is just a vertical iron ladder and scuttle opening, not both.

OLD LAW TENEMENTS

- ◆ **BUILT:**.....before 4/12/1901
- ◆ **CONSTRUCTION:**class 3, non-fireproof
 - (brick walls and wood floors)
- ◆ **HEIGHT:**three to seven stories
- ◆ **AREA:**Width (20' to 25') Depth (50' to 85')
- ◆ **APTS. PER FLOOR:**2 to 4
- ◆ **CELLAR ENTRANCE:**.....Combustible stairway to the cellar is located inside the building, usually beneath the interior stairway. These stairs may have been removed if building has been renovated
- ◆ **SECONDARY MEANS OF EGRESS**.....fire escape or party wall balcony
- ◆ Originally the stairs and stairway enclosures were wood with wood lath and plaster partitions. In 1934 most of these buildings were required to fire retard the stairway enclosure.
- ◆ To provide light and air to each room, shafts of different shapes and sizes may be provided between adjoining buildings. These shafts are open at the top. The term “enclosed” as used in this manual will mean “a shaft open at the top and bound by building walls on all sides.”
- ◆ Limited fire stopping.
- ◆ "Railroad Flats" are those apartments which extend from the front of the building to the rear. There are usually two of these apartments on each floor. Building with these apartments usually have fire escapes on either the front or the rear.
- ◆ Some OLT's have four apartments on a floor. These buildings have fire escapes on both the front and the rear.



**For another illustration of Rail Road Flats go to Search section of chapter*

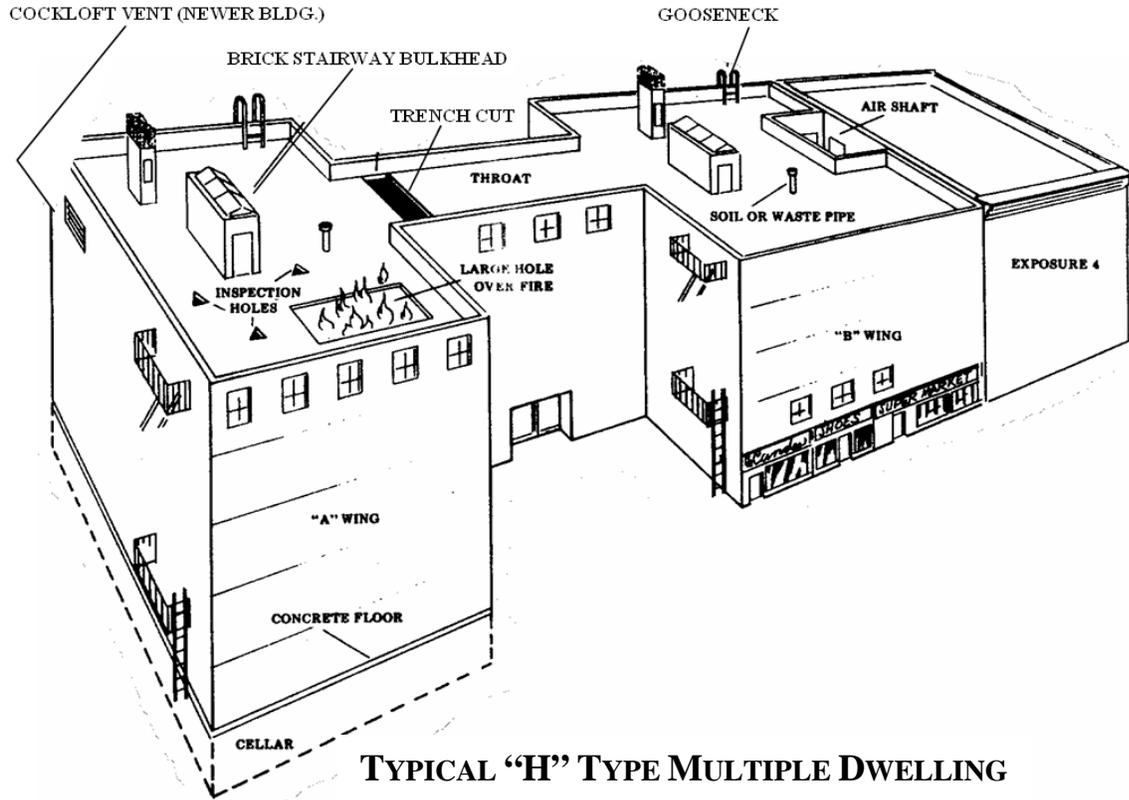


TYPICAL NLT OF THE TYPE BUILT FROM 1901 TO 1916

NEW LAW TENEMENTS

CONSTRUCTION:

- ◆ Class 3, Non-Fireproof (wood, masonry & steel)
 - 1901 to 1916
 - Steel “I” beams were introduced to carry floor joists which couldn’t span the enlarged floor areas. These steel beams generally were supported by masonry walls.
 - 1916 to 1929
 - Unprotected steel beams are used to support some of the wood floor joists. These steel beams are supported by vertical steel columns which run the height of the building. Wooden floor joists (beams) run horizontally from brick wall to a steel girder or from a steel girder to a steel girder.
 - To avoid being required to be built of fireproof construction, the floor areas were broken up into units of 2500 square feet or less. This means that between some apartments there are brick or fireproof partitions which effectively limit the horizontal spread of fire.
 - However, these dividing walls only go as high as the ceiling of the top floor. This results in a very large undivided cockloft area. Fire can, and often does, spread throughout this large cockloft area.
 - After 1929
 - Changes, in NYS building law, were designed to reduce the size of the cockloft, by requiring firewalls to be extended through to the roof.

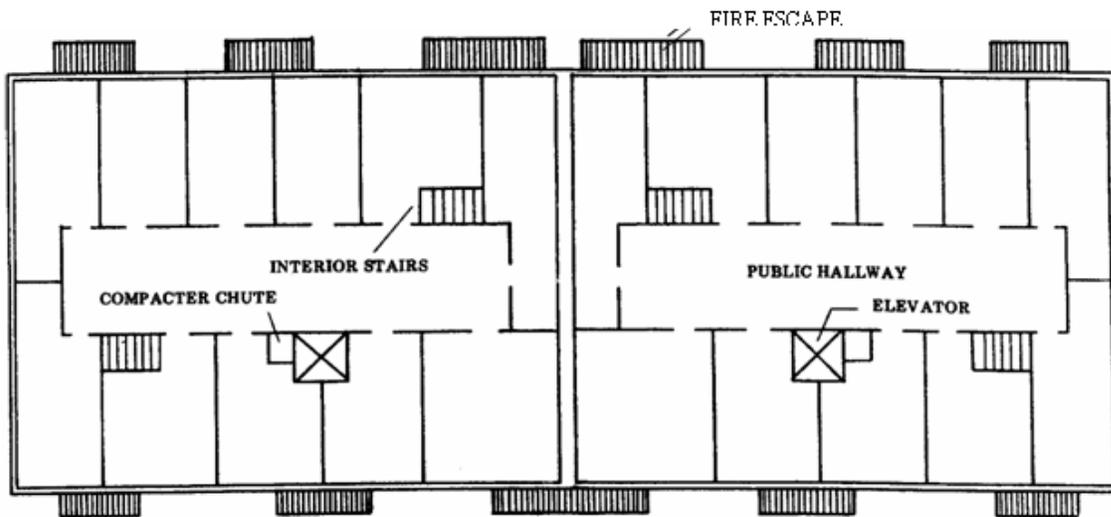


NEW TYPE CLASS "A" MULTIPLE DWELLING

6 STORIES, 60' X 340', NON-FIREPROOF SUBDIVIDED ABOVE THE FIRST FLOOR INTO TWO AREAS 60' X 170', 2 STAIRS IN EACH SECTION.

22 APARTMENTS ON EACH FLOOR.

(ROOMS OF APARTMENTS NOT SHOWN)



AREA:

- ◆ 1901 to 191635' to 50' wide & 85' deep
- ◆ 1916 to 1929150' x 200'
- ◆ After 1929extraordinary dimensions, though every 3,000 sq. ft., was required to be enclosed by firewalls

APTS. PER FLOOR:

- ◆ 1901 to 1916
 - Five to six
- ◆ After 1916
 - “H-Type” buildings developed with the number & layout of apartments varying from building to building.
 - Some having long interior hallways, rooms of one apartment may be behind another apartment, in “L” or “T” shaped form.
 - Except for the first floor (lobby), upper floor apartment layouts are generally identical in each vertical line.

CELLARS:

- ◆ Exterior entrance only
 - Either by a side or rear door at that level via an exterior stair from the first floor, or through a passageway located in the front of the building
- ◆ First floor (cellar ceiling) is of fireproof construction. Openings below the first floor for pipes, conduits, ducts, dumbwaiter and elevator shafts, must be protected by fireproof doors and assemblies and such doors must be self-closing.
- ◆ Some buildings may require a sprinkler in the cellar.

SECONDARY MEANS OF EGRESS:

- ◆ Fire escapes are more generally found in these buildings. They may be on one, two, or all sides of the building. Some buildings may have ten or more.

ELEVATORS:

- ◆ Provided in some buildings, running from the cellar to the top floor with a bulkhead on the roof.

STAIRWAYS:

- ◆ Some will be found near the front entrance; other will be some distance away

REAR YARDS:

- ◆ Entrance may be gained through passageways from the street or through interior doors located on the first public hallway to exterior stairs.



FIREPROOF MULTIPLE DWELLING

FIREPROOF MULTIPLE DWELLINGS

◆ CONSTRUCTION:

- Usually poured concrete floors, cinder block or gypsum block walls. Newer buildings use gypsum board (sheetrock) in the interior construction.
- In conjunction with the heat retaining characteristics of fireproof construction, the results are extreme temperature conditions within the fire area.
 - Fires in these buildings can be extensive, extremely hot and, depending on wind conditions and building air flow patterns, very difficult to extinguish.
 - The use of the KO Curtain may be required to aid in the advancement of hose lines down a public hallway when the door to the fire apartment is open and the wind and building air flow are opposing hose line advance.

◆ HEIGHT & AREA:

- Four to 40 or higher stories
- Irregularly shaped clusters of buildings – Double H, Star, rectangular, semicircular, that may have elevators, compactors, standpipes and sprinklers

◆ SECONDARY MEANS OF EGRESS:

- Generally apartments are served by two fireproof stairways reached by public hallway.
- Smaller fireproof buildings (4 to 6 stories) usually have one fireproof stairs which may be open or enclosed and runs from first floor to roof.

◆ FIRST FLOOR MAY CONTAIN:

- Large stores, supermarkets, day care centers, clinics, offices, the size of which may cover several apartments on the second floor.

◆ CELLARS AND BASEMENTS MAY CONTAIN:

- Parking garages, laundry rooms, meeting rooms, stock areas for the first floor stores, tenant storage, incinerator or compactor rooms, loading docks.

◆ LIFE HAZARD:

- Not severe outside of fire apartment, when the door to the apartment is closed, but the potential for rapid fire development and extensive heavy smoke on the fire floor and floors above, especially stairways, mandate the need for sufficient units for extinguishment and search.

◆ EXTENSION:

- Rarely exposure problems

◆ **VENTILATION:**

- When indiscriminate ventilation is accomplished, whether naturally, because the windows fail, or by fire fighting forces ventilating improperly, unpredictable results will follow, sometimes with disastrous consequences.
- Generally smoke & air will travel in a direction toward vertical shafts, stairwells and elevators.
 - Care must be taken to maintain the doorway to the evacuation stair closed on the fire floor.
- The most prominent variables that effect smoke movement are:
 - Height of building.
 - Stack Effect: the temperature differential between outside & inside
 - Construction and configuration of the building.
 - Surrounding structures and their relation to the building.
 - Mechanical ventilation systems.
 - **WIND**-Wind is the most serious concern to firefighting, as it alone can override the effects of some or all of the other variables. **We must strongly consider the effects of wind , even on lower floor fires.**
- When the fire apartment door has been left in the open position and the windows fail, the **public hall becomes part of the fire area.**

◆ **VENTILATION PROCEDURES:**

- In these occupancies our ventilation is very limited. In fact it is usually not performed until the main body of fire has been controlled.
 - The ladder officer in the fire apartment conducting a search and examination should be the only one to initiate the request for additional ventilation. All other ventilation must be strictly limited and controlled by the Incident Commander.
 - In some older fireproof multiple dwellings there are windows in the stairways. However, newer high-rise structures with scissor stairs are usually windowless.
 - Stairways other than the evacuation stair may be used for venting the fire floor. Where only two stairways are present the attack stairway will be the primary means for vertical ventilation.
 - Conditions in stairways can change dramatically at a wind driven fire.
 - ⇒ Stairways that are relatively clear at the onset of the operation may soon become severely contaminated with smoke, especially if this stairway is used for ventilation.

⇒ The possibility of tenants entering the stairway above the fire must always be expected and all stairways and hallways must be monitored on a continual basis for the presence of victims.

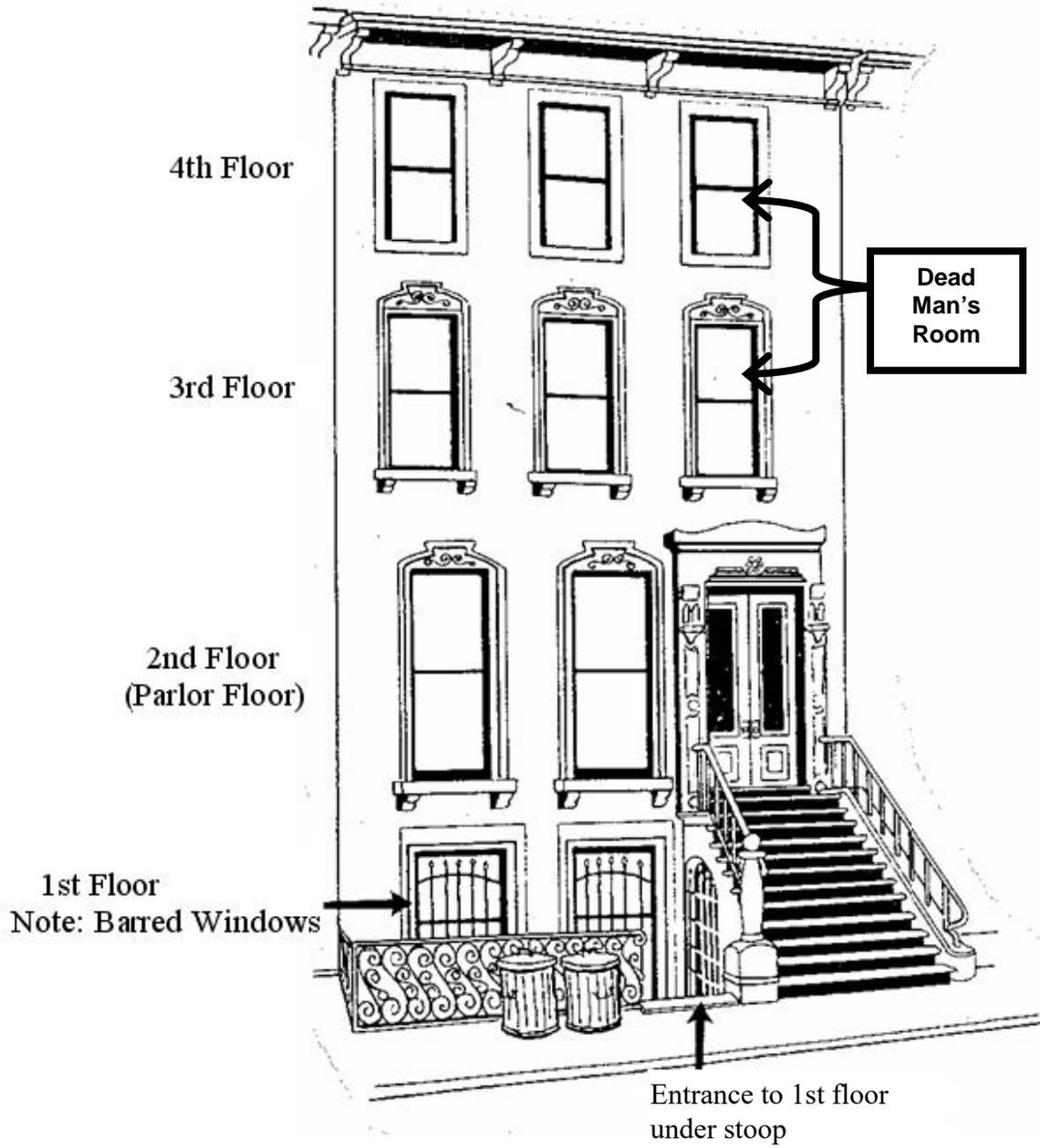
◆ **ELEVATORS:**

- Stairs shall be used when the fire is on the seventh floor or below.
- Projects may have two elevators, one serving odd and one serving even floors. Members may wind up more than two floors below the fire due to this alternate floor system. In other projects, the elevators serve all floors or there is a LOW/HIGH bank system.
- Overloading of elevators must be avoided or the units responding to the fire will be delayed arriving at the fire/emergency. A stalled elevator, is an elevator out of service. Look for maximum load signs and consider each member and his/her equipment to be over 200 pounds.
- After all units are in position, and two elevators are available and serviceable, maintain one elevator on standby in the lobby and one two floors below the fire, to transport injured members or civilians down to the lobby.

◆ **FORCIBLE ENTRY:**

- Fire Floor
 - Adjoining apartments may be forced for sufficient reasons such as high carbon monoxide readings in the hallway or severe smoke conditions. The ventilation effects of forcing doors other than the fire apartment on the fire floor cannot be accurately predicted. Air movement may work against our firefighting and search efforts. A heavy smoke condition in the hallway indicates that the door to the fire apartment most likely has been left open.
 - When it is decided that a door is going to be forced to provide an area of refuge, the door selected must be on the same side as the fire apartment door to prevent fire from being drawn across the hall if the fire apartment windows fail.

TYPICAL BROWNSTONE FRONT



BROWNSTONES

BUILTas private dwellings in the late 1800's

CONSTRUCTION Non-Fireproof, interior is of combustible materials, while the exterior shell is made of non-combustible material. Fire is generally confined to the original fire building, although there may be some spread in cellars due to beams of adjoining buildings butting up against one another, and in the cockloft due to the deterioration and faulty construction in division walls. Fire can also extend to adjoining buildings via the cornice and/ or the "Yankee gutter."

HEIGHT three to five stories with a cellar

AREA 20 to 25 feet wide & various depths to about 60 feet

SECONDARY MEANS OF EGRESS:

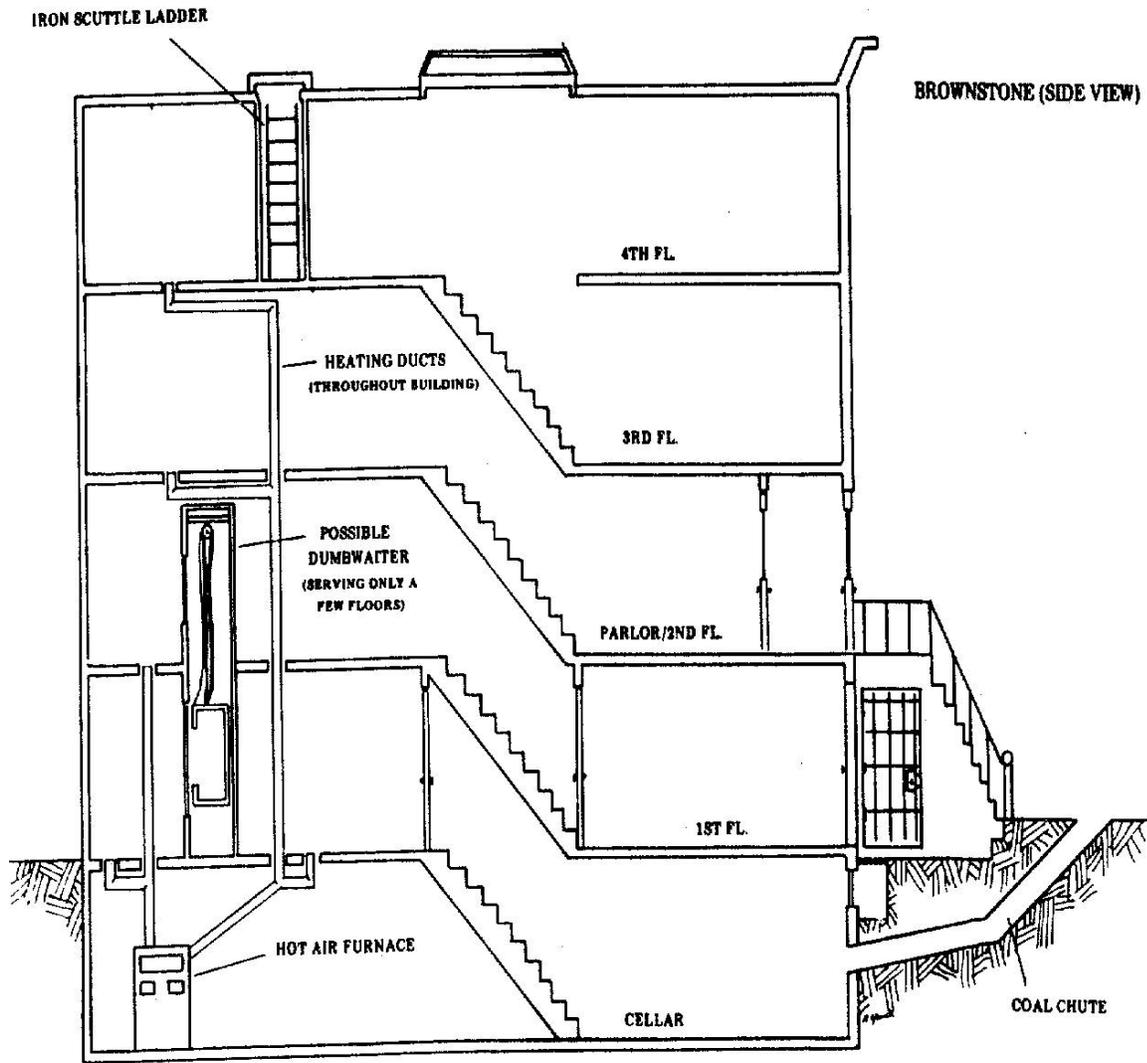
- ◆ Most Brownstones do not have fire escapes.

CELLAR:

- ◆ Interior wooden stairs connect the cellar and first floor
- ◆ Limited means of ventilation; Most that can be expected are:
 - a couple of very small windows at ground level in the rear
 - an opening under a grating near the 1st floor vestibule
 - possibly a coal chute
 - It might be necessary to cut holes in the first floor flooring, near windows in order to adequately ventilate the cellar.

FIRST FLOOR :

- ◆ Entrance is through a doorway located under the exterior stoop
- ◆ composed of a kitchen in the rear with a dining room in the front
- ◆ an interior wooden stairway to the second floor (parlor) and cellar
- ◆ This is the only floor with two means of egress to the outside.



SECOND FLOOR (PARLOR):

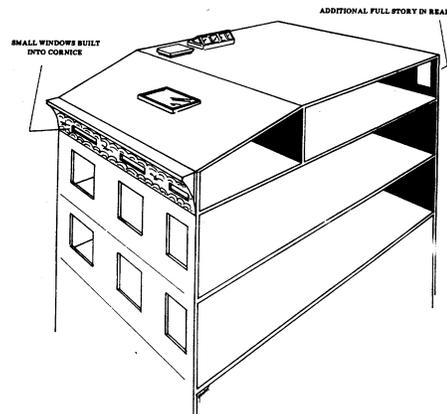
- ◆ Entrance is usually by way of exterior stair or stoop.
- ◆ Front and rear parlor rooms, a hall, bedroom in the rear and the main entrance to the building
- ◆ Open interior stairs to the upper floors
- ◆ 10-foot hooks may be needed for ceilings

THIRD AND FOURTH FLOORS:

- ◆ Originally contained two bedrooms on each floor
- ◆ Hall rooms in the front and the rear, off the stairway. These may have been bedrooms or bathrooms.
 - Generally, these rooms have only one means of egress to the interior hall, causing occupants to be trapped when fire has possession of the open interior stairs. Because of this, these rooms have been referred to as the "deadman's" room.
 - Due to the poor integrity of individual rooms and areas, the single open interior stair often becomes involved in fire and/or heavily charged with smoke. Build up of heat and smoke on the top floor is extremely rapid, and since the buildings were originally constructed without secondary means of egress, occupants are often trapped above the fire. **IMMEDIATE VENTILATION, ENTRY AND SEARCH (VES) OF THE TOP FLOOR IS MANDATORY, AND IS CONSIDERED TO BE ONE OF THE MOST IMPORTANT OPERATIONS AT THESE FIRES.**

ROOF:

- ◆ An iron ladder (usually in a closet) gives access from top floor to the roof through a scuttle.
- ◆ Majority are flat construction with no rear parapet, with an approximate cockloft of 2 to 3 feet in height, pitched to the rear
- ◆ Some have a center peak, sloping towards the front & rear
- ◆ A third type has more floors in the rear than the front. There may be five stories in the rear with full windows. The roof slopes to the front where there are small front (eyebrow) windows making access to and removal of trapped persons from these areas difficult. This also creates a communication problem when making a size up.

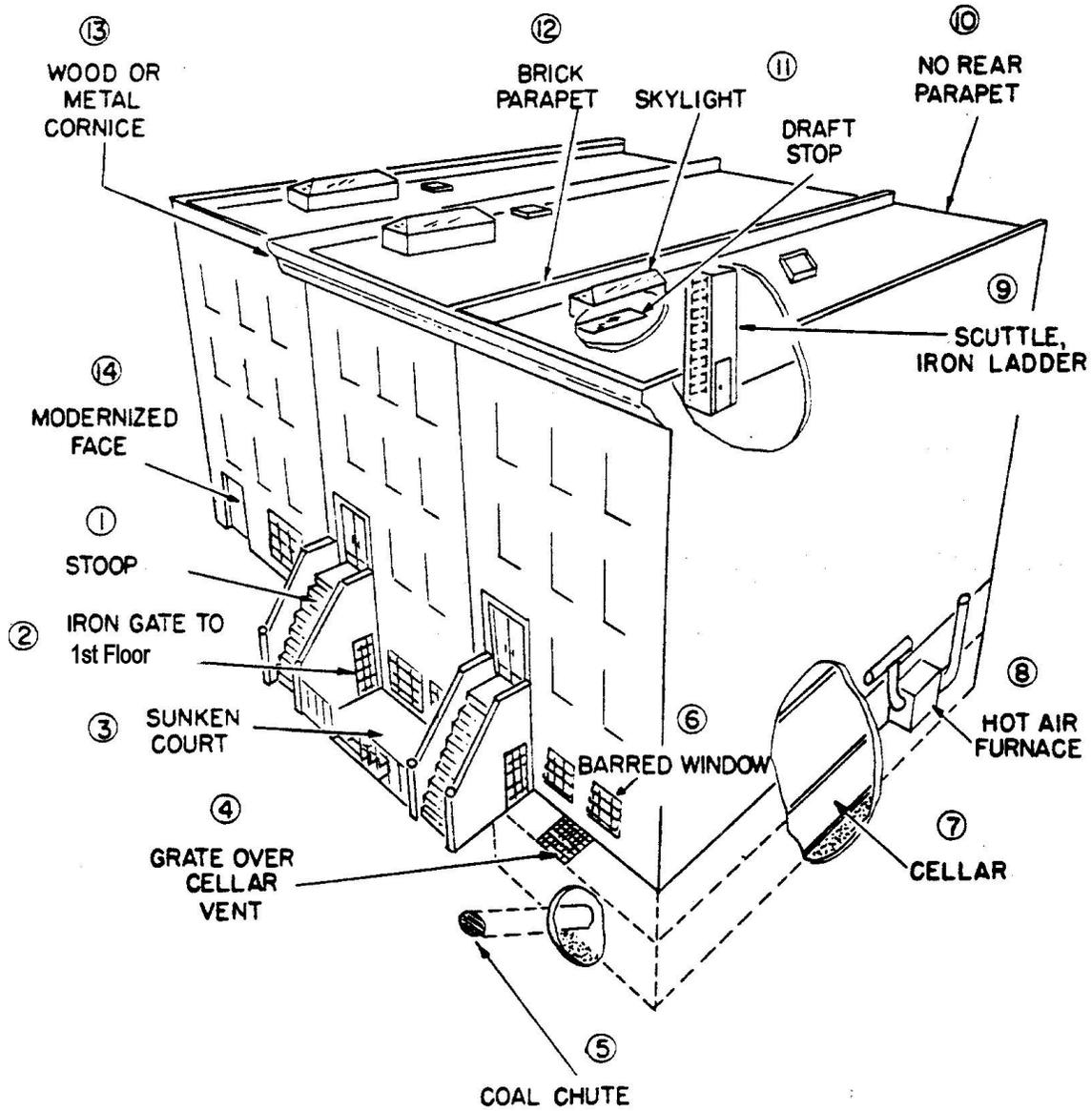


OTHER FEATURES ENCOUNTERED:

- ◆ Brownstones are often found to occupy entire blocks or section of them. When built at the same time, and by the same contractor, they are normally of the same height.
- ◆ Originally bars were often encountered on both front and rear first floor windows and iron gates beneath the front stoop, negating access and egress. Additional bars and gates may be found on upper floors.
- ◆ In some instances these buildings have been renovated by removal of the front stoop converting the former first floor entrance to the main access for the building.
- ◆ In many buildings, when they were converted to Multiple Dwellings, fire escapes were added or sprinklers were installed in the interior halls in lieu of secondary means of egress. Sprinkler lines were further extended into individual rooms when buildings were converted to Rooming Houses. The presence of these sprinklers may indicate the absence of a fire escape. **MOST BROWNSTONES, HOWEVER, DO NOT HAVE FIRE ESCAPES.**
- ◆ In many instances these buildings are being utilized as "illegal" Multiple Dwellings with single room occupancies or entire families found on all floors, without the required fire escape or sprinklers.
- ◆ Rear extensions also have been added on the first floor. In some cases these extensions may be two or three stories in height, and 10 to 20 feet in depth. They will have their own cockloft.
- ◆ In addition to typical problem areas associated with NFP buildings, particular points of examination inside the Brownstone should include dumbwaiter shafts, hot air ducts and registers running throughout the building and pockets in the walls on the second floor (parlor floor) constructed to facilitate the operation of sliding doors (pocket doors).
- ◆ Some Brownstone buildings may have open stairs in the rear of the building. They usually go from the first to second (parlor) floors. This is separate from the main staircase. Their original use was for servants. Fire may extend via these stairs.
- ◆ Transom windows, which may be found over the interior doors, can fail under fire conditions and allow heat and smoke into the hall areas. This also will allow fire to spread more easily.

- ◆ Duplex Apartments: In certain areas of the city, it has become popular to convert to duplex apartments. Each conversion will present its own unique problems. The following is a list of construction features that may be found:
 - A. Access to the apartments:
 - 1. It is common to have one apartment on the first and second (parlor) floors and the other apartment on the third and fourth floors, with each apartment having its own separate entrance.
 - 2. In Brownstone conversions of this type, where the high stoop remains in place, access to the lower apartment will usually be the entrance under the stoop. Ascending the stoop will provide entrance to the apartment on the upper floors.
 - B. Partial areas of the floors may be cut out to create two story-high ceilings and balconies.

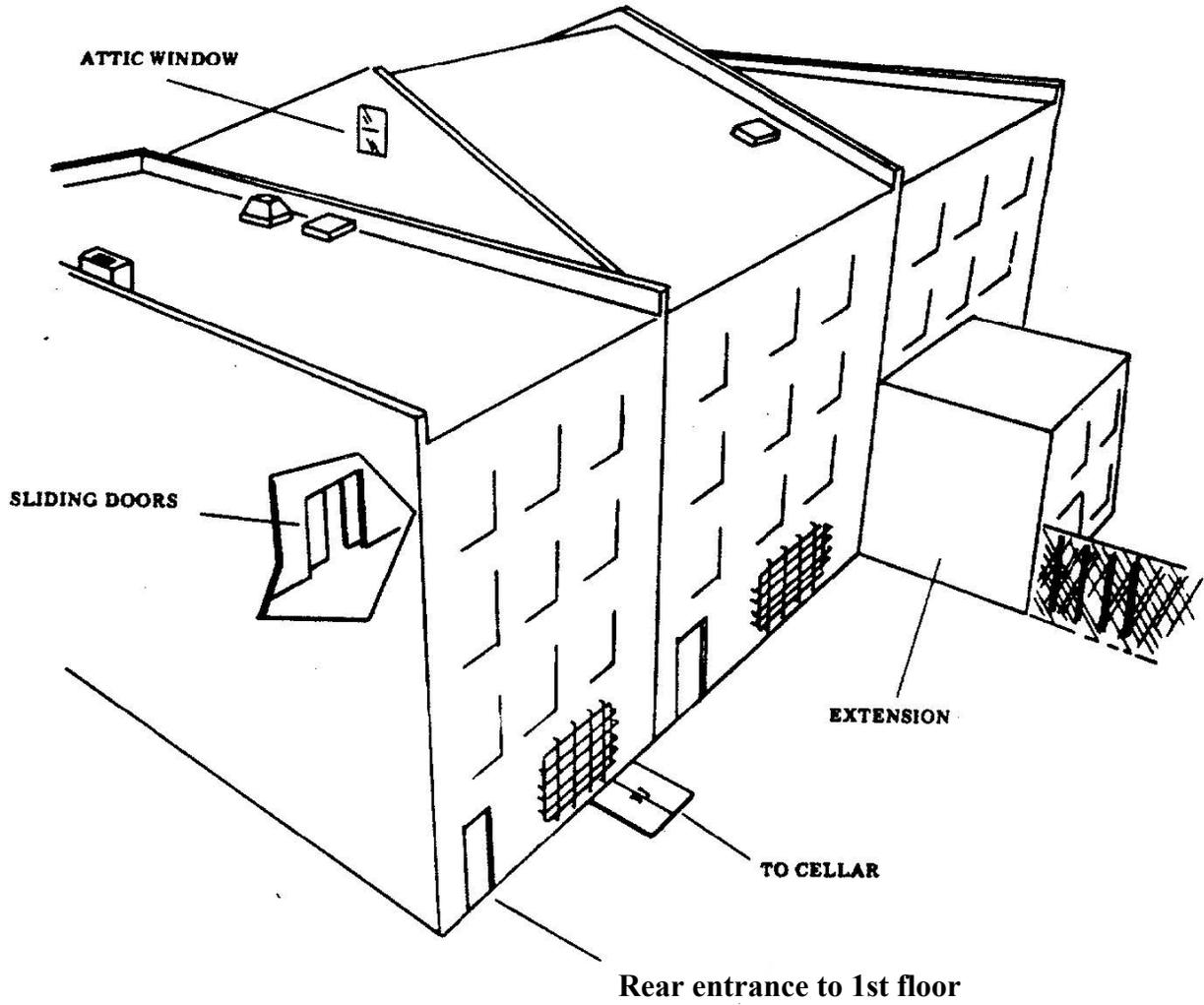
Note: In some cases, ventilation of the roof will only provide ventilation for the apartments on the upper floors.
 - C. Other popular conversions may include a penthouse. These structures are constructed on the roof. They are usually accessed via the apartment on the top floor, creating a duplex apartment.



BROWNSTONE (FRONT)

1. **Stoop** - May be present. Provides access to 2nd floor and better control of 1st floor fires. Interferes with laddering of 3rd floor. Some stoops have been removed to modernize the front.
2. **Iron Gate** - Difficult to force: Steel exit cover from cellar often found just inside gate; this 2nd exit required for class "B" Converted Dwellings.
3. **Sunken Court** - Makes laddering difficult, i.e. handling problems, falling ladders.
4. **Grate Over Vent Hole** - Often has wooden cover, which can be removed for ventilation.
5. **Coal Chute** - Metal cover often found in street or sunken court. Provides ventilation for cellar fires.
6. **Barred Windows** - Bars usually recessed into brick or stone, sometimes attached to frame with wood screws. Bars attached to wood frame are much easier to remove.
7. **Cellar** - Low ceiling; storage area; difficult access; ceiling is open beam construction (unless converted to M. D.).
8. **Heating Plant** - Older systems coal fired, hot air. Many ducts leading to hot air registers throughout building. Even if a newer type system present (steam or hot water) suspect presence of ducts, for often they were left in place when newer system was installed.
9. **Scuttle** - (Bulkheads not found in Brownstones). Iron ladder leads from top floor to roof. Where ladder goes through cockloft, area enclosed by "returns". A quick examination of "cockloft" can be made by removing lightly constructed "returns".
10. Generally no parapet on back wall of roof.
11. **Skylight over stairwell** -. Often has glass panel (draft stop) at ceiling level of top floor. For proper venting this panel must be opened or removed.
12. **Brick Parapet** - Carried above roof 8" or higher (as a rule).
13. **Cornice** - May be removed on renovated buildings.
14. **Modernized Face** - removal of stoop eliminates means of egress from front of building on parlor floor. Occupants encounter difficulty exiting the building during cellar fires

**BROWNSTONE
(REAR)**



BROWNSTONE (REAR)

1. Some of the older Brownstones have peaked roofs. Dangerous to work on , particularly in wet or icy weather.
2. Window in peak allows access and limited ventilation of top level.
Note: Brownstones generally have a low ceiling on top floor, in which heat banks down rapidly.
This makes entrance to the top floor very difficult under fire conditions.
3. Sliding doors are common in Brownstones. The doors recess into hollow partitions on each side of the opening. Voids are created in the partition which allows fire to extend; voids are larger when doors are in closed position.
4. Rear Entrance - 1st level. Only level with 2 exits (unless fire escape is present).
5. Iron Bars - Difficult to remove, unless installed with screws into wood frame. Where bars are attached with screws to the frame, the frame is often rotted permitting rapid removal with a prying tool.
6. Roof of Extension has cockloft which must be examined when extension area is involved with fire.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

ROWFRAMES

◆ **CONSTRUCTION:**

- Class 4, wood frame, as the name implies, are built in rows containing as many as twenty or more buildings.
- When constructed, each builder may have used varying designs, i.e., with stoop similar to brownstones but all wood; with or without cornices.
- These buildings can be either balloon frame or braced frame construction
- The salient feature common to all, regardless of variations in design, is the common cockloft spreading over all the buildings in the row. This cockloft may vary in height from one foot to a height tall enough for a man to stand in.
- These buildings can be considered large rectangular boxes of dry lumber, capable of generating large amounts of heat when burning. There is danger of fire spreading in all directions.
- Interior construction is similar to tenements and Brownstones, usually wood lathe and plaster, wood studs; caps, and plates forming the outline for walls, door frames, etc.
- Exterior is wood or a veneer over outer wood sheathing. Fire can travel unseen in the air space formed when vertical wood furring strips are used between a veneer and outer sheathing.

◆ **HEIGHT & AREA:**

- Varying from two to five stories, are twenty to thirty feet in width, with depths ranging from forty to sixty feet.

◆ **TWO TYPES OF DESIGNS:**

1. Brownstone Type:

- Generally have three front windows per floor
- One apartment going front to rear and no rear fire escape

2. Old Law Tenement Type:

- Four window front
- Two railroad apartments per floor
 - The depth of the building will determine the size and number of rooms.
- Rear fire escape
- There may be a dumbwaiter shaft present.
- The presence of light shafts is also a possibility.



BROWNSTONE TYPE ROW FRAMES



OLD LAW TENEMENT TYPE

OTHER FEATURES ENCOUNTERED:

- The division walls between buildings are quite frequently no more than the equivalent of a partition wall with nogging present. Because of age, this nogging presents limited hindrance to fire. The mortar has disintegrated with age leaving many spaces through which the fire can penetrate.
- Common cornices may be present, but even in buildings in the same row there may be variations. Owners of some of the row buildings may have altered the original construction. The impression that can result is that the cocklofts were constructed at different times, and are not connected to those burning. It is important to determine the extent of the common cockloft which is involved in fire.
- Common or poorly fire stopped cockloft and cornice permits rapid fire spread into exposures. The term Row Frame is, of course, derived from the fact that these are constructed in rows, often running the length of the entire block.
- There are many variations in the construction of these buildings. Light and airshafts are found in some, while not in others. Usually the buildings of longer length will have the shafts.
- Air and light shafts are of wood, and fire in shafts rapidly assumes blowtorch proportions.
- To gain entrance to the roof from the interior of the building, there is a scuttle on the roof which is reached by an iron ladder from the top floor. The scuttle is usually near the skylight over the stairs.
- Many of these buildings have a retail store on the first floor. This may include anything from a grocery to a repair shop.
- Lack of fire stopping at cellar ceilings may permit fire travel from one building to another. Sometimes the cellar runs under more than one building with no separation. Fire in these cellars endanger two or more buildings.
- Common partition walls between buildings readily permit horizontal fire spread to exposures through adjacent walls.

◆ **EXTENSION AND SPREAD OF FIRE**

- The life hazard is great due to the large number of occupants and the rapidity with which the fire may spread. Loss of life may occur within the building, or as a result of the occupants jumping from windows.
- The major defects or faults in the construction are the lack of the fire stopping and the vast quantity of combustible material used in the construction. Fire can spread in the following manner:

A. Vertically

1. Via pipe recesses.
2. Via light and air shafts.
3. Auto exposure via front and rear windows, and via siding,
4. Via interior walls and partitions.
5. Via false fronts, bay windows, spaces between sheathing and building.

B. Horizontally

1. Via the common cockloft from one building to another. As the heat from the fire on a lower floor increases in intensity, the temperature rises rapidly. Smoke and heat will then spread laterally throughout the entire cockloft area. An extremely intense fire will develop in short order. Identifying those buildings already involved will be made more difficult, since we will already have heavy smoke throughout the cockloft.
2. Fire will spread via the common cornice.
3. Thin and flimsy walls between buildings will present no stop to fire spread.
4. In those with cellars common to more than one building, fire will involve both if the fire is of any consequence.
5. Presence of a store, and the type of business, may add to the fire. Tin ceilings make opening up more difficult.
6. Wood cellar beams in adjoining buildings, resting on a common wall, may spread fire where they butt.
7. Fire may also spread from the roof of the fire building to the roof of an adjoining building by ignition of the roof covering.
8. Via windows and siding to adjoining buildings.

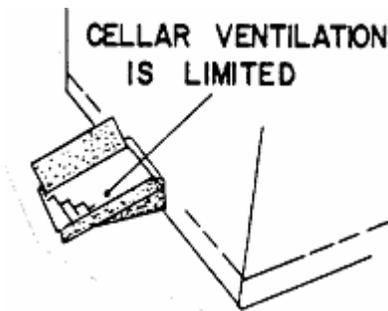
THE DANGER OF COLLAPSE WITH FIRES IN ROW FRAMES IS A FACTOR DESERVING CONSIDERATION.

- A. A heavy fire in the cockloft will burn roof supports and cause the collapse of the roof into the top floor.
- B. Rear walls can pull away from the building and collapse in one section into the yard. Personnel will have to be alert to the possibility.
- C. Collapse of sidewalls is also a danger. This is especially true where buildings within the row have been demolished and removed. Even if walls bordering this gap are braced, the danger is still present.
- D. Indiscriminate removal of structural members during overhauling can cause partial or complete collapse of the building
- E. The weight of a fire escape can cause a complete collapse of an exterior wall.
- F. Brick veneer and stucco facing can collapse in sections or as a complete unit.
- G. Steel plating attached on interior and exterior walls for security purposes adds additional weight increasing collapse potential.
- H. When a serious fire burns out the entire first floor, there is danger of collapse, especially in corner buildings and buildings standing alone.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

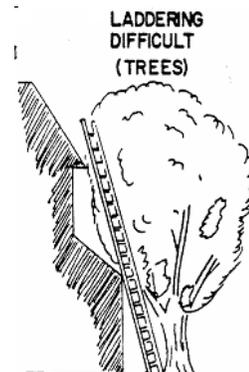
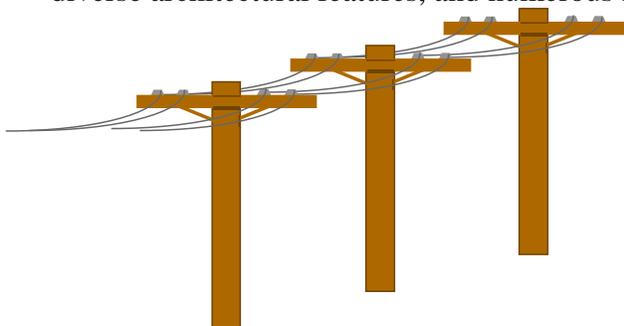
PRIVATE DWELLINGS

- ◆ **BUILT:**.....Originally for one or two families
- ◆ **CONSTRUCTION:**Class 4 (Frame) or Class 3 (NFP) ^w/brick exterior walls
 - May be attached, semi-attached or detached
 - An open interior and unenclosed stairway is the major weakness from a fire protection standpoint.
 - Many newly constructed dwellings are incorporating lightweight construction systems are used in place of both conventional floor joists and/or roof rafters.
 - When fire extends from the building contents to the structure, early collapse can be expected
- ◆ **HEIGHT:**1 to 3 stories
 - Split level homes may have as many as 5 levels within a 3-story building
- ◆ **AREA:**Average approximately 20' x 40'
 - Generally rectangular although alterations & extensions are common
- ◆ **CELLAR ENTRANCE:**.....Usually underneath the interior stairs, some dwellings may have a rear exterior entrance.



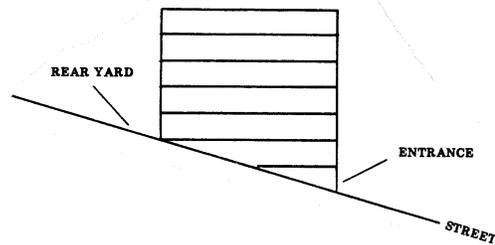
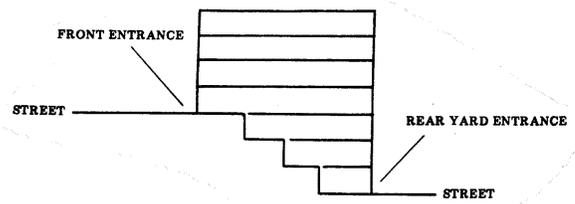
- Throughout the city there have been many renovations to private dwellings. As part of these renovations, the interior stairway, to the cellar, may have been moved or sealed off. It is common to find a closet in the area where the stairs were once located.

- ◆ Complicating fire operations units should expect obstacles such as hilly terrain, set backs, overhead wires, fences, trees, shrubbery, diverse architectural features, and numerous floor plans.



◆ Dwellings built on sloped terrain can cause communication and operational problems.

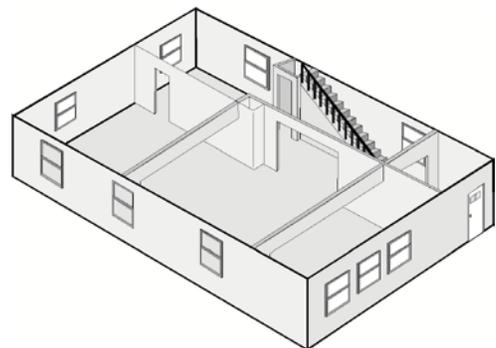
- A dwelling which has 2 or 3 stories in the front may be 3 or 4 stories in the rear.
- The top floor may be used as a point of reference as the difference in floor levels may not always be apparent from the front. The outside team should make this a part of their size up.



SPECIFIC DESCRIPTIONS

◆ **Straight Line Colonial**

- Typically 2½ to 3 story and 20'x40'
- Balloon frame construction is commonly found.
- The side door generally gives access to the kitchen and to the cellar stairway.
- The utilities are found in the cellar.
- The 1st floor has a front porch area, a living room with an open stairway to the 2nd floor, a dining room, and a kitchen in the rear.
- The kitchen contains the stairway leading to the side door and cellar.
- The 2nd floor has 2 or 3 bedrooms, a bathroom, and access to the attic.
 - This access space can be as large as a normal stairway or as small as a hatch in a closet.
- Due to the limited ventilation of the attic/3rd floor, conditions in this area will be extremely punishing.
- The roof of the front porch allows for easy access to upper floor bedrooms.



◆ **Cape Style House**

- Two dormers are normally found facing the street.
- They usually indicate 2nd floor bedrooms.
- Portable laddering of these dormers can be very difficult.
- The easiest exterior access to these rooms, via portable ladders, is through windows that are found on the exposure #2 & #4 sides of the house.
- These homes may have a full sized second floor or the rear may have a dormer.

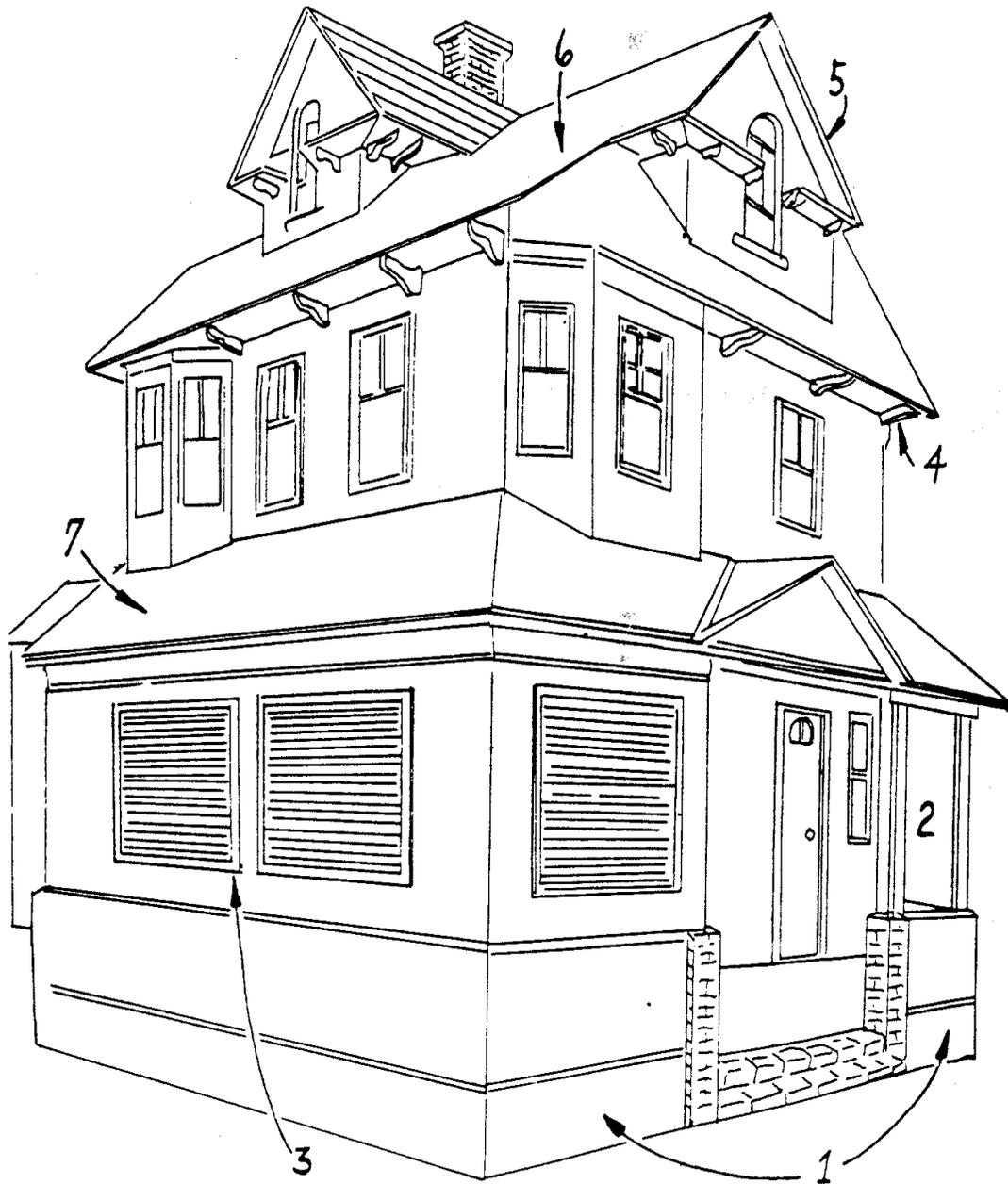


◆ **Queen Anne**

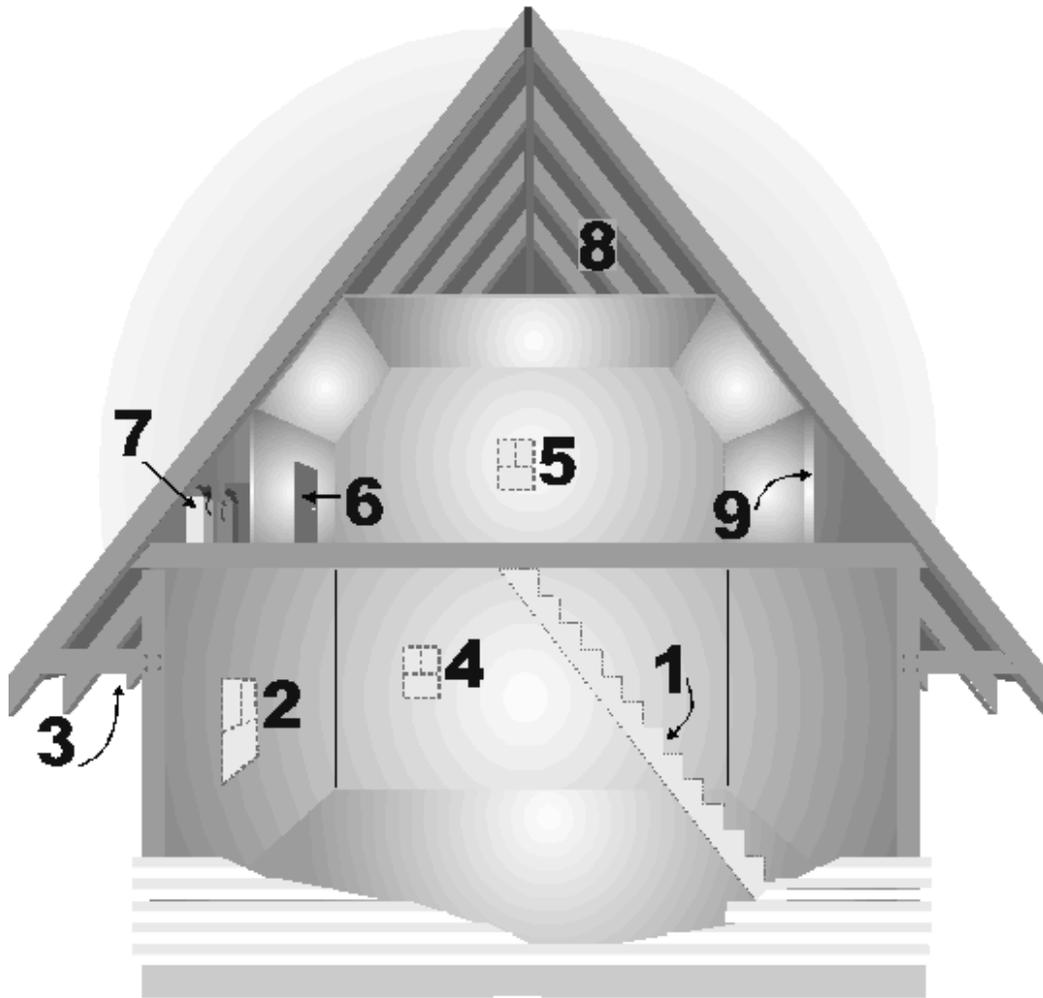
- 2½ to 3½ stories in height
- 25' to 30' wide & 30' to 50' deep
- Construction is wood frame with exteriors of wood siding, asphalt shingles, brick veneer, or stucco.
- The roofs have many peaks, dormers, overhanging eaves and possibly a cupola.
- (A cupola/turret is a tower-like room with a round or dome shaped roof).
- Multiple variations in size and number of dormers and gables create a maze of peaks and valleys at roof level.
- Balloon construction is most common and early attempts at built-in fire stopping are negated by poor workmanship, open holes for house service lines, etc.
- A narrow rear or side stair connects the 1st, 2nd, and 3rd floors, or a stair may lead directly to the 3rd floor from the 1st floor.
- Vertical arteries supplied by old hot air ducts, dumbwaiter shafts, boxed in space around fireplaces and the usual pipe recesses, contribute to undetected and fast upward fire travel.
- They may have a fire escape or a sprinklered stairway.



- The fire escape will be attached to a combustible wall and its use shall be carefully considered if that wall is exposed to, or involved in fire.



1. Under the porch area may be a ventilation point. Cellar windows rarely exist here. When they do, they may be inaccessible. Windows may exist in the rear, however.
2. Open area permits ventilation and easy access to the first floor.
3. Enclosed porch inhibits access and ventilation.
4. Roof overhang(eaves) can permit fire to extend into the attic if fire has vented out a window. Three levels of eaves are shown.
5. & 6 Sharply pitched roof with many peaks and gables is difficult to walk on.
7. Rear and side extensions may present many other means of entry and escape. An outside cellar entrance usually exists at the rear or side.



1. **STAIRS** – May or may not exist
2. **WINDOW** – Uncontrolled venting of this window can extend fire to attic
3. **EAVES** – Eaves (not fire-stopped) extend fire to attic
4. & 5. **WINDOWS** – Vent these windows where possible
6. **DOOR** – Existence of door indicates closet
7. **BOXES** – Possible storage of combustibles
8. **CEILING** – Attic may be finished (all or part) concealing fire
9. **INSULATION** – Insulation with combustible covering may exist

◆ **Flat Roof Private Dwellings**

- Flat roof dwellings may be found isolated, attached in pairs, or attached in a row occupying an entire block.
 - ◆ Many attached dwellings were built with firewalls that cannot be relied on. Exposures must be monitored.



With attached homes it is not always apparent from the front what conditions may be in the rear. Another concern is proper identification of the fire floor.



This photo shows the rear of the attached homes shown in the photo to the left. Note the difference in height in the rear.

- In most cases, it is readily apparent from street level that these structures have flat roofs. However, in some areas of the city, flat roof structures have a decorative peak in the front. The absence of a window in this peak may be an indication of a flat roof. Once it is confirmed that the structure has a flat roof, all members must be informed. These structures may have a skylight and/or scuttle.



◆ **SPECIAL CONSIDERATIONS**

The following are common in private dwellings and create special fire safety and fire fighting problems:

- Cellar areas used as living quarters with no secondary means of egress.
- Lack of a secondary means of egress from upper floors. Interior stairs are often narrow and sometimes winding. Landings are small; thus restricting movement of the operating forces and making an interior attack more difficult. **CONTROL AND MANAGEMENT OF THE INTERIOR STAIRS IS CRITICAL TO A SUCCESSFUL OPERATION.**
- In some dwellings the stairs to the attic or third floor are found behind a small door resembling a closet door. In other homes, access to the attic is via a pull down type stairs with a rope attached for ease of use. Access may also be found in a bedroom closet with no ladder provided.
- When it is obvious that the dwelling has two or more families (separate entrances, multiple mailboxes, etc.) bedrooms can be found on all floors.
- Attached and built-in garages may have a door that opens directly into the house which can be avenues for fire extension. Storage of automobiles, flammable liquids, propane, lawn or pool chemicals may be found. Some attached garages may also be converted to living spaces.
- Alterations and repairs using sub-standard materials and faulty workmanship.
- Fires involving the electrical service may energize the aluminum siding. A ground is completed when an aluminum ladder is placed against, or a firefighter makes contact with, the siding.
- Use extreme caution when operating with aluminum ladders in proximity to overhead electrical service. Power lines may burn through when exposed to heavy fire conditions causing live wires to fall to the ground. If these wires fall on a chain link fence, the entire fence may become energized.
- Thoroughly examine areas under windows (especially when found in the open position), and porch roofs, as victims may have jumped prior to the arrival of units. These victims may be easily overlooked if trees and bushes surround the house.
- Central air conditioning systems may spread smoke and toxic gases throughout the building. Dual heat and air-conditioning units will be in operation throughout the year.

The term "Taxpayer" is not defined or recognized in the building code. The term originally referred to the practice of real estate investors who, while holding land for speculation, resorted to minimal investment in construction to produce income to offset the cost of taxes. These structures were usually of cheap and flimsy construction with little or no fire retarding features.

Supermarkets and one story shopping centers of more recent construction do not fit the above description but contain many of the inherent hazards associated with taxpayers. For the purpose of this manual, they shall be considered "taxpayers."

A taxpayer building is commonly taken to mean a business structure one or two stories in height. Their areas vary from 20' x 50' to areas of whole city blocks, the most common size being approximately 100' x 100'.

They can be built on one or more lots with adjoining structures of greater heights on three sides. These buildings are usually single structures commonly sheltering from one to as many as 15 different businesses with weak non-fire resistive partitions and no fire stops in the cocklofts.



THERE ARE THREE BROAD CATEGORIES OF TAXPAYERS:

1. OLDER TYPE: BUILT UP UNTIL THE 1920's

- ◆ One to two stories
- ◆ Wood & masonry, some may be just wood frame
- ◆ Original ceilings may have been tin, but as many as two or three suspend ceilings may be found due to renovations.
- ◆ Decorative metal cornices or small signs, attached to the front wall, sometimes provide access to the cockloft.

2. BUILT FROM THE 1920'S INTO THE 1960'S

- ◆ Usually larger in area & one tenant occupancies, such as supermarkets, bowling alleys, restaurants, factories, etc.
- ◆ Firewalls may be present for subdivision of the building
- ◆ May have 2nd floor with separate occupants, such as large meeting halls, dancehalls, restaurants, etc., or may be broken up into small offices.
- ◆ Removing the cornice or sign in most cases will not provide access into the cockloft area.

3. NEWER TYPES BUILT SINCE 1960'S

- Combustible construction material has been reduced
- Steel bar joists used to support the floors & roofs in lieu of wood beams
- Floor & roof may be concrete poured on top of metal decking

AUXILIARY FIRE PROTECTION SYSTEMS

- ◆ Generally the only auxiliary fire protection that may be found in these buildings will be automatic sprinkler systems where they are required by the Code.
 - In some cases due to variances, sprinklers may only be found in the cellar areas.

BACKDRAFTS

- ◆ When a fire burns within a structure, particularly a sealed or closed occupancy and the fire is unable to vent itself to the outer air, the available air supply within the structure is used up quickly and since very little seeps in from the outside the flames begin to subside. A high heat condition, with combustible gases and highly heated contents may now be present in the structure. All that is missing is a source of air or oxygen to create an explosive fire.
- ◆ If the conditions described exist when the units arrive, the conditions are favorable for a backdraft unless the building is opened up properly.
 - If the front door is opened prior to roof venting there will be a momentary out rush of smoke followed almost immediately by an inrush of fresh air. This air sweeps in towards the fire area and when it reaches the edge of the glowing embers there will be an explosion and the entire store or structure will burst into flames and flash back or vent through this opening.
 - The proper procedure is to open the roof or area directly over the fire. This allows the hot gases to move upward through the opening away from the fire. These gases will ignite and vent to the outer atmosphere.
 - After roof venting has been accomplished, entry may then be forced at the lower level and lines advanced to extinguish the fire.

- ◆ An indication that a fire may have been "cooking" for some time prior to receipt of an alarm by this department, is an alarm received in the early morning hours, after the occupancy has been closed since the night before or longer. This calls for a more careful assessment of a plan of action before the commitment of forces since the factors of collapse or backdraft must be considered.

CANOPIES OR MARQUEES

- ◆ These extensions are generally supported by cables, steel tie rods or steel beams, which go through the wall and are attached inside the building, probably to combustible members in the cockloft. A fire in the cockloft can weaken these attachments or supports, causing sudden collapse of the canopy or marquee and a long section of the parapet wall, without any warning. Six firefighters lost their lives in the collapse of such a marquee and parapet wall at a furniture store fire in 1956.
 - Marquees are hollow boxes which can fill up with run-off water at a fire operation due to use of heavy streams. A 12' x 24' marquee, 4' deep, when filled would contain approximately 35 tons of water. In effect, a hanging swimming pool. Marquees are required by the building code to have drainage facilities. Many have been found to have roof type gutters and down spouts blocked with debris, rubbish and rubber balls.

ACCESS TO CELLAR AREAS

- ◆ Outside sidewalk trap doors in front of the stores give access to wooden, iron or masonry stairs, straight iron ladders and chutes or conveyors for stock delivery.
 - The chutes, when not in use, may be folded against the wall alongside the cellar stairs. After units have been committed to cellar operations down such stairs, these chutes can fall, covering the stairs. This will make it difficult to evacuate the cellar in an emergency.
- ◆ Outside cellar stairs are usually found in the rear of taxpayers. When there are several stores in the building, these stairs may lead to a passageway along the rear cellar wall from which access can be gained to the various storage areas.
- ◆ Outside sidewalk or interior elevators.
- ◆ Interior stairs, trapdoors or chutes and conveyors.
- ◆ Windows to cellars and basement in taxpayers are usually below grade in depressed areas that are covered with gratings.
- ◆ In the older type taxpayers, the flooring of the first floor may not be extended under the raised front window display area. By removing the paneling under these windows an opening for ventilation and water application can be gained.

CELLAR AREAS

- ◆ Cellar areas are often divided into a maze of storage spaces. The layout often does not necessarily conform to the store layout. One occupancy may use a large section of the cellar with openings through partitions, while other occupancies may use smaller areas or none at all.
- ◆ Cellar ceilings are required to be fire retarded but the plaster covering may be deficient. Partition walls between cellars are usually of combustible or flimsy construction and joist channels at cellar ceilings are often not fire-stopped allowing fire, combustible gas and smoke extension from cellar to cellar.

CELLAR CONTENTS

- ◆ May include flammable, fast burning or poisonous materials, and/or pressurized containers.
- ◆ Large amounts of stock piled to the ceiling with very little aisle space.
- ◆ Refrigeration machinery and piping.
- ◆ Walk-in refrigerated areas.
- ◆ Heating furnace rooms and oil storage tanks.
- ◆ Electrical supply entrance points with panel boxes and large amounts of wiring.
- ◆ Gas supply with gas meters and piping.

COCKLOFTS

- ◆ Usually is a common area extending over all the stores in the structure.
- ◆ Can vary in height from four inches to more than six feet.

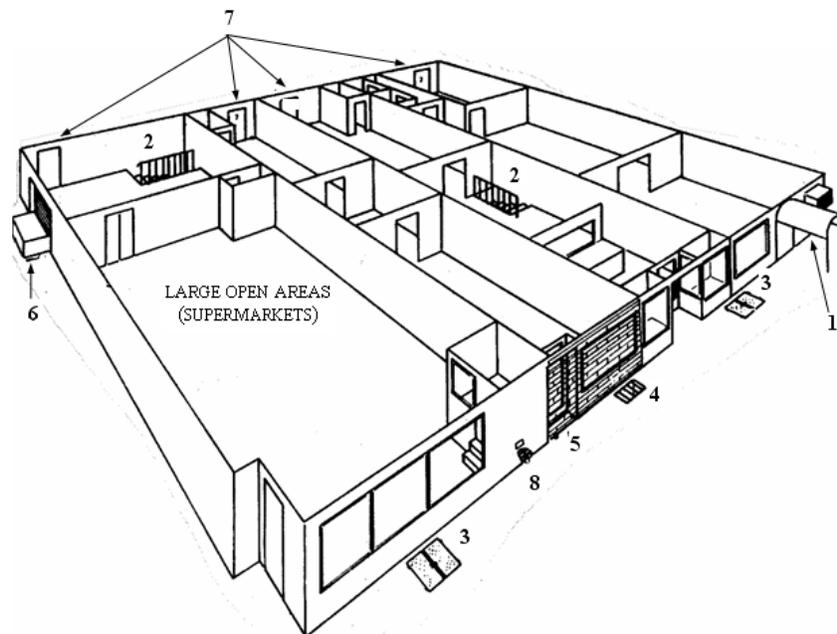
COLUMNS

- ◆ Can be made from wood, cast iron, lally columns (steel or cast iron) or masonry piers which support the beams.
 - Cast iron columns are unpredictable and fail, on the average, in about thirty (30) minutes in fire endurance tests. Some columns fail sooner than cast iron columns. The failure of a column is generally more serious than the failure of a girder or beam. The failure of a column in the cellar can cause the subsequent collapse of the floors and roof. Coating or spraying the columns with fire proofing material on new type construction is often a haphazard process, because of shoddy workmanship and on-the-job alterations made after application.

COLLAPSE

- ◆ The following may be causes of collapse during fire operations in taxpayers:
 - Backdrafts blowing out walls or floor.
 - Weakened and burned out structural members.
 - Heating of unprotected structural members.
 - Accumulation of a large volume of water on a floor or in a ceiling.
 - Presence of water absorbent materials such as rags, paper, clothing, which increase floor loads when wet and which may push out walls by expansion from the absorbed water.
 - Impact load: An object such as a gas heater falling from the ceiling, or a firefighter jumping onto a roof or floor which has been weakened by fire may be enough to cause collapse. An impact load has a much greater effect than the same weight carried as a static (stationary) load.
 - Vibration or movement in or near a weakened building.
 - Water, ice or snow loads on the roof.

TYPICAL ONE STORY TAXPAYER



LEGEND

- 1 --- Canopy
- 2 --- Interior Cellar Entrance
- 3 --- Sidewalk Cellar Entrance
- 4 --- Sidewalk Grating
- 5 --- Roll Down Gate
- 6 --- Delivery Entrance (roll down door)
- 7 --- Rear Exit
- 8 --- Siamese Connection

Some of the warning signs that will signal a potential structural collapse:

- Heavy body of fire which has been burning out of control for 20 minutes or more, particularly in a large open floor area.
- Walls leaking smoke or water.
- Walls or columns out of plumb.
- Unsupported walls.
- Sagging or bulging walls. One cubic foot of brickwork weighs about 100 pounds. Multiply this by the expected area of wall collapse and we are dealing with a vast total weight.
- Cracks in exterior walls.
- Movement in or on any floor or the roof.
- Rumbling noises or heavy puffs of smoke.
- Cracking or groaning noises which may indicate strain being placed on structural members.
- Inability to make successful headway against a heavy fire condition within 20 minutes into the operation at the fire.
- Presence of heavy equipment or signs on the roof. These are examples of static loads. They pose especially dangerous collapse potential when their supporting structural members are subject to heavy fire conditions.
- Heavy floor loading. Floor loads vary with the occupancies. Display cases loaded with merchandise or the presence of heavy stock or equipment such as ice boxes, freezers, and counter must be taken into account.
- Spongy or soft feeling, as you walk on the roof. The inverted or raised roof is inherently spongy. A realistic appraisal must be made.

CONSTRUCTION

- ◆ Instability of the structure may not be obvious during fire operations because structural elements are covered by finishing material or obscured by smoke conditions.

NEW TYPE CONSTRUCTION

- ◆ The new type of construction (supermarkets, etc.) is much better than the traditional or older type from a fire protection view point.
 - Many of the newer type taxpayers are built on a concrete slab foundation, which removes a major problem of cellar and basement fires. The partition walls are usually better constructed due to the use of the steel and aluminum stud system which employs gypsum blocks and sheathing as a bearing or nonbearing wall system.
 - The roof system will remain a major fire fighting factor because, for the most part, the roofs are constructed of "Bar Joists," light weight steel or flat wood trusses.

EXIT FACILITIES

- ◆ In both the older and newer taxpayer, exit facilities are poor.
 - In the smaller type store establishments there is usually only one means of entrance and exit; the main store opening.
 - In the larger type occupancy (supermarkets, etc.), there are two means of egress. The customers, however, are aware of the main entrance only, since the secondary exit is usually remote or obscure. The entrance may consist of only two doors to as many as six doors. Some of the newer types are automatic in operation, opening inward and outward for the customers use.
 - Depending on access, use and location, there may be a second means of egress in the rear of the store from a storage, utility or delivery area. This exit is not readily available or accessible for public use.
 - In supermarket and discount type store occupancies the obstruction of exit accessibility can be anticipated due to the presence of checkout counters, stock displays and shopping carts.

FIRE EXTENSION

- ◆ Horizontal Spread:
 - Via common cockloft.
 - Through flimsy partitions.
 - Between the beams in ceilings.
 - Via hanging ceilings.
 - Via ducts-air conditioning, heating, vent ducts
 - Butted joists.
 - Common ceiling.
 - "I" beams.
 - Party walls.
- ◆ Vertical Spread.
 - Via ducts.
 - Via pipe recesses.
 - Through ceilings.
 - Via concealed spaces between furred plaster and brick walls.
 - Via open stairs or trap-doors.
 - Via voids.
 - Convection -mushrooming at upper levels.
 - Shafts- light and ventilation shafts from interior bathrooms and offices.
 - Stock conveyor belts and chutes from cellars.

FLOORS

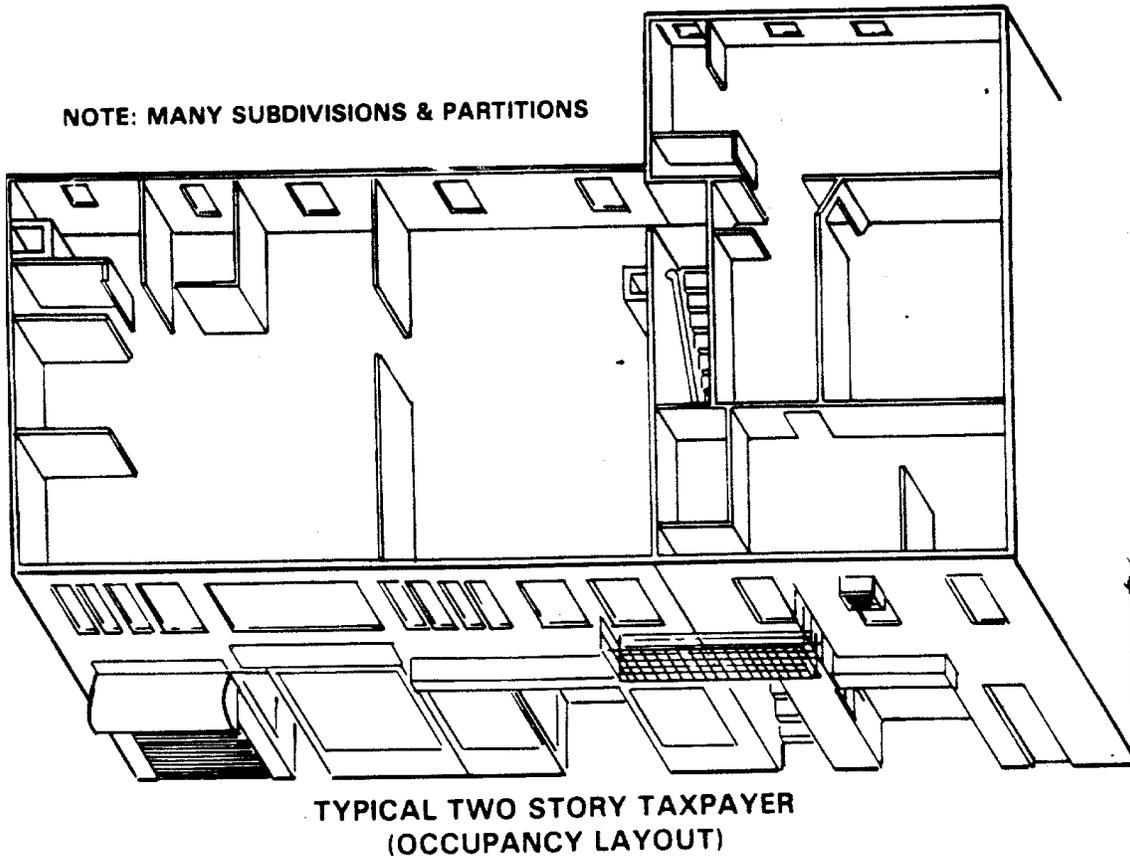
- ◆ The most common type floors are tongue and groove boards or plywood, supported by wood floor joists.
- ◆ Heavy terrazzo or concrete placed over a wood joist floor can possibly create an exceptionally hazardous condition. A fire in the cellar may weaken floor supports with little evidence of heat conditions on the first floor. These floors are difficult to ventilate to allow early advance of cellar lines or use of cellar pipes and distributors. Sudden failure due to weight on the floor is possible.
- ◆ Paneling under display windows at street fronts can sometimes be removed to offer easy ventilation and stream operation points for cellar fires. The flooring under the raised display platform is sometimes omitted behind these panels.
 - In newer type taxpayer slab construction, concrete floors are prevalent on ground level with no basements or cellars in the buildings.

HAZARDOUS MATERIALS

- ◆ By looking at the occupancy signs, or through knowledge gained during building inspection, units should be aware of the presence of hazardous materials. This will alert them to the precautions that must be taken before starting operations.
- ◆ Some occupancies containing hazardous materials are:
 - Drug Stores. The presence of combustible, explosive, and flammable materials, which if mixed with each other, or if water is applied, or if exposed to the heat of a fire, may unleash poisonous or corrosive fumes or create an explosion or an explosive atmosphere.
 - Paint Stores. They present the problems of various combustibles or flammables such as paints, lacquers, varnishes, etc., in containers of various sizes.
 - Supermarkets. They have many different aerosol sprays, refrigerants, compressed cylinders, lye in containers and other corrosives and caustics.
 - Bakeries. They have large ovens. The potential for extensive gas leaks from broken or burned away piping presents the potential for a highly combustible atmosphere and a gas explosion.
 - Swimming Pool Supply Stores. They have large stocks of oxidizing agents which in the presence of fire and limited water supply pose the possibility of rapid fire involvement and the release of gases such as chlorine.
 - Smoke Shops are prevalent in many areas of the city. Various drug paraphernalia are commonly stored and sold out of these shops. Among the substances stored and sold are: ether in pint bottles, small butane cylinders (packed in cases) and in some cases acetone in small bottles. Most of the stores have roll down security doors, but can be identified by advertising signs denoting them as Smoke Shops.
- ◆ It is recommended that any units encountering a fire in these occupancies stretch 2 ½" line and proceed with extreme caution. Consideration should be given to knocking down the fire from sidewalk area before entry is attempted.

LIFE HAZARDS

- ◆ Life hazard in two story taxpayers can be a serious problem on the second floor. Occupancies such as restaurants, private clubs, dance halls, etc., open to large numbers of people unfamiliar with the means of egress. Security measures may also be a factor effecting means of egress.



MEZZANINE AREA

- ◆ Found in some taxpayers. Their location, area and use will differ. In most cases used for storage of goods, but it can contain offices (predominant in supermarkets and factories) and also sales areas to which the public will have access.
- ◆ Since these areas have probably been added to the premises after the original construction date, the load bearing components can be of light construction.
 - These supports may be loaded beyond their safe load bearing capabilities.
- ◆ The height of the ceilings in the mezzanine and the area below will be below average.
- ◆ In the majority of the mezzanines this area will not be enclosed.

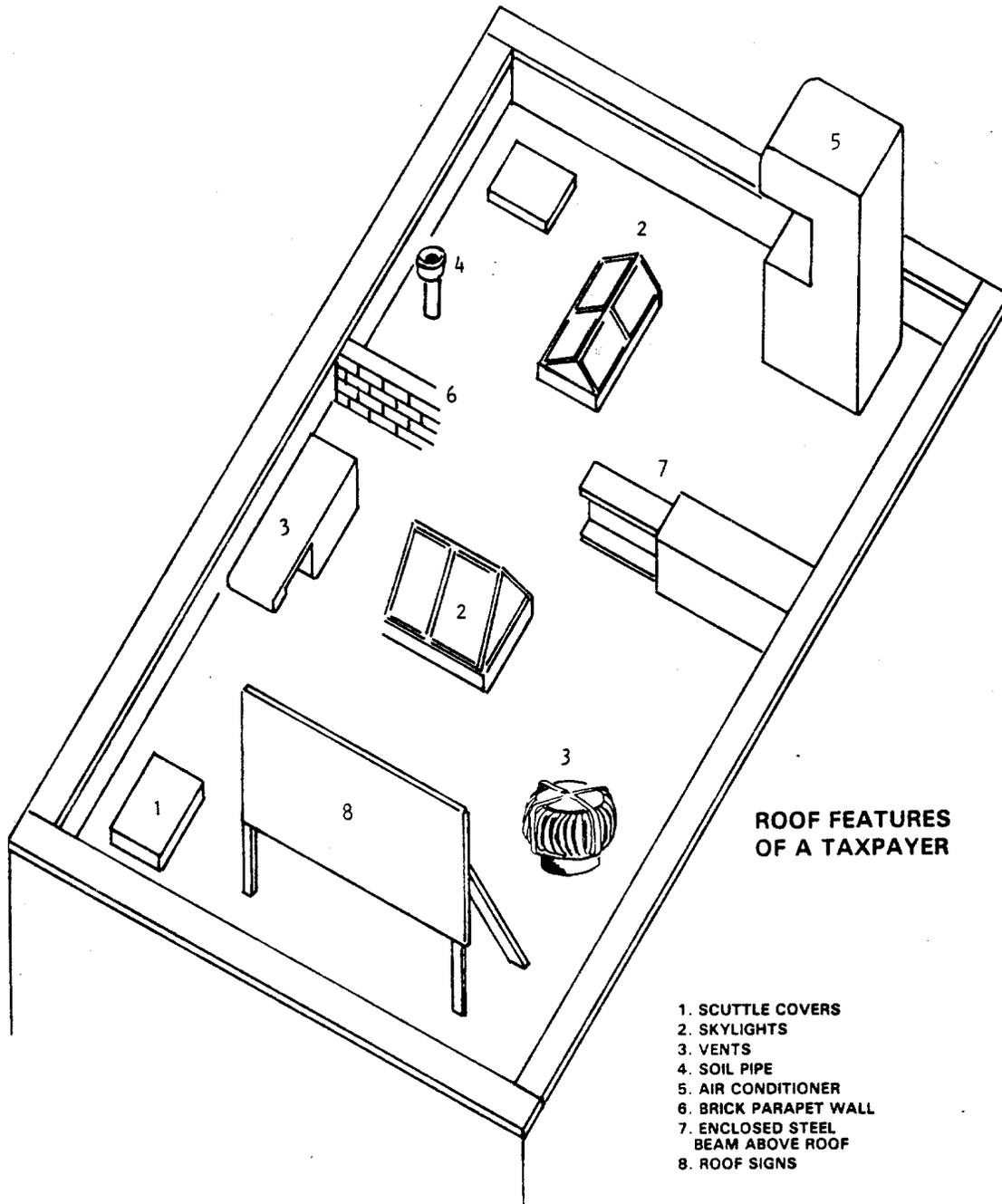
ROOFS

- ◆ Roofs built in step fashion with one store roof slightly higher than another sometimes give the false impression of fire division walls. The side walls of such protrusions are made of wood sheathing and are easily detected by striking them with a tool to differentiate them from a masonry wall. They can be opened for inspection or stream operation.
- ◆ **Trusses:**

Truss construction is used where large areas, free of roof support columns, are desired. As spans and loads increase, structural components must increase in size to absorb and transmit to bearing surfaces the stresses of tension and compression. The truss was developed to allow greater spans while minimizing the increase in the size of the spanning members. Basically, the truss is composed of two major members -the top one is called the TOP CHORD and the lower one called the BOTTOM CHORD. Shorter members, called WEBS, connect the top and bottom chords. The WEBS are placed vertically and diagonally, forming triangular configurations with the CHORD members. There are many variations but all are essentially the same; a combination of interdependent components used to span large distances through the use of smaller pieces fastened together. Trusses can be either wood or steel. The open web joist or steel bar Joist prevalent in modern taxpayer construction is a light weight parallel chord truss. The type of truss and the material used varies with the needs of the particular application.
- ◆ **Skylights:**
 - On some roofs the skylights, scuttles & other openings have additional security materials, such as, heavy metal grates, steel plates & electrically charged grids.
 - If any of these appurtenances are removed & the area covered over, the supports for these coverings may be of very light weight (sometimes wooden 2 x 4's covered with thin sheets of plywood). In a fire situation these supports will fail much more rapidly than the regular beams.
 - In some cases heavy steel plates are being used to cover these openings
- ◆ Ventilators or exhaust ducts are sometimes found on the roof
- ◆ Large display signs on rods or front walls can present a collapse hazard.

SUSPENDED CEILINGS

- ◆ As many as two or three dropped ceilings may be found in a particular store.



SECURITY DOORS

- ◆ Typical of these installations are the familiar metal overhead rolling doors which cover the entire store or building front.
- ◆ It is common to find six case hardened padlocks securing one of these doors. The locks defy our conventional methods for forcing them open, and they must be cut with a power saw or a torch.
- ◆ The weight that is added to the front walls, especially when these doors are in the open position, can cause the lintel over the store front to fail and the wall and door assembly may fall during a fire.
- ◆ Store fronts covered by overhead doors have presented the following problems:
 - A. Delayed discovery of the fire causing:
 - Greater severity of fire upon arrival with possible extension.
 - Possible early collapse in parts of the structure.
 - Possibility of a smoke explosion (backdraft) when entry is made, causing a collapse with resulting injuries to members and fire involvement of the entire structure.
 - B. Delay in operations due to the following:
 - Difficulty in determining the exact location of the fire.
 - Time consumed in gaining entry.
 - Water application and ventilating operation delays.
 - Examination for fire extension and stopping fire spread.
 - Need for special tools to gain entry, power saws, torches, etc.
 - The bottom bar of some overhead doors, when they are closed, may rest on the sidewalk entrance doors to the cellar.
 - Where a store covers a large area or there are a number of stores in a building all with overhead doors, it may be difficult to determine the exact location of the entrance door or doors to the stores. Overhead signs might give a clue.
 - These doors may cover the exterior entrances to the upper floors and also flush type fire department sprinkler siamese connections.
 - Extensive and punishing operations requiring additional manpower and apparatus.
- ◆ Doors in the rear will be equipped with many strong security devices, such as the same type overhead doors as are found in the front. Conventional doors will have two or three strong door locks, plus strong metal bars across the inside of the door with strong anchor supports, which are securely attached to the walls, and the doors.

- ◆ Problems with overhead type doors that depend on spring tension to counter balance their weight will be encountered in structures as well as trucks. At fires in warehouses, garages etc., heat can cause springs to loose tension. If these doors start down without the counterbalance of fully tensioned springs they will come down with tremendous force.
 - When dealing with overhead type doors that may have been affected by fire the following is suggested:
 1. Avoid standing in door path.
 2. Secure door from rolling by clamping vise grip pliers in track under roller or place a ladder as a stop.
 3. Check the integrity of overhead track as soon as conditions permit.
 4. Attempting to force large overhead doors that have lost spring tension will require lifting dead weight and normally may be futile. If door can be opened electrically it should be serviced immediately.
- ◆ Treat every open overhead door for what it is - a heavy overhead hazard like air conditioners, machinery trucks, etc

TRUSSES

- ◆ The open web joist or steel bar joist are prevalent in modern taxpayer construction.

WALLS

- ◆ Exterior bearing walls are constructed of brick, stone, concrete block and mortar.
 - In some cases brick walls are only two courses wide in taxpayers. Differential thermal expansion may cause a wall to bulge, expanding "I" beams can easily upset masonry or stone walls which inherently have little lateral strength. A close watch should be kept on such walls.
 - Stone or block may spall due to heat or subsequent stream application.
- ◆ The stability of masonry walls is very much dependent on the integrity of the roof.
 - The roof acts as a monolithic brace which ties the walls together. In effect the roof is holding up the walls by providing lateral support.
 - A collapse or disintegration of the roof removes this support and may impart a lateral load, either pushing out, or pulling in, on the wall as stresses are formed.
- ◆ A parapet wall is a continuation of an exterior wall, fire wall or party wall above the roof line. The parapet section of the exterior walls may extend around the entire perimeter of a building roof area.
 - A particularly hazardous condition is the possible collapse of the front parapet wall (e.g., any parapet wall facing a street; a corner building facing one, two or three streets). This parapet wall is often unsupported laterally for a long distance, receiving its support only at the ends where they tie into crosswalls.

- The weight of the parapet wall is supported by steel “I” beams or angle shapes which span the openings for the display windows and entrance doors. Rust formation and normal expansion and contraction of these steel lintels and frost action in the parapet, weaken the mortar joints. “I” beams which support the roof joists often butt against the front parapet. An uncontrolled fire in a remote portion of the taxpayer or in the cockloft may be heating these “I” beams causing their expansion and steadily pushing the parapet outward.



- ◆ Operations within the stores or operations at the front of the store such as forcible entry, cellar pipe or hand lines, may have to be discontinued because of the condition of the parapet wall.
 - A long section of this wall often remains intact as the wall topples onto the sidewalk. Members have been killed or injured by such wall collapses.
- ◆ Interior partition walls between stores are usually of wood stud construction, with plaster or sheetrock covering, and are usually firestopped at the floor and the ceiling by wood sills and plates. The plaster or sheetrock provides longitudinal rigidity for these partition walls between the front and rear walls and roof. Removal of large sections of plaster will weaken this bracing.

HIGH-RISE OFFICE

THIS PAGE WAS INTENTIONALLY LEFT BLANK

HIGH-RISE OFFICE

GENERAL DESCRIPTION

- ◆ **HEIGHT:**75 feet or more
- ◆ **AREA:**varies from 2,000 to over 300,000sq. ft.
- ◆ **CONSTRUCTION:**Class 1 non-combustible
- ◆ **CLASSIFICATION:**
Buildings shall be classified as Class “E” when they are primarily occupied for transacting business, e.g. office spaces, showrooms, banks, civic administration, etc.

THERE ARE THREE BROAD CATEGORIES OF HIGH-RISE OFFICE BLDGS

1. “HEAVY-WEIGHT” – BUILT BEFORE 1945

- ◆ 20 to 23 pounds per cubic foot
- ◆ Structural steel components were encased in concrete.
- ◆ Exterior walls were of masonry construction and substantially tied to all floors.
- ◆ Floors were constructed of reinforced concrete
- ◆ Core construction techniques were not used.
- ◆ Plenum type ceilings are generally not found in these buildings.
- ◆ Normally steam heated and not centrally air conditioned.
- ◆ Exterior windows were open-able



2. “MEDIUM-WEIGHT” – BUILT BETWEEN 1945 & 1968

- ◆ 10 to 20 pounds per cubic foot
- ◆ Fire towers required in all of these buildings
- ◆ Constructional characteristics are of a mix between pre-1945 and post 1968 buildings

3. “LIGHT-WEIGHT” – BUILT AFTER 1968

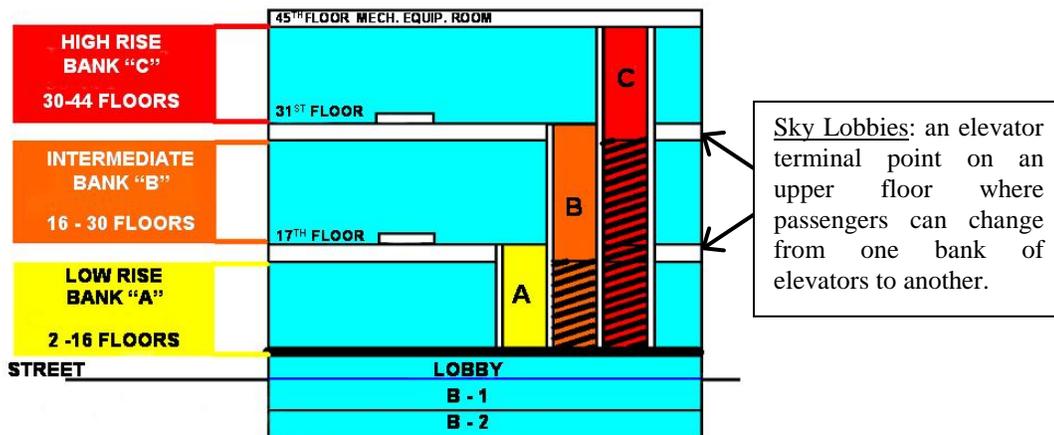
- ◆ 8 to 10 pounds per cubic foot
- ◆ Lack of compartmentation
- ◆ Structural steel usually protected by fireproofing material sprayed on
- ◆ Curtain exterior walls constructed of a combination of glass & metal
 - Exterior curtain walls leave a space of 6 to 12 inches which requires additional fire stopping.
- ◆ Extensive plenum ceilings with a lack of fire stopping.
- ◆ Usually supplied with a HVAC (heating, ventilation and air-conditioning) system.
 - Systems are usually multi-floor
- ◆ Exterior windows usually not open-able.
- ◆ Floors usually consist of lightweight concrete, “Q” decking,” etc.
- ◆ Core construction techniques used extensively



BLIND SHAFT ELEVATORS

Elevators that serve the upper areas of a building in a shaft that is not equipped with hoist way doors on the lower floors. These elevators bypass several floors, with no opening to those floors, and may possibly be utilized to go up pass the fire floor.

HIGH RISE BUILDING



NOTE: CROSS-HATCH INDICATES A BLIND SHAFT

CLASS “E” COMMUNICATION SYSTEM

A system required for class “E” buildings, to alert and direct occupants in the event of a fire and to transmit an alarm to the FDNY. This system shall consist of²:

- ◆ A fire command station, located in the lobby near the elevator control panel, with a public address servicing all floors, elevators and stairways.
- ◆ Floor warden stations, on each floor, with two-way communications with the fire command station.
- ◆ Manual fire alarm sending stations on each floor.
- ◆ Associated systems:
 - Smoke detectors
 - Sprinkler water flow alarms
 - Thermostatic alarms
 - Locked door fail safe system (where lock mechanisms are controlled electrically from a remote location or activation of the class “E” system)

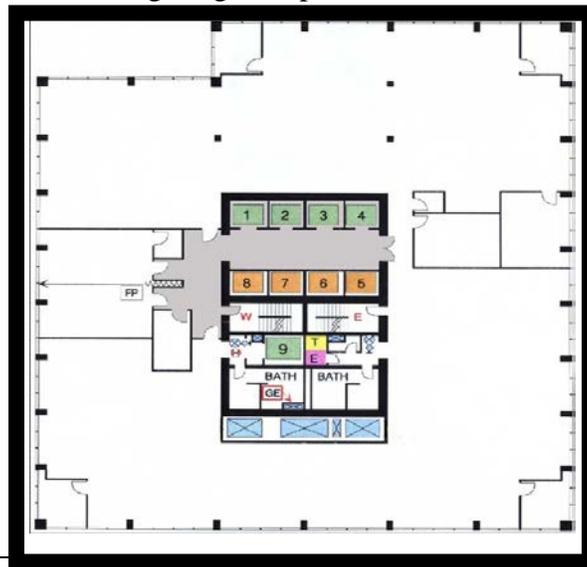
COMPARTMENTATION

The subdividing of floor areas by fire resistive separations into smaller spaces or compartments, such as numerous enclosed offices as compared to open space cubicles

CORE CONSTRUCTION

A building in which the elevators, stairway and building support systems are grouped together in one area of the building. This area could be in the center of the building as in a center core building or on one of the sides of the building as in a side core building.

In buildings of this design, the second hose line may be used to prevent fire from wrapping around the core, endangering the operation of the first line.



² This is not a complete list of what is required of a class “E” system.

CURTAIN WALL

A non-bearing wall, built between piers or columns for the enclosure of the structure, but not supported at each story.

FIRE SAFETY DIRECTOR

A designated civilian employee of the building, holding a certificate of fitness from the FDNY, qualifying him to perform the duties as required, this person is to be knowledgeable of the building, Class “E” alarm system, occupants in need of evacuation, and to execute the fire safety plan. This person is required to be present in the building anytime there are 100 or more occupants above or below street level or more than 500 anywhere in the building. If the Fire Safety Director is not required to be present, a Building Evacuation Supervisor, who is another civilian employee of the building and trained by the Fire Safety Director, should be presented to execute the fire safety plan, if needed.

HEATING, VENTILATION, & AIR CONDITIONING (HVAC)

There are two general categories: central, which supplies air to more than one floor, or non-central, which serves only the floor on which the processing equipment is located.

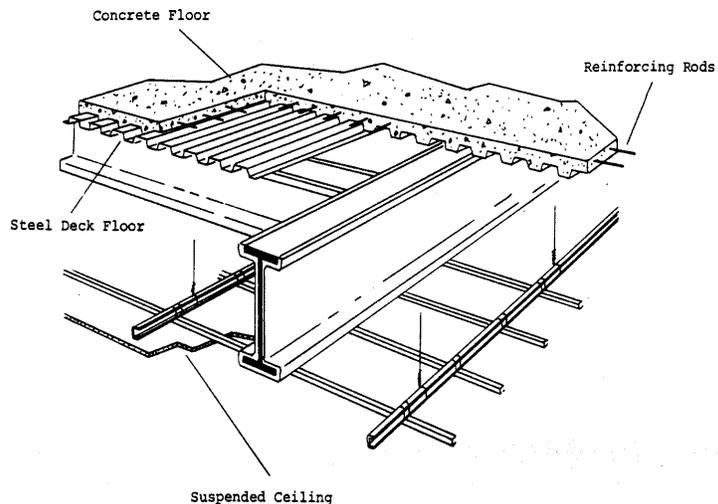
Central HVAC systems create problems during fires because they can spread fire and/or smoke over a greater area than non-central systems.

MECHANICAL CONTROL CENTER

This is a location within a building where equipment is located for the monitoring of the building support systems. It has limited ability to control these systems and may or may not be located on the same floor as the mechanical equipment rooms (MER).

“Q” DECKING

A type of composite floor construction in which corrugated steel is used to support the concrete floor.



VACANTS



GENERAL DESCRIPTION

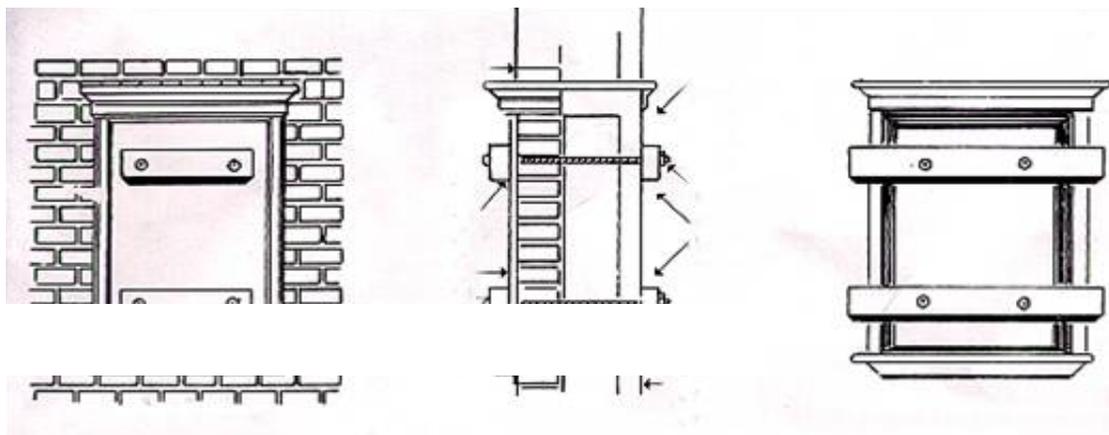
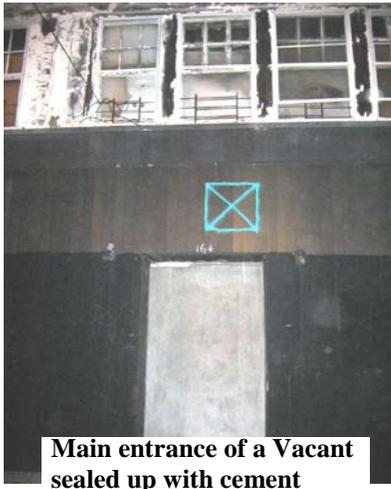
- ◆ For the purpose of this manual, a vacant building is a structure which is considered to be completely unoccupied, where the owner has abandoned all efforts to maintain the building. These buildings are typically open, unguarded, lack operating utilities and are not maintained in a safe condition.
- ◆ Vacant buildings have all the construction defects and potential for fire spread that they possessed when occupied. In addition, hazards above the normal have developed as a result of deterioration caused by misuse, vandalism and previous fires.
- ◆ In vacant buildings, the life hazard is typically limited to firefighters. A slower, more cautious operation should be initiated. Devote more time than usual must be devoted to the size-up of the situation.
- ◆ The personal injury hazard to firefighters is of paramount importance. Items to be considered are entrapment by rapid fire spread, falls, falling objects and partial and complete structural collapse.
- ◆ A vacant building does not necessarily mean there is no civilian life hazard. Children, derelicts, trespassers, workmen, squatters, etc., may be present.
- ◆ What may appear to be a vacant building could be occupied by one or more families. In many cases this occupancy may not be evident from the front of the building because the apartments in the rear of the building are the ones that are occupied.
- ◆ Indications of tenants in an apparent vacant building:
 - Lights in windows of some apartments.
 - Curtains, window shades, plants, window gates.
 - Open doors or windows, or signs of forced entry in sealed building.
 - Electric extension wires strung from utility pole, or through backyard of adjoining building into windows of an apparently vacant building.
- ◆ Vacant building fires do not "just happen." They are caused by one or more individuals who have no regard for the safety of the firefighter. Indeed, vacant buildings have been "Booby Trapped" deliberately to injure or kill the unwary.
- ◆ More time than usual must be devoted to physical size-up of the building.
- ◆ The IC may implement an interior attack after a risk assessment has been performed based on the following factors:
 - Size and intensity of the fire.
 - Location of the fire within the structure
 - Structural stability of the building
 - Safe access to the fire area

If interior operations are implemented, the operating force and interior operational time shall be kept to a minimum with the maximum amount of supervision.

At large or advanced fires, the primary attack strategy should consist of a defensive exterior attack and should focus on the protection of exposures. The IC may vary from this guideline in critical situations involving life hazard.

ACCESS & EGRESS

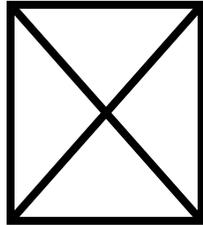
- ◆ Exterior openings may be sealed with cement blocks or covered with tin. Windows may be boarded up. A fire can burn for a considerable amount of time before being detected. Access and ventilation will be very difficult.
- ◆ All members responding to vacant building fires, (especially roof and outside vent firefighters) are cautioned to note the method used to seal these buildings in their size-up. Access may be gained via the roof or upper floors only to find no means of escape from the lower floors.
- ◆ Members must psychologically adjust to a "no rush" approach. In these buildings, the life hazard is to the firefighter. A slower, more cautious operation is definitely indicated.



Sealed up windows; commonly referred to as "HUD" windows.

MARKING OF VACANT BUILDING

Vacant buildings shall be identified and marked with the following symbol:



- ◆ Such markings should be in lime yellow, reflective type paint.
 - SQUARE to be approximately 18" x 18".
 - LINES to be 2" wide
- ◆ Primary markings shall be made alongside the front entrance. If deemed advantageous, additional markings shall be made at other places (fire escape, roof bulkhead, etc.).
- ◆ If the building has multiple entrances or other likely means of access, additional markings shall be made at other places (e.g., rear or side entrance, fire escape, roof bulkhead, etc.)
- ◆ Do not mark sealed doors or windows. The structure should be marked at locations that are likely to remain undisturbed.
- ◆ The letters “RO” (roof open) shall be made directly over the vacant building markings in cases when a roof is opened to the degree that there is little need for future vertical ventilation (e.g., the roof has been previously cut or burned away).
- ◆ The letters “FO” (floor openings) shall be made directly underneath vacant building markings in cases when members determine that floors within the building have holes or openings that may endanger members.
- ◆ Markings shall be used only as tentative indicators, as the condition of vacant buildings can alter dramatically due to vandalism, demolition, subsequent fire and water effects, etc.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

F.D.N.Y.

PROBATIONARY FIREFIGHTERS MANUAL

VOLUME II



DANIEL A. NIGRO

Fire Commissioner

Thomas J. Richardson

Chief of Department

Brendan D. McSweeney

Chief of Training

Frank A. Leeb

Chief of the Fire Academy



PROBATIONARY FIREFIGHTERS MANUAL

TABLE OF CONTENTS – VOLUME TWO

<u>CHAPTER</u>	<u>SUBJECT</u>
10.	HYDRANTS
11.	ENGINE COMPANY TOOLS & APPLIANCES
12.	ENGINE COMPANY OPERATIONS
13.	STANDPIPE & SPRINKLER OPERATIONS
14.	LADDER COMPANY TOOLS
15.	PORTABLE LADDERS
16.	LADDER COMPANY OPERATIONS
17.	EMERGENCIES
18.	ELEVATOR EMERGENCIES
19.	NON-STRUCTURAL FIRES
20.	FOAM
21.	PORTABLE FIRE EXTINGUISHERS
22.	HOUSEWATCH
23.	DECONTAMINATION
24.	EMERGENCY OPERATIONS
25.	BISP WORKBOOK
26.	AUC 323



HYDRANTS

OBJECTIVE:	<ul style="list-style-type: none">• To provide a brief overview of the importance of water supply and the care and maintenance of fire hydrants
CONTENTS:	<ul style="list-style-type: none">• Types of Hydrants• Connecting to Hydrants• Hydrant Features• Specially Designated Hydrants
SOURCE:	<ul style="list-style-type: none">• FDNY Firefighting Procedures, – Engine Co. Ops. Ch 3 Add 3
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Firefighting Procedures, – Engine Co. Ops. Ch 3 Add 3

HYDRANTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	TYPES	1
2	CONNECTING TO HYDRANTS	2
3	HYDRANT FEATURES.....	3
4	SPECIALTY DESIGNED HYDRANTS.....	4

HYDRANTS

Hydrants are the primary source of water for firefighting operations. There are several types of hydrants available in NYC, which may be equipped with a variety of features, as described below.

NOTE: Hydrant pressure varies significantly based on local geography.

1. TYPES OF HYDRANTS

1.2 **Smith Low Pressure Hydrant** - The Smith hydrant has a black barrel with a silver bonnet. There are two outlets, one 2 1/2 inch and one 4 1/2 inch. This hydrant is equipped with two valves, a main and a drain which are both activated by the operating nut on top of the hydrant. The number on the barrel of the hydrant indicates the size of the main supplying the hydrant. A white line under the number on the barrel indicates this hydrant is on a dead end main and is only supplied from one direction. Dead end mains are generally smaller in diameter and provide less water than mains fed from two directions (see Fig. 1-1).

1.3 **Dresser Low Pressure Hydrant** - The Dresser hydrant differs from the Smith in appearance but its operation is the same. The barrel is painted black and the bonnet silver and it is provided with two outlets, one 2 1/2 inch and one 4 1/2 inch. This hydrant also has two valves (main and drain) which are activated by the operating nut.



Fig. 1-1



Fig. 1-2

2. **CONNECTING TO HYDRANTS** (see Chapter 11 Sec 13 for Hydrant connections)

In order to provide for a reliable and uninterrupted flow of water through attack hoselines an engine company must locate and connect to a hydrant. There are several methods of connecting to hydrants All engine companies should be equipped with the following hydrant connections:

35-foot Soft Connection (Fig 2)

10-foot Small Connection (Fig 3)

50-Foot length of 3 1/2 inch Hose (Fig 4)

10-Foot Hard Suction (Fig 5)



FIG. 2



FIG. 3



FIG. 4



FIG. 5

3. Hydrant features

- 3.1 **Hydrant Markings** - Some hydrants may be marked with a white number on the barrel, which indicates the size of the main supplying the hydrant (in inches). A white line under the number on the barrel indicates the hydrant is on a dead end main and is only supplied from one direction, which may limit water flow.
- 3.2 **Breakaway Feature** - Some hydrants have a “breakaway” feature, which was designed as a safety feature to minimize damage to the hydrant system if a hydrant is struck by a vehicle. These hydrants will have a “collar” fitted on the lower portion of the barrel which, when broken, will cause the water supply to the hydrant to be shut down. It is sometimes possible to find this collar buried beneath concrete surrounding a hydrant.
- 3.3 **Curb Valve** - Hydrants are equipped with a curb valve, which provides a means to shut the water supply to a hydrant from the water main. These valves are generally located in the street, near the hydrant and require a special curb valve key to shut down. The curb valve key is turned clockwise to shut the valve.
- 3.4 **Hydra-Shield** – This is a threaded hydrant cap with three indentations on its surface. Except for the three tapered indentations, the cap has a smooth rounded surface which prevents removal using conventional tools. The hydrant wrench matches the indentations on both the 2 1/2 inch and 4 1/2 inch caps. (see **Figure 6**)
- 3.5 **Custodian Hydrant Guard** – This is a free spinning cap which completely covers the hydrant operating nut to prevent it from being turned on by unauthorized users. The Custodian hydrant wrench, which is equipped with an internal magnet, is needed to open the hydrant. (see **Figure 7**)
- 3.6 **Hydrant Drain** - After the hydrant is shut, the residual water in the barrel will drain out into the ground by way of a small hole in the bottom of the barrel. This hole is the hydrant drain and, if blocked, it may not completely drain.
- 3.7 **Hydrant Discs** - If a hydrant is found to be unserviceable, it should have a white disc attached to one of the outlets. A frozen hydrant should have a yellow disc attached. Blue discs are reserved for use on partially OOS auxiliary fire protection systems (standpipe and sprinkler systems). The company number and individual disc number shall be marked in black on one side of each disc.
- 3.8 **Hydrant Caps** – All hydrants should be equipped with caps on both the 2 ½” and 4 ½” outlets. This minimizes damage to the hydrant and limits possible obstructions inside the barrel.



Fig. 6



Fig. 7

4. SPECIALLY DESIGNATED HYDRANTS

- 4.1 **Yellow Hydrants** on Parkways and Expressways - Some hydrants on parkways and expressways are maintained shut at the curb valve. These hydrants are painted yellow. They must be turned on fully at the curb valve, approximately 18 turns clockwise using a curb valve key, in order to be used.
- 4.2 **Red Air Cock Hydrants** - Hydrants on 30 inch diameter or greater mains in strategic locations (high and low points). Also allow Water Department repair crews to bleed off air when repairs are completed. These hydrants are painted red and are excellent sources of water for fire department use.
- 4.3 **Red Satellite Water System Hydrants** - Twin Hydrant arrangement on large mains for a rapid and adequate source of water for Satellite Water System. Two special hydrants, each with two 4 1/2 inch outlets, painted red and located close to each other. Engine companies should avoid use of these hydrants. (see **Figure 8**)



Figure 8

- 4.4 **Wall Hydrants** – Hydrants that are embedded in the wall of a building (**Figure 9**). They closely resemble a Fire Department Connection (FDC), but should be labeled as a hydrant. They are operated by turning an operating nut (often located above the outlets).



Figure 9



**ENGINE COMPANY TOOLS
AND APPLIANCES**

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with the uses of the tools and appliances associated with Engine Companies.				
CONTENTS:	<table><tr><td>Part 1</td><td><ul style="list-style-type: none">• Hose- specifications, use, care, loading, and maintenance• Fittings• Appliances- Handline nozzles and Multiversal nozzle</td></tr><tr><td>Part 2</td><td><ul style="list-style-type: none">• Large Caliber Streams</td></tr></table>	Part 1	<ul style="list-style-type: none">• Hose- specifications, use, care, loading, and maintenance• Fittings• Appliances- Handline nozzles and Multiversal nozzle	Part 2	<ul style="list-style-type: none">• Large Caliber Streams
Part 1	<ul style="list-style-type: none">• Hose- specifications, use, care, loading, and maintenance• Fittings• Appliances- Handline nozzles and Multiversal nozzle				
Part 2	<ul style="list-style-type: none">• Large Caliber Streams				
SOURCE:	<ul style="list-style-type: none">• FDNY Firefighting Procedures• FDNY Training Bulletins				
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Firefighting Procedures, Vol. 2, Book 1 – Engine Co. Ops. Ch 3• TB Tools 7, DS 2,9,12,17; TB Tools 11, DS 1,2,3; TB Tools 17				

PART ONE

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	OVERVIEW.....	1
2	HOSE.....	2
3	NOZZLES, FITTINGS AND ADAPTERS.....	7
4	IN-LINE PRESSURE GAUGE.....	21
5	FOAM EDUCTOR AND NOZZLE.....	24
6	NEW YORKER MULTIVERSAL.....	25
7	HOSE ROLLER AND BRESNAN DISTRIBUTER.....	26
8	GATES AND SIAMESE CONNECTION	27
9	SPANNER AND HOSE STRAP.....	29
10	HYDRANT WRENCHES AND CURB VALVE KEY.....	32
11.	HYDRANT PLUG.....	33
12.	DRAFT CONNECTION.....	34
13.	HYDRANT CONNECTIONS.....	35
ADDENDUM 1.....	EQUIPMENT INSPECTIONS.....	37
ADDENDUM 2.....	HOSE MAINTENANCE.....	39
ADDENDUM 3.....	WATER SUPPLY INFRASTRUCTURE	37
ADDENDUM 4.....	DIGITAL IN-LINE GAUGE.....	57



ENGINE COMPANY EQUIPMENT

1. OVERVIEW

1.1 This chapter will describe the various equipment used by engine companies in the FDNY. The aim of the chapter is to describe key physical attributes of each piece of equipment, as well as its pertinent operating capabilities and capacity.

1.1.1 For information on the inspection requirements and out-of-service procedures of standard engine equipment, refer to *Chapter 3, Addendum 1: Engine Equipment Inspection and OOS Procedures*.

1.1.2 For information on the maintenance and routine inspections of hydrants, refer to *Chapter 3, Addendum 2: Hydrant Maintenance*.

1.1.3 For information on the maintenance and annual testing of hose, refer to *Chapter 11, Addendum 2: Hose Maintenance*.

1.1.4 For information on the equipment that exists as part of the water supply infrastructure in NYC that is used by engine companies, specifically, this includes hydrants, sprinkler systems, and standpipe systems, refer to *Chapter 11, Addendum 3: Water Supply Infrastructure Equipment*

2. HOSE

- 2.1 Hose is the primary tool for the application and transfer of water in the FDNY. A variety of different size and types of hose are used by units in the department. This section will describe key characteristics of each type of hose used in the FDNY.
- 2.2 1 ¾" rubber-lined hose (Figure 1)



Figure 1

- 2.2.1 1 ¾" hose is the primary attack hose for firefighting operations in the FDNY. Its smaller size and reduced weight provide the benefits of increased speed and mobility while operating.
- 2.2.2 1 ¾" hose is carried on the hosebeds of all engine and squad companies for rapid deployment at a fire or emergency operation.
- 2.2.3 Operational specifications
- A. Each length of hose is 50 feet long.
 - B. The coupling size is 1 ½".
 - C. Operating pressure is normally limited to 250 psi.
 - D. The friction loss in each 50-foot length of 1 ¾" hose is 20 psi.

2.3 2 ½” rubber-lined hose (Figure 2)



Figure 2

- 2.3.1 2 ½” hose is the most versatile type of hose in the FDNY. It can be used as an attack line at a fire or emergency. Additionally, it can be used as a supply line in a number of situations.
- 2.3.2 2 ½” hose is carried on the hosebeds of all engine and squad companies for rapid deployment at a fire or emergency operation.
- 2.3.3 When used as an attack line, 2 ½” hose provides increased water flow, but is heavier and more difficult to maneuver than the 1 ¾” line.
- 2.3.4. Operational specifications:
 - A. Each length of hose is 50 feet long.
 - B. The coupling size is 2 ½”.
 - C. Operating pressure is normally limited to 250 psi.
 - D. The friction loss in each 50-foot length of 2 ½” hose is 5 psi.

2.4 2" polyurethane-lined lightweight hose (Figure 3)



Figure 3

- 2.4.1 2" lightweight hose is colored green with red stripes.
- 2.4.2 2" lightweight hose is carried by all engine and squad companies.
- 2.4.3 It is only used as the lead (nozzle) length on the attack line when using a standpipe system in residential buildings.
- 2.4.4 Operational specifications
 - A. Each length of hose is 50 feet long.
 - B. The coupling size is 2 ½"
 - C. Operating pressure is normally limited to 250 psi.
 - D. The friction loss in each length of lightweight 2" hose is 10 psi.
 - E. The midpoint of the hose is painted red. This marking can facilitate a smooth deployment of the hose and is called the "A-fold".
 - F. There are reflective arrows on each female coupling that serve as a directional indicator. The arrows point in the direction of the water source.

2.5 2 ½” polyurethane-lined lightweight hose (Figure 4)



Figure 4

- 2.5.1 2 ½” lightweight hose is colored white with red stripes.
- 2.5.2 2 ½” lightweight hose is carried by all engine and squad companies.
- 2.5.3 It is used as an attack line when using a standpipe system.
- 2.5.4 Operational specifications
 - A. Each length of hose is 50 feet long.
 - B. The coupling size is 2 ½”.
 - C. Operating pressure is normally limited to 250 psi.
 - D. The friction loss in each length of lightweight 2 ½” hose is 5 psi.
 - E. The midpoint of the hose is painted red. This marking can facilitate a smooth deployment of the hose and is called the “A-fold”.
 - F. There are reflective arrows on each the female coupling that serve as a directional indicator. The arrows point in the direction of the water source.

2.6 3 ½" rubber-lined hose (Figure 5)



Figure 5

2.6.1 3 ½" hose is carried by all engine and squad companies

2.6.2 3 ½" hose is only used as a supply line.

2.6.3 Operational specifications

1. Each length of hose is 50 feet long.
2. The coupling size is 3".
3. Operating pressure is normally limited to 250 psi.
4. The friction loss in each 50-foot length of 3 ½" hose is approximately 3 psi. This number depends upon several factors including the length of the stretch and the amount of water flowing.

3. NOZZLES, FITTINGS AND ADAPTORS

3.1 NOZZLES

3.1.1 A nozzle is a hose line appliance that is used to direct the flow of water, increase the velocity of flow, or disperse water in various patterns. Nozzles are identified by the type of water pattern created and size of the tip used.

3.2 A nozzle is typically comprised of two components: a shut-off and a tip.

3.3 A shut-off is the portion of the nozzle that contains a handle which controls the opening and closing of the nozzle. Shut-offs may sometimes be equipped with a “pistol grip” handle.

3.4 A tip is an attachable component that shapes the stream of water as it leaves the nozzle.

3.4.1 Tips can either be solid stream or fog stream and exist in a variety of different sizes.

3.4.2 Tips are also classified as Main Stream Tip (MST) or Outer Stream Tip (OST).

A. MST’s attach directly to the shut-off and have a threaded outlet orifice. In the FDNY, nozzles to be used for fire attack are equipped with MST’s.

B. OST’s are smaller and can attach to the threaded outlet orifice of the MST. The only OST used in the FDNY is the ½” tip. The OST should only be attached to the MST for overhaul operations, if deemed necessary.

3.5 There are **three** basic metrics used to describe the performance of a nozzle:

3.5.1 **Nozzle pressure** - In order to create the desired stream, nozzles must be supplied with sufficient pressure “at the tip”. This pressure is called nozzle pressure. It is generally measured in psi (pounds per square inch).

3.5.2 **Nozzle reaction** - This is a metric that measures the reaction force of water flowing through an open nozzle. It is a mathematically derived metric that is based on the size of the tip and the supplied nozzle pressure. Nozzle reaction provides a standard measure of how strong the force of the nozzle “feels”, which allows for comparison between nozzles of different sizes. It is generally measured in pounds.

3.5.3 **Flowrate** – This is a measurement of how much water is discharged by the nozzle. It is generally measured in gallons per minute.

3.6 Solid Stream Nozzles

3.6.1 Solid Stream nozzles (also called “Smooth Bore” nozzles) create a solid, straight stream of water when used (Figures 6, 7 & 8). They provide high volume flows at low pressure and have long stream reach, superior penetration, and manageable nozzle reaction.

3.6.2. 1 3/4" Nozzle



Figure 6

- A. The 1 3/4" nozzle is used with the 1 3/4" hose
- B. It has a 1 1/2" coupling and a 15/16" MST that is used for attack
- C. The required nozzle pressure is 50 psi at the tip
- D. At 50 psi nozzle pressure, the flowrate is 180 GPM
- E. The nozzle reaction at 50 psi nozzle pressure is 68 lbs
- F. A 1/2" OST can be attached to the MST for overhaul purposes

3.6.3 2 ½" Nozzle



Figure 7

- A. The 2 ½" nozzle is used with the 2 ½" hose
- B. It has a 2 ½" coupling and a 1 1/8" MST that is used for attack
- C. The required nozzle pressure is 40 psi at the tip
- D. At 40 psi nozzle pressure, the flowrate is 235 GPM
- E. The nozzle reaction at 40 psi nozzle pressure is 78 lbs
- F. At 50 psi nozzle pressure, the flowrate is 265 GPM
- G. The nozzle reaction at 50 psi nozzle pressure is 98 lbs
- H. A ½" OST can be attached to the MST for overhaul purposes
- I. The 2 ½" nozzle should be marked with a white stripe around the MST

3.6.4. 2" Nozzle



Figure 8

- A. The 2" nozzle is used with the 2" lightweight hose
- B. It has a 2 ½" coupling and a 1" MST that is used for attack
- C. The required nozzle pressure is 50 psi at the tip
- D. At 50 psi, the flowrate is 210 GPM
- E. The nozzle reaction at 50 psi nozzle pressure is 77 lbs
- F. At 55 psi nozzle pressure, the flowrate is 220 GPM
- G. The nozzle reaction at 55 psi nozzle pressure is 85 lbs
- H. A ½" OST can be attached to the MST for overhaul purposes

3.7 Fog Nozzles

- 3.7.1. Fog nozzles can produce either a straight stream or a fog pattern (Figures 9, 10, 11 & 12). The straight stream is hollow. The fog pattern is adjusted by rotating the outer barrel and the reach of the stream depends on the width of the pattern: when the fog pattern is wider, the reach of the pattern will become shorter.
- 3.7.2. Removable fog tips may have a fixed fog pattern without the option of a straight stream. These can be attached directly to a shut-off.
- 3.7.3. Fog patterns are effective for maximizing hydraulic ventilation, dispersing gas vapors, and extinguishing fire near electrical equipment. However, fog patterns can have limited stream reach and can entrain (draw in) air as they operate.
- 3.7.4. Fog nozzles used in the FDNY are classified in the following two ways:
 - A. *Variable flow* fog nozzles provide a different flowrate depending on the fog pattern selected. All fog nozzles in the FDNY are variable flow.
 - B. *Variable pressure* (also called non-automatic) fog nozzles will allow their nozzle pressure to change as the fog pattern is adjusted. All fog nozzles in the FDNY are variable pressure.

3.7.5 1 3/4" Fog Nozzle



Figure 9

- A. The 1 3/4" fog nozzle is used with the 1 3/4" hose
- B. It has a 1 1/2" coupling and a fog tip
- C. The required nozzle pressure is 100 psi at the tip
- D. At 100 psi nozzle pressure, the flowrate can reach 200 GPM
- E. At 200 GPM, the nozzle reaction is 101 lbs.
- F. This fog nozzle can be adjusted from a straight stream to a fog pattern.
- G. To operate as a straight stream, the tip is rotated to the right.
- H. To operate as a fog pattern, the tip is rotated to the left.
- I. The further to the left the tip is rotated, the wider the fog pattern will be

3.7.6 2 ½" Fog Nozzle



Figure 10

- A. The 2 ½" fog nozzle is used with the 2 ½" hose
- B. It has a 2 ½" coupling and a fog tip
- C. The required nozzle pressure is 100 psi at the tip
- D. At 100 psi nozzle pressure, the flowrate can reach 250 GPM
- E. At 250 GPM, the nozzle reaction is 121 lbs.
- F. This fog nozzle can be adjusted from a straight stream to a fog pattern.
- G. To operate as a straight stream, the tip is rotated to the right.
- H. To operate as a fog pattern, the tip is rotated to the left.
- I. The further to the left the tip is rotated, the wider the fog pattern will be

3.7.7 2 ½” fog tip



Figure 11

- A. Also called the “Aquastream”
- B. It is used to produce a fog spray for a mass decontamination procedure
- C. It has a 2 ½” coupling and a non-adjustable fog pattern
- D. The required nozzle pressure is 100 psi at the tip
- E. At 100 psi nozzle pressure, the flowrate is 750 GPM at full fog
- F. It may be connected directly to an apparatus outlet or ladder pipe. It may also be used on a 2 ½” hoseline in conjunction with a shut-off for decontamination.

3.7.8 Akron Turbomaster Fog Tip



Figure 12

- A. The Turbomaster is connected directly to a Tower Ladder basket waterway.
- B. It is used to produce a fog spray for a mass decontamination procedure.
- C. It has a 2 ½” coupling and an adjustable fog pattern
- D. The required nozzle pressure is 100 psi at the tip
- E. It has 4 settings, capable of producing flows of 500, 750, 1000, or 1250 GPM

3.7.9 High Rise Nozzle



Figure 13

- A. The High-Rise Nozzle (Figure 13) is designed to be used from the floor below the fire when standard interior handline attack methods are not possible, such as conditions caused by wind-driven fires.

3.7.10 Cockloft Nozzle

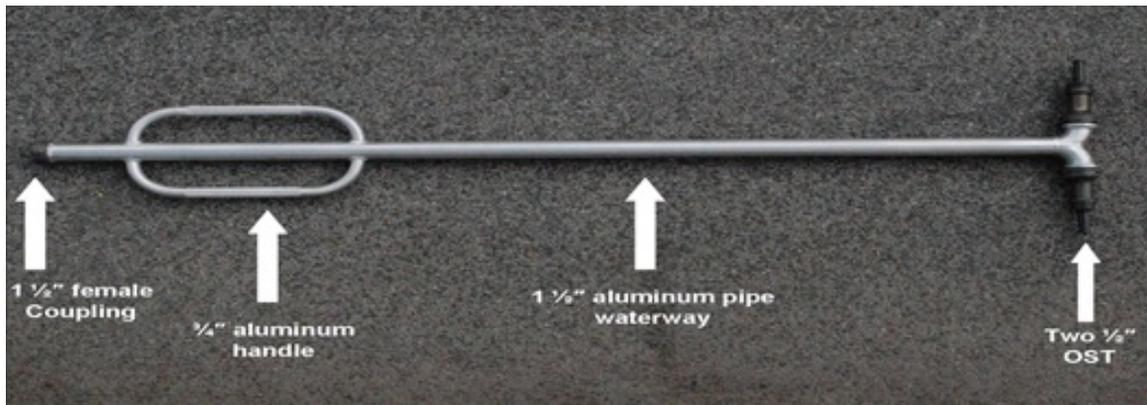


Figure 14

- A. The cockloft nozzle (Figure 14) is primarily designed for use at cockloft fires, but may also be used in other situations such as in a vertical application to extinguish fire on the outside of a building from a window on the floor below. When the cockloft nozzle is being used to extinguish fire in a cockloft, the nozzle may be placed above the ceiling on the top floor of a building or inverted and lowered into the cockloft area from the roof of the building.

3.7.11 The Combination Nozzle is a two-piece system that allows for the use of either a High-Rise Nozzle attachment or a Cockloft Nozzle attachment to a single base pipe section.

A. It is comprised of 3 different components, as follows:

1. *Base Pipe* – a 48” long aluminum alloy pipe with a 1 ½” diameter. It is equipped with a permanently attached 2 ½” shutoff and has a 1 ½” quick connect for attaching one of the two different nozzles (Figure 15). Attached to the aluminum pipe is a support rod with a quick connect at the top and a T-handle at the bottom. The Base pipe should be stored with the 1 ½” x 2 ½” increaser attached to the 2 ½” shut off.



Figure 15

B. *High Rise Nozzle (HRN) Tip* - a 44” long aluminum pipe with a 68 degree, 2-foot bend to provide the proper angle for the water stream (Figure 16). It has a 1 1/8” tip attached to its outlet and a 1 ½” quick connect at the bottom. The HRN tip has a support rod attached with a quick connect.



Figure 16



Figure 17

C. *Cockloft Nozzle Tip* - a 32” long aluminum pipe divided at the tip into two ninety-degree bends to provide the proper angle for the water stream (Figure 17). Each bend terminates with a 15/16” MST and a ½” OST. The two ½” OSTs are NOT to be removed; these tips increase the reach of the stream in excess of 60 feet. They also facilitate the generation of steam that enables a more rapid extinguishment of fire in the confined spaces of a cockloft. The Cockloft Nozzle tip has a support rod attached with a quick connect.

D. The Combination Nozzle has been issued to a number of companies in the field. It is carried in a kit mounted above the portable ladder rack on the apparatus.

Note: The original one piece HRN has not been removed from Companies equipped with the Combination Nozzle. These Companies carry both so that non-trained members can use the one piece HRN. Engine Companies not trained in the use of the Combination Nozzle System should continue to use the conventional High Rise Nozzle or Cockloft Nozzle as required.

E. The Combination Nozzle System shall be visually inspected weekly

3.8 FITTINGS

3.9 A fitting is a hose connection which allows dissimilar couplings to become coupled. Specifically, fittings allow for different size couplings to be connected and for couplings of the same sex to be connected.

3.10 There are four categories of fittings:

3.10.1 *Reducers* – allow for larger male couplings to connect to smaller female couplings. The male threaded orifice on a reducer is smaller than the female threaded orifice. These are typically used for water to flow from a larger hose to a smaller hose.(Figure 16A)

3.10.2 *Increasesers* – allow for smaller male couplings to connect to larger female couplings. The male threaded orifice on an increaser is larger than the female threaded orifice. These are typically used for water to flow from a smaller hose to a larger hose (Figure 16B).



Figure 16A

Figure 16B

3.10.3 *Double males* – allow for two female couplings of the same size to be connected (Figure 17).



Figure 17

- 3.10.4 *Double females* – allow for two male couplings of the same size to be connected (Figure 18)



Figure 18

- 3.11 Fittings are available in all necessary sizes in each of the four categories above.
- 3.12 There also exists a fitting specially designed as a hydrant connection, which is a double female with different sized couplings. One side has 4 ½” threads (for hydrant connection) and the other side has 3” threads (for connection to a 3 ½” hose)



Figure 19

3.13 By using the proper fittings, any hose in the FDNY can be connected to any other hose. Be aware that multiple fittings may have to be used to make coupling possible.

3.14 ADAPTERS

3.15 An adapter is a fitting that allows connection between a coupling with FDNY threads and National Standard threads or between FDNY threads and National Pipe threads.

3.16 The following different types of adapters exist:

3.16.1 Adapter with a male FDNY coupling and female National Standard (or National Pipe) coupling

3.16.2 Adapter with a female FDNY coupling and male National Standard (or National Pipe) coupling

3.16.3 Double male adapter, with a male FDNY coupling and male National Standard (or National Pipe) coupling

3.16.4 Double female adapter, with a female FDNY coupling and female National Standard (or National Pipe) coupling

- 3.17 National Pipe threads (NPT) adapter can be differentiated by the length of the threaded coupling; National Pipe threads (Figure 20) are longer (deeper) than FDNY or National Standard (NST) threads (Figure 21).



Figure 20



Figure 21

4. IN-LINE PRESSURE GAUGE

4.1 Digital In-Line Gauge

- 4.1.1 The Digital In-Line Pressure/Flow metering device (Digital In-line Gauge) is used to monitor the pressure and flow being delivered from the standpipe outlet. It does not regulate water flow; it simply monitors the pressure and flow of the water supplied (Figure 22)



Figure 22

- 4.1.2 The Digital In-line Gauge has 2 ½” couplings and has a built-in 45-degree elbow.
- 4.1.3 To turn the gauge on, press and hold the green ON/OFF button. The digital display will show “- - -” under PRESSURE and "r3.00" above FLOW. When the button is released, the digital display will show “0” PRESSURE and “0” FLOW. The gauge is now ready to be used. (Figure 23)



Figure 23

- 4.1.4 The red digital display shows the pressure at the gauge in psi.
- A. *High Pressure Warning*: red display flashes “HI-P” when pressure exceeds 200 psi.
- 4.1.5 The blue digital display shows water flow at the gauge in GPM.
- A. *High Flow Warning*: blue display flashes “HI-F” when flow exceeds 250 GPM.
- B. *Low Flow Warning*: blue display flashes “LO-F” when flow is less than 80 GPM.
- 4.1.6 If there is no water flow for 15 minutes, the display goes into “sleep” mode and will not display any readings. Resumed water flow automatically re-activates the display. If there is no water flow for 30 minutes, the display will power off automatically. To resume operations, the gauge has to be re-started manually.

- 4.1.7 The Digital In-line Gauge is powered by a 9-volt rechargeable lithium ion battery
- A. Only the supplied batteries (HIGHTECH RLI-9600 9V 600) may be used.
 - B. A fully charged battery will supply approximately 5 hours of continuous operation.
 - C. After 3½ hours of usage, the digital display will slowly flash “LO batt”.
 - D. When 10 minutes of battery life remains, “LO batt” will flash rapidly. Immediately replace the battery if this occurs.
 - E. To test the battery, press the “Battery” button. A battery in serviceable condition will display as “Batt Good”.
 - F. Units are issued 4 batteries. One is used in the gauge, one is carried in the clear battery pouch of the carrying case, and 2 are placed in the charging unit at quarters.
 - G. Batteries on the charger should be rotated weekly and switched with the batteries in the gauge and the carrying case.
 - H. The battery charger indicators are as follows:
 - 1. Indicator is steady red color = the battery is charging
 - 2. Indicator is slowly blinking red color = defective battery must be replaced
 - 3. Indicator is steady green

4.2 Analog In-Line Pressure Gauge (Figure 24)



Figure 24

- 4.2.1 The analog in-line pressure gauge is used to monitor the pressure being delivered from the standpipe outlet.
 - A. Like the digital in-line gauge, it does not regulate water flow; it simply monitors the pressure of the water supplied.
 - B. Unlike the digital in-line gauge, the analog gauge does not measure water flow
- 4.2.2 It has 2 ½” couplings and an analog dial to measure the supply pressure.
- 4.2.3 The analog in-line gauge is not battery powered.

5. FOAM EDUCTOR AND NOZZLE

- 5.1 All Engine and Squad companies carry a foam eductor and nozzle capable of producing finished firefighting foam.
- 5.2 The eductor and nozzle are carried together in a black pelican case. The foam nozzle can be identified by white markings on the tip, handle, and pistol grip.
- 5.3 When supplied with 200 psi, it has a flow of 125 GPM.
- 5.4 Refer to *Chapter 20, Foam* for a full discussion of foam operations.

6. NEW YORKER MULTIVERSAL (FIGURE 25)

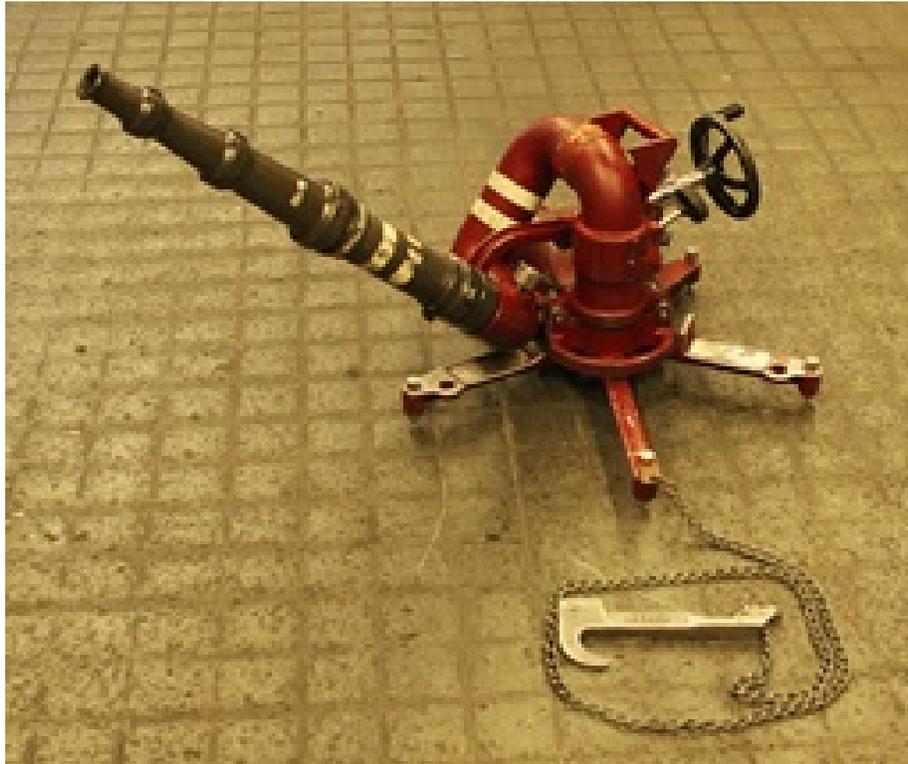


Figure 25

- 6.1 The New Yorker Multiversal is carried by all engine companies.
- 6.2 The multiversal has three stacked tips (2", 1 ½", 1 ¼").
 - 6.2.1 When the 1 ¼" tip is used, it will flow roughly 465 GPM with 100 psi at the tip
 - 6.2.2 When the 1 ½" tip is used, it will flow roughly 560 GPM with 70 psi at the tip.
When supplied with 100 psi at the 1 ½" tip, it will flow roughly 660 GPM.
 - 6.2.3 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip
- 6.3 The multiversal has two 3" inlets. The maximum pressure to be supplied to the appliance base is 200 psi.

7. Hose Roller and Bresnan Distributor



Figure 26

- 7.1 The hose roller (Figure 26) is used to facilitate the hoisting of a hoseline over a windowsill or parapet by eliminating the friction of the dry line being pulled over a window sill or roof parapet during an exterior hose stretch.
- 7.2 When properly used, the hose roller should be placed over the windowsill or roof parapet and secured to a substantial object using the attached rope.
- 7.3 Bresnan Distributor



Figure 27

- 7.4 The Bresnan Distributor (Figure 27) is an appliance carried by engine companies that attaches to a hoseline to distribute water in a 360-degree pattern. It is designed to be used remotely in a fire area that cannot be accessed by a hoseline. Generally, it is used for fires below grade, such as cellar fires.
- 7.5 It is comprised of 9 angled ports for water delivery. When in operation, the angled force of the water will cause the Bresnan distributor to spin, which maximizes the distribution of water.
- 7.6 When supplied at 50 psi nozzle pressure, it will deliver 250 GPM of water.
- 7.7 The Bresnan distributor is supplied with a 2 ½” hose. A shut-off should be placed one length from the distributor, allowing flow to the distributor to be controlled.
- 7.8 To properly use the Bresnan distributor, it should be lowered into the fire area via an opening and the shut-off should be opened to begin water flow. The distributor is lowered until it hits the floor, then raised several feet to position for optimal distribution.

8. GATES and SIAMESE CONNECTION

- 8.1 **SINGLE GATE:** The primary function of a single gate (also called “one-way gate”) is to enable firefighters to control the flow of water at a point other than the water source itself. By using a single gate, flow can be augmented, or even halted, without having to shut down the water source itself. (Figure 28)



Figure 28

- 8.2 Commonly, single gates are used on the 2 ½” outlet of a hydrant, but they are also often used to control flow from standpipe outlets, deck guns, or multiversals.

- 8.3 Single gates exist in a number of different sizes for use on hydrants, standpipe outlets, or other appliances (such as a deck pipe or multiversal).
- 8.4 To use a single gate, it must be attached before the water source is turned on. Once attached, the water source is opened and the flow can be controlled at the single gate.
- 8.5 **GATED WYE:** The primary function of a gated wye is to allow a single source of water to supply two separate hoselines. A gated wye has one inlet and two outlets. Each outlet is equipped with a gate that allows for the control of water flow.(Figure 29 a & b)



Figure 29 a



Figure 29 b

- 8.6 Commonly, gated wyes can be found attached to an outlet on fire apparatus, most often on the front pumper. Gated wyes can also be attached to a hydrant, or attached to a hoseline to facilitate the stretching and operation of multiple hoselines.
- 8.7 Gated wyes exist in all available sizes, from 4 ½” to 1 ½”. The most common size has one 2½” inlet and two 1 ½” outlets and is often found on the front outlet of the apparatus.
- 8.8 To use a gated wye, it must be attached before the water source is turned on. Once attached, water flow can be controlled by the quarter-turn ball valve at each outlet. Units should be aware that when two hoselines are operating from a gated wye and one of those hoselines is shut down, backpressure may impact the other operating hoseline.

- 8.9 **SIAMESE CONNECTION (WITH SINGLE GATE):** A Siamese connection performs the opposite function of the gated wye. Its primary function is to supply a single outlet by way of two separate hoselines. A Siamese connection has two inlets and one outlet. (Figure 30)



Figure 30

- 8.10 Siamese connections are not typically carried on engine apparatus in the FDNY, but they are carried by aerial ladder apparatus for use with their ladder pipe.
- 8.11 The Siamese used in the FDNY has two 3" inlets and one 3" outlet. It is used in conjunction with a single gate to supply the 3 ½" hose used when an aerial ladder pipe is placed in operation.

9. SPANNER WRENCH AND HOSE STRAP

- 9.1 The primary function of a **spanner wrench** (Figure 30) is to tighten and loosen hose couplings.



Figure 30

- 9.2 Every firefighter is issued a spanner wrench and is required to carry it with them at a fire operation.
- 9.3 Two basic types of spanner wrenches exist:
- 14.3.1 Flip-open spanner (often carried in a bunker coat pocket)
 - 14.3.2 Straight spanner (often carried on the apparatus)
- 9.4 A spanner wrench is used by gripping the lugs to tighten or loosen the coupling. While a single spanner can be used, it is most effective to use two spanners together, facing opposite each other and pulled in opposite directions.

9.5 HOSE STRAP



Figure 31A



Figure 31B

- 9.6 The primary function of a **hose strap** is to secure a hoseline that has been stretched a distance vertically, with the purpose of preventing the hose from falling back down the vertical space through which it was stretched.
- 9.7 Hose straps are commonly used when performing a well-hole stretch, fire escape stretch, or a rope stretch.
- 9.8 Every firefighter is issued a hose strap and is required to carry it with them at a fire operation. Two basic types of hose strap exist:
- 9.8.1 **Rope hose strap with hook** - One end has a metal hook and the opposite end has a loop in the rope (Figure 31A)
- 9.8.2 **Nylon hose strap with carabiner** - One end has a carabiner and the opposite end has a loop in the nylon strap. There are a number of small metal loops on the strap, which are not normally used when securing a hose (Figure 31B)
- 9.9 When used properly, the looped end of the hose strap secures the hose by using a girth hitch. This uses the weight of the hose to tighten the grip of the hose strap. The carabiner (or hook) end of the hose strap is used to attach to an anchor point. The hose strap is attached to the anchor point by passing over the anchor point and is attached back to the strap itself.
- 9.10 The ideal location on the hose to secure the hose strap is just below a coupling. This minimizes the likelihood of the hose slipping through the girth hitch, while also relieving pressure on the coupling.

10. HYDRANT WRENCH AND CURB VALVE KEY



Figure 32A



Figure 32B

10.1 There are two basic types of **hydrant wrenches** available, both of which are carried by all engine and squad companies:

10.1.1 **Custodian Hydrant Wrench** - equipped with a magnetic cup (Figure 32A) that allows the operation of hydrants equipped with a Custodian lock. It can also operate Hydra-Shield equipped hydrant caps and can operate the standard 5-sided hydrant operating nut. Hydrant is turned clockwise to open.

10.1.2 **Standard Hydrant Wrench** – Used to open the standard 5-sided hydrant operating nut (Figure 32B). Hydrant is turned clockwise to open.

10.2 Curb Valve Keys (Figure 33) Carried by all engine and squad companies and is used to operate the curb valve that controls water flow from the water main to a hydrant.



Figure 33

10.3 The wrench is placed over the operating nut and turned counter-clockwise to close.

11. HYDRANT PLUG



Figure 34A

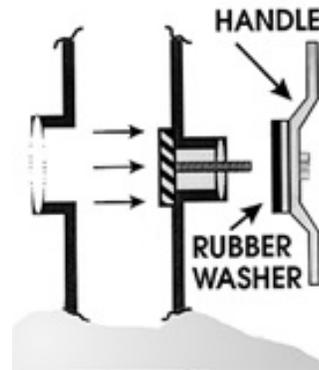


Figure 34B

- 11.1 Carried by all engine and squad companies. If the outlet threads of a hydrant are damaged or missing, a hydrant plug can be used to close the 2 ½” outlet before using the hydrant.
- 11.2 The hydrant plug (Figure 34A) consists of a T-bolt, (which has a threaded rod) and a handle with an attached rubber washer. The T-bolt may be equipped with a rope in case it falls into the barrel of the hydrant during operation.
- 11.3 To use the hydrant plug, maneuver the T-bolt through the 4 ½” outlet into the hydrant barrel (as pictured). Place the threaded rod out through the 2 ½” outlet, centering it in the middle of the opening. Hold the T-Bolt firmly against the inside of the hydrant barrel with one hand and turn the handle onto the threaded end of the T-Bolt with the other hand until handle is tight to the barrel. The washer must be on the outside of the hydrant Figure 34B).

12. Drafting Connections



Figure 35

- 12.1 There are 3 different drafting connections on the apparatus (Figure 35):
- 12.1.1 One ribbed 10-foot hard connection
 - 12.1.2 One ribbed 10-foot hard connection with strainer
 - 12.1.3 One smooth 10-foot hard connection
- 12.2 Each of these connections is equipped with 6” couplings. The connection with a strainer has a strainer on one end and a female coupling on the other. The other two connections have one male and one female coupling.
- 12.3 When used for drafting, the connection with the strainer is lowered into the water and the smooth connection is used to connect to the ungated inlet on the apparatus. The 3rd connection is to be used between them if more length is needed. Please refer to *Chapter 12: Engine Company Chauffeur* for more information on drafting.

13. HYDRANT CONNECTIONS



10-FOOT SOFT SUCTION 3 ½”
HYDRANT CONNECTION

Figure 36

Figure 36

- 13.1 The “soft suction” is a black, semi-rigid hose used exclusively as a hydrant connection.
- 13.2 It is 10 feet long, has a 3 ½” diameter, and is equipped with two 4 ½” female couplings for direct connection to a hydrant.



10-FOOT SEMI-RIGID 4 ½”
HYDRANT CONNECTION

Figure 37

Figure 37

- 13.3 The “**semi-rigid connection**” is a black, semi-rigid hose used exclusively as a hydrant connection.
- 13.4 It is 10 feet long, has a 4 ½” diameter, and is equipped with two 4 ½” female couplings for direct connection to a hydrant. It is similar to the older 3 ½” soft suction connection, but is more rigid and has a larger diameter.



35-FOOT SOFT HYDRANT
CONNECTION

Figure 38

Figure 38

- 13.5 The **35-foot soft connection** is a yellow, synthetic hose that is used exclusively as a hydrant connection.
- 13.6 It is 35 feet long, has a 5" diameter, and is equipped with two 4 ½" female couplings for direct connection to a hydrant.



EQUIPMENT INSPECTIONS

1. ENGINE EQUIPMENT INSPECTION REQUIREMENTS AND OUT-OF-SERVICE PROCEDURES

1.1 The following table lists each piece of engine company equipment, along with the following information:

1.1.1 The inspection requirement for the equipment

Equipment	Inspection
Hydrants	Spring and Fall
Hose	Annual test, Spring and Fall repacking
Nozzles	Annual test (in August), Each tour
Digital In-line Gauge	Each tour
Hose Strap	Each tour
Hydrant Wrench	Each tour
Spanner Wrench	Each tour
10-foot Semi-rigid 4 ½" Connection	Each tour
10-foot Soft 3 ½" Suction	Each tour
35-foot Soft Hydrant Connection	Each tour
Analog In-line Gauge	Weekly
Adapters	Weekly
Blitzfire	Weekly
Bresnan Distributor	Weekly
Cockloft Nozzle	Weekly
Combination Nozzle	Weekly
Curb Valve Wrench	Weekly
Drafting Connections	Weekly
Fittings	Weekly
Foam Eductor and Nozzle	Weekly
Gated Wye	Weekly
High Rise Nozzle	Weekly
Hose Roller	Weekly
Hydrant Plug	Weekly
New Yorker Multiversal	Weekly
Single Gate	Weekly

THIS PAGE INTENTIONALLY LEFT BLANK



HOSE MAINTENANCE

1. HOSE MAINTENANCE

1.1 This bulletin will outline the basic requirements of hose maintenance for all engine companies in the FDNY. This includes the following:

- 1.1.1 Hose requirements
- 1.1.2 Hose packing
- 1.1.3 Hose removal and repacking
- 1.1.4 Hose testing
- 1.1.5 Hose out-of-service

2. HOSE REQUIREMENTS

2.1 Engine companies are required to maintain the amount of hose listed below. This amount includes hose kept on the apparatus and hose maintained in quarters. Minimum requirements are as follows:

- 2.1.1 20 lengths of 1 ¾" hose
- 2.1.2 1 length of 2" lightweight hose
- 2.1.3 3 lengths of 2 ½" lightweight hose
(Engines normally staffed with 5 FF's should carry 4 lengths)
- 2.1.4 30 lengths of 2 ½" hose
- 2.1.5 10 lengths of 3 ½" hose

2.2 Additionally, hose is required to be carried on the apparatus in the following fashion:

- 2.2.1 1 length of 2" lightweight hose shall be arranged in a roll-up and maintained with a 2" nozzle attached.
- 2.2.2 3 lengths of 2 ½" lightweight hose shall be arranged in a roll-up. One of these lengths shall be maintained with a 2 ½" nozzle attached.
- 2.2.3 For companies staffed with 5 firefighters, 1 additional length of 2 ½" lightweight hose must be carried, maintained as a roll-up.
- 2.3.4 At least 4 lengths of 1 ¾" hose shall be carried, either rolled or arranged in a roll-up. One of these lengths shall be maintained with a 1 ¾" nozzle attached (to be used to replace a burst length or to add to a short stretch).

3. HOSE PACKING

3.1 When carried on the apparatus or stored in quarters, hose can be maintained in several different arrangements, as described in the following sections.

3.1.1 The typical hose load has:

- One bed of 3 1/2 inch hose.
- One bed of 2 1/2 inch hose.
- Two beds with lead lengths of 1 3/4" hose coupled to 2 1/2 inch hose to finish out the load.

3.1.2 No more than six lengths of 1 3/4 inch hose shall be used as lead lengths in any hose stretch. Greater friction loss in 1 3/4 inch hose precludes the use of more lengths without the danger of exceeding the maximum permissible working pressure of 250 psi.

3.1.3 When loading hose, fold it neatly, compactly and uniformly. Loading hose correctly allows the hose to play out properly and at the same time indicates to the public and to the Department, the state of supervision and spirit of the company.

3.2 Traditional hose bed arrangement (See Figure 1)

3.2.1 Hose is carried in the hosebeds of all engine apparatus in a traditional hosebed arrangement. This is created as follows:

- A. Load hose from left to right in the hosebed compartment
- B. Begin on the left side with the coupling extended beyond the hosebed
- C. Lay the hose straight back to the left rear of the compartment
- D. Fold hose at the rear and bring back forward, veering slightly to the right
- E. When at the front of the compartment, the hose should lie alongside the coupling.
- F. Fold the hose at the front and repeat the movement until the layer is complete
- G. When a layer is finished, fold the hose at the right rear of the compartment and bring forward diagonally to the front left to begin the next layer.

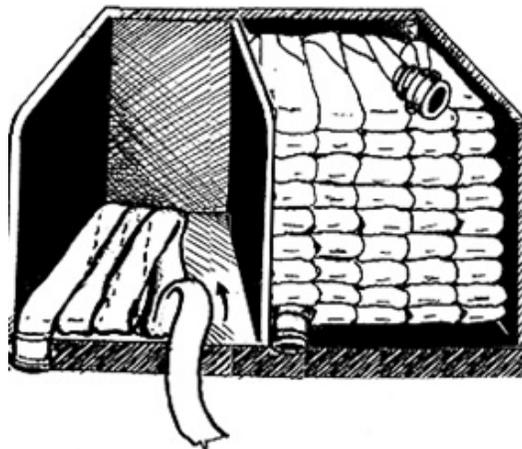


Figure 1

3.3 Horseshoe Arrangement



Figure 2

- 3.3.1 The lead lengths of hose in a hosebed can be maintained in a horseshoe arrangement to facilitate the hose stretch (Figure 2). This arrangement is created as follows:
- A. Each horseshoe is comprised of exactly 1 length of hose
 - B. Place the hose on its edge on top of the hosebed
 - C. Fold the hose back and forth in the shape of a horseshoe
 - D. Completed horseshoes should be roughly 4 feet long
- 3.3.2 The horseshoe arrangement makes the hose easier to carry and ensures exactly 1 length of hose is carried.
- 3.3.3 The midpoint of the horseshoe can be located by grabbing the middle ring of the horseshoe (Figure 3).



Figure 3

3.4 Roll-ups



Figure 4

3.4.1 In order to facilitate the efficient deployment of hose when stretching from a standpipe outlet, dedicated lengths of hose should be folded in a specific arrangement, referred to as a “roll-up” (Figure 4).

3.4.2 The roll-up is created as follows:

- A. Lay one length of hose folded halfway with the couplings side by side. Facing couplings (while standing away from the hose, as pictured), the male coupling is on the left.



Figure 5

- B. For the lead length, attach the nozzle and fold hose in half so that the nozzle tip is even with the female coupling (Figure 5).
- C. Bring the midpoint fold to the couplings (Figures 6A with nozzle and 6B).



Figure 6A



Figure 6B

- D. Bring the next fold up to the couplings over the midpoint fold (Figure 7)



Figure 7

- E. Lift the couplings (and the two folds of hose on top of them) and fold them over on top of the remaining fold of hose.

- F. The folded hose should now be arranged with the couplings on top of the hose. Facing couplings (while standing away from the hose, as pictured), the male coupling is now on the right (Figure 8).



Figure 8

- G. Secure completed folds with a strap connector on top



Figure 9

- 3.4.3 The roll-up makes the hose easy to carry, allows lengths to be easily connected to each other, and facilitates a smooth deployment when stretched.
- 3.4.4 The midpoint of the hose can be identified by grabbing the hose fold located directly beneath the couplings (Figure 10). This point is called the “A-fold” and is painted red on all lightweight hose. Using this A-fold, the hose should be deployed as discussed in *Chapter 8: Standpipe Operations*.



Figure 10

3.5 Rolled hose (Figure 11)

3.5.1 Spare serviceable hose may be maintained in a rolled length when carried on the apparatus or stored in quarters. This arrangement is created as follows:

- A. Lay the hose out and fold the hose back on itself
- B. Lay the male coupling on top, roughly 3 feet from the female coupling
- C. Beginning at the folded end, roll the doubled hose towards the couplings
- D. Rolled hose may be secured with a short piece of rope



Figure 11

- 3.5.2 When hose is being placed out-of-service, it is arranged in a single roll (Figure 12). The male coupling should be placed on the inside when single rolled. An over-hand knot is to be tied 3' from the female coupling.



Figure 12

4. HOSE REMOVAL AND REPACKNG

- 4.1 Hose should be removed and repacked in the spring and fall of each year, in accordance with schedules issued by Division Commanders. Spare hose shall be used to replace hose on the apparatus, when available.
- 4.2 Any hose 10 years old or older should be placed out-of-service. The first two digits of the serial number stamped on the female coupling will indicate the year of manufacture.
- 4.3 Hose should be inspected before being placed on the apparatus.
- 4.3.1 Any hose of doubtful strength should be placed out-of-service. This may be due to cuts, abrasions, wear, or burns to the hose jacket.
- 4.3.2 Couplings should not be cracked or out-of-round and there should be no burred threads
- 4.3.3 All female couplings should have a rubber washer. Washers that are dried out or cracked shall be replaced.

6. HOSE OUT-OF-SERVICE

- 6.1 To place hose out of service, complete form RT-3 and attach it to the OOS hose.
- 6.2 Replacement hose is requisitioned from Fire Tools and Equipment (718) 391-9405.

THIS PAGE INTENTIONALLY LEFT BLANK



WATER SUPPLY INFRASTRUCTURE

1. WATER SUPPLY INFRASTRUCTURE

1.1 This section will discuss critical equipment that is regularly used by Engine Companies, but is not carried on the engine apparatus. This equipment exists as part of the water supply infrastructure of New York City and plays a vital role in Engine Company Operations.

1.2 This section will provide a brief discussion of the physical specifications and key equipment as it exists in the field. It is not intended to provide a comprehensive description of the capabilities of the systems discussed, but rather a general overview of key components.

1.3 Specifically, the infrastructure discussed will concern the following:

1.3.1 Hydrants (See Chapter 10, Hydrants)

1.3.2 Sprinkler systems

1.3.3 Standpipe systems

2. SPRINKLER SYSTEMS

2.1 Sprinkler systems are found in a wide range of buildings and occupancies in NYC.

Depending on the occupancy, the system may be either automatic or non-automatic.

2.1.1 **Automatic sprinkler systems** are capable of being activated and issuing water without fire department assistance. They are typically supplied by a city water main and at least one other source. Most common among these other sources are gravity tanks, pressure tanks, suction tanks, or cisterns. Types of automatic sprinkler systems include the following:

2.1.2 **Wet pipe** - Wet pipe sprinkler systems contain water in the riser and piping at all times. When a sprinkler head activates, water is immediately discharged.

2.1.3 **Dry pipe** - Dry pipe systems are installed where there is a danger of freezing and contain air (or sometimes nitrogen) in the riser and piping. When a sprinkler head activates, the air is exhausted through the open head, allowing water to be admitted to the riser and piping.

- 3.1.4 **Deluge** - Deluge systems are often found in aircraft hangars or where large quantities of flammable liquids are used in industrial processes. A "deluge" valve opens upon an electrical signal received from a detector. In a deluge system, all sprinkler heads (or nozzles) are open and will flow water simultaneously.
- 3.1.5 **Pre-action** - Pre-action systems are most often found in computer rooms or where other sensitive electronic equipment is used. A pre-action type of sprinkler system consists of fusible sprinkler heads, dry piping, and a valve which is opened upon an electrical signal from a detector.
- 3.1.6 **Combination** - A combination sprinkler system or combination sprinkler-standpipe consists of sprinkler heads and standpipe hose outlets attached to a common riser. Combination systems may be either "wet" or "dry."
- 3.1.7 **Non-automatic sprinkler systems** depend solely upon the fire department to supply water for firefighting. They are commonly found in cellars and sub-cellars of older commercial buildings. These systems may contain fusible sprinkler heads, open sprinkler heads, or even perforated pipes.
- 3.2 While many sprinkler systems will have a fire department connection (FDC) for FDNY units to supply water, it is common to find a sprinkler system with no FDC. These systems cannot be augmented by FDNY units.
- 3.3 Automatic sprinkler systems are identified by FDC or caps that are painted green. Non-automatic sprinkler systems will have FDC or caps that are aluminum colored. Sprinkler systems that are part of a combination system will have FDC or caps painted yellow.
- 3.4 While the flowrate provided by sprinkler heads will vary, a standard sprinkler head can be expected to provide a flowrate of 13 – 18 GPM.

4. STANDPIPE SYSTEMS

- 4.1 A standpipe system is a system of piping installed in a building or other structure that serves to transfer water to hose connections located throughout the structure for firefighting purposes.
- 4.2 In NYC, the requirements for the presence of a standpipe system are described in the NYC Building Code and are based on several criteria, primarily the height and area of the structure.
- 4.3 Standpipe Classifications
- 4.3.1 According to national standards, standpipes are formally classified into 3 distinct classes as follows:
- A. **Class I** - Designed to be used by the fire department only. Equipped with 2 ½” outlets only.
 - B. **Class II** - Designed to be used by trained, non-fire department personnel. Equipped with 1 ½” outlets only.
 - C. **Class III** - Designed to be used by both the fire department and by trained, non-fire department personnel. Equipped with both 2 ½” and 1 ½” outlets.
- 4.3.2 In NYC, nearly all standpipe systems are Class I systems. In several older occupancies (such as theaters), Class III systems may still exist. Class II systems are not compliant with NYC building code and should not exist in NYC.
- 4.4 Types of Standpipe Systems
- 4.4.1 Standpipe systems can be categorized as either “wet” or “dry”. Wet systems contain water in the piping at all times. Dry systems do not contain water in the system under normal conditions.
- 4.4.2 Standpipe systems can also be considered either “automatic” or “manual”. The description of each type will depend on whether the system is wet or dry, as follows:
- A. **Automatic wet systems** - capable of providing water under pressure at the standpipe outlets, possibly with the assistance of a fire pump or a gravity tank.
 - B. **Manual wet systems** - connected to a small water supply that will maintain water in the system, but is not capable of providing necessary operating pressure to the system.
 - C. **Automatic dry systems** - usually supplied by a public water main, but are maintained with pressurized air in the standpipe piping. When a decrease in air pressure is detected in the system, water will automatically be supplied to the system.

- D. **Manual dry systems** - may or may not be connected to a water supply. If it is connected to a water supply, the provided water supply will only enter the system when a control valve is manually opened. If there is no water supply, the system will remain dry until water is supplied by FDNY units via FDC.
- 4.4.3 **Air Pressurized Systems** – a specific type of manual dry systems that are maintained pressurized by a dedicated air compressor. These systems are required in buildings under construction that are taller than 75 feet. When there is a change in air pressure that exceeds a pre-determined threshold, an alarm will sound on site.
- 4.4.4 **Combination systems** - systems that supply both the standpipe system and an automatic sprinkler system. The FDC or caps for combination systems are painted yellow.
- 4.4.5 **Multi-zone systems** - standpipe systems that are vertically subdivided into zones to limit the maximum operating pressure in the system. Each zone may have its own FDC, or the entire system may be supplied from a single FDC.
- 4.4.6 **Express Piping Systems** - Some taller high-rise buildings may have separate “Low Zone” and “High Zone” standpipe systems (Figure 5). These separate risers are not interconnected and may have separate FDC. The FDC shall be identified with signage stating either “Low Zone” or “High Zone” and indicate the floors they serve. The High Zone riser is also known as “Express Piping”.



Figure 5

4.4.7 ***Interconnected Building Systems*** - systems in which the standpipes of multiple buildings are interconnected to each other via underground piping. This is common in residential housing complexes, especially those owned by the NYC Housing Authority (NYCHA).

- A. Generally, the water supply to the entire interconnected system is by way of a single gravity tank located on one of the buildings.
- B. Each building will have a Post Indicator Valve (PIV) that can be used to isolate that building from the rest of the system. When the PIV is closed, the building will be disconnected from all other buildings, including the gravity tank, and will not be connected to any additional water supply.
- C. When the PIV is open, the building will be connected to the rest of the complex. When all PIV's are open, all standpipes in the system can be supplied by way of any building.
- D. The PIV will generally be located outside and in close proximity to the building and is often found in the direction of the building that contains the gravity tank for the system.

4.5 Components of Standpipe Systems

4.5.1 Standpipe systems include a variety of different components. The most significant of these are described below. This list is not exhaustive and additional components may exist.

4.5.2 ***Fire Department Connections (FDC)*** - Formerly known as “Siamese connections”, FDC are the 3” connections by which the Fire Department can supply water to the standpipe system (Figure 6)

- A. The FDC (or FDC caps) of a standpipe system should be painted red.
- B. For a combination system, the FDC (or FDC caps) should be painted yellow
- C. If the system is out-of-service, a white disc should be affixed to the FDC
- D. If the system is partially out-of-service, a blue disc should be affixed to the FDC. Yellow discs should not be used on FDC.



Figure 6

- 4.5.3 **Section valves** - can be used to shut down water supply to a section of the standpipe system (Figure 7). These are OS&Y type valves (Outside Stem & Yoke) and can be located at various points in the system. Often, they can be located in a cabinet below the standpipe outlet. If the valve is open, the stem will be visible outside the attached wheel. If closed, the stem is not visible. These valves may also be called a Riser Control Valve or an Isolation Valve.



Figure 7

- 4.5.4 **Post Indicator Valves** - exist in Interconnected Building Systems and are used to isolate a building from the rest of the system. They are painted red and are generally located outside and in close proximity to the building (Figure 8). If the valve is open, the word "OPEN" should be visible on the face of the valve. If closed, the word "CLOSED" should be visible.



Figure 8

- 4.5.5 **Gravity Tank** - a large container that uses the force of gravity to supply water pressure to a standpipe system. To work properly, the gravity tank needs to be located a distance above the highest outlet, so they are commonly located above roof level. For standpipe systems in an interconnected building complex, a single gravity tank may supply the system for the entire complex (Figure 9 and Figure 10). In larger high-rise buildings with low-zone and high-zone systems (such as mega-high-rises), it is possible for additional gravity tanks to be found inside the building.

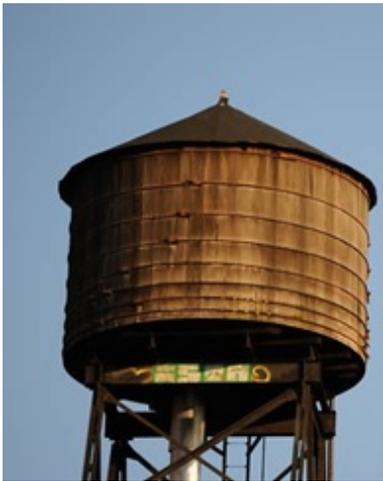


Figure 9



Figure 10

- 4.5.6 **Roof Manifold** - the top of the standpipe riser, where the piping extends to the roof level (Figure 11). It is terminated with three outlet connections, which are used when testing water flow in the standpipe. It may be used by fire companies to supply a hoseline at the roof level.



Figure 11

4.5.7 **Pressure Reducing Device (PRD)** - a device installed at the standpipe outlet for the purpose of reducing the water pressure (Figure 12 and Figure 13) flowing from the outlet. PRD's are removable and are adjustable.

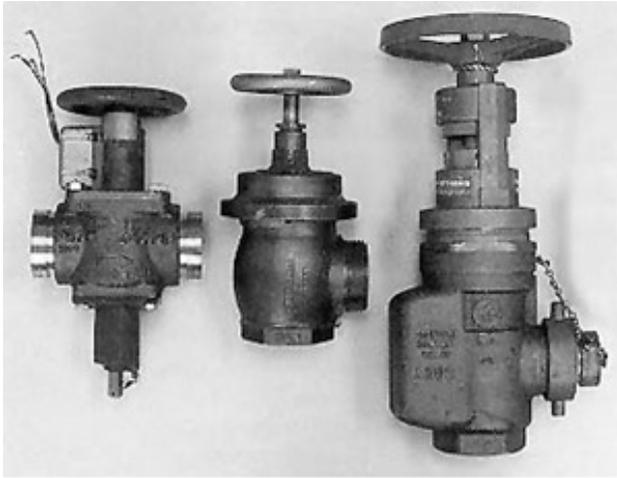


Figure 12



Figure 13

4.5.8 **Pressure Reducing Valve (PRV)** - a valve (Figure 14) that is permanently attached to a standpipe outlet for the purpose of reducing the water pressure flowing from the outlet. PRV's are not removable and cannot be adjusted.



Figure 14



DIGITAL IN-LINE GAUGE

1. INTRODUCTION

- 1.1 This bulletin will describe the operation of the FRC Digital In-Line Pressure/Flow metering device that has been designed specifically for standpipe operations. The Digital In-Line Gauge does not regulate water flow, but provides members with the ability to monitor the pressure and flow being delivered from the standpipe outlet to the nozzle team.



Photo 1: Digital In-Line Gauge



Photo 2: Digital In-Line Gauge Display

2. DESCRIPTION

2.1 The Digital In-line Gauge has the following features:

- Red LED readout of pressure in pounds per square inch (psi).
- Blue LED readout of water flow in gallons per minute (gpm).
- Constructed of black anodized aluminum that weighs approximately 5 lbs.
- Powered by a rechargeable lithium ion 9 volt battery to provide optimal power and longevity for 5 hours of operation.
- A “sleep” mode and auto shutoff to conserve battery life.
- A multi-stage “low battery” warning system that indicates the need for battery replacement.
- Built-in 45 degree elbow to ease use in wall cabinets.
- Carrying case for the gauge and required tools.



Photo 3: Built in 45 degree angle



Photo 4: Power-up button

3. OPERATION

3.1 Members should be guided by “Standpipe Operations” procedures in Chapter 9 of Engine Company Operations, and Evolution 9.

- A. Connect the Digital In-line Gauge to the standpipe outlet. (**The gauge is not to be pre-connected to a folded length of hose**).
- B. Firmly press and hold the **green** ON/OFF button for 4 to 5 seconds. Four dashes will appear under PRESSURE and "r3.00" will appear above FLOW. (Photo 4)
- C. Release the ON/OFF button and the digital readout will show 0 (Zero) PRESSURE and 0 (Zero) FLOW.
- D. When ordered to start water, open the standpipe control valve. **Static** pressure will immediately be indicated in the top red LED digital readout. Static pressure (control valve open, nozzle closed, no movement of water) is not an indicator of sufficient nozzle pressure.
- E. An effective firefighting stream for a 2 ½" hoseline with a 1 1/8" MST is between 225 and 250 gallons per minute (GPM). Therefore the goal is to obtain a **residual** pressure (nozzle open, water flowing) of approximately 70 PSI for a 3 length stretch or 80 PSI for a 4 length stretch with a flow of 225-250 GPM.
- F. Suspect kinks if the pressure reading is normal or higher and the **flow is reduced** below normal. Suspect a burst length if the pressure reading is normal or lower and the **flow is increased** above normal.

Note: If the Digital In-Line Gauge fails to display upon initial start-up, make another attempt to turn the gauge on. If this attempt fails, the control firefighter shall verify with their officer that the nozzle team is receiving proper pressure and flow. **Since the Digital In-Line Gauge does not regulate water flow, hoseline operations can continue without the display functioning properly.** The officer must monitor water pressure and flow and communicate the need for any adjustments to the Control Firefighter.

4. SPECIAL FEATURES

- 4.1 A safety alerting system is incorporated in the Digital In-line Gauge. The visual alerts are set at the following levels and will give the Control Firefighter an early indication of a condition that may require attention. The pressure and flow alerts are not a direct indication of an unsafe condition. HT communication with the officer may be needed to clarify the situation.
- The red digital readout will alternately flash a high pressure alert -“HI-P” when pressure exceeds 200 psi.
 - The blue digital readout will alternately flash high flow alert “HI-F” when water flow exceeds 250 gpm.
 - The blue digital readout will alternately flash a low flow alert “LO-F” when water flow is less than 80 gpm.
- 4.2 In order to extend battery life, a “**sleep**” mode for conserving battery power has been programmed into the Digital In-line Gauge.
- After the unit is turned on the display will remain on as long as water is flowing.
 - If there has been no water flow for 15 minutes, the digital display will go into a “sleep” mode and not display any readings. The resumption of water flow during this “sleep” mode will re-activate the digital display automatically.
 - If there has been no water flow after 30 minutes, the digital display will power off automatically. If operations are then resumed, the Digital In-line Gauge will need to be re-started by firmly **pressing and holding the green ON/OFF button for 4 to 5 seconds.**

5. BATTERIES

- 5.1 The Digital In-line Gauge is powered by a **special 9v rechargeable lithium ion** battery. The specific batteries supplied are HIGHTECH RLI-9600 9V 600 mAh specifically used in the design and operation of the Digital In-Line Gauge. **No other 9V battery may be used in this equipment.**
- 5.2 Units will be issued four batteries to be used as follows:
- One battery to be installed in the Digital In-line Gauge.
 - One battery to be kept in the clear battery pouch of the carrying case. Storing only one spare battery in carry case will prevent damage to batteries due to battery terminal cross-contact.
 - Two batteries are to be placed in the charging unit at quarters.

- 5.3 A fully charged battery will supply approximately 5 hours of continuous operation. After 3.5 hours of usage, the digital readout will **slowly** flash “LO batt”. This is an indication that approximately 90 minutes of battery life remains. If a slowly flashing “LO batt” is displayed, the battery shall be swapped at the conclusion of the operation. When 10 minutes of battery life remains, the digital readout will flash “LO batt” **rapidly**. If a rapidly flashing “LO batt” is displayed the battery shall be swapped with the replacement in the carry case as soon as possible. This can be done when water is flowing.
- 5.4 The Digital In-line Gauge has a battery test feature that when pressed will indicate battery condition. Condition of the battery installed in the gauge is to be checked each tour using this Battery Test Function. A battery in serviceable condition will display as “Batt Good”. (Photo 5)
- 5.5 Batteries are easily changed by unscrewing the knurled battery cup, pulling out the existing battery and inserting a fully charged battery. Ensure that the battery terminals are properly aligned and do not force the connection. Inspect the condition of the “O” ring on the battery cup. Reconnect the battery cup snugly; be careful not to over tighten. (Photo 6)
- 5.6 Batteries should be rotated and recharged weekly and after use. Remove the batteries from the Digital In-Line Gauge and the carry case (clear pouch). Rotate them with batteries from the charging unit (two in, two out). Field units may put identification numbers or letters on batteries in order to track and evenly rotate them (for example A + AA and B + BB). Recharging batteries in this manner will ensure properly charged batteries are in service at all times. Company Commanders shall establish schedules that will facilitate this battery rotation.
- 5.7 The battery charger is to be connected to a 120v AC outlet. If the battery charger indicator is a steady red color, the inserted battery is charging. A steady green color indicates a fully charged battery. A slowly blinking red color indicates a defective battery that must be replaced.



Photo 5: Battery Test Button



Photo 6: Battery Compartment

6. STORAGE

- 6.1 The Digital In-line Gauge is issued with a specially designed carry case that helps protect it from damage. (Photos 7 & 8) Fittings and adapters should be placed in the bottom of the bag under the moveable flap, with the In-Line Gauge placed on top. The contents of the bag should be arranged so that the tools needed first are easier to obtain. Adjustable dividers can separate the various items into different compartments. This will provide a level of protection to the gauge and to threaded fittings.



Photo 7: Carry case



Photo 8: Carry case

7. CARE AND MAINTENANCE

- 7.1 The Digital In-Line Gauge should be inspected for damage and operability each tour.
- 7.2 The Digital In-Line Gauge does not require specialized maintenance. It should, however, be carefully handled and kept clean. As with all standpipe equipment, it should not be stowed away wet after use.
- 7.3 If the Digital In-Line Gauge needs to be placed out of service, or replacement batteries are required, complete form RT-2 and notify the Fire Tools and Equipment Unit at 718-391-9405.

PART TWO
LARGE CALIBER STREAMS

(LCS)
Title

<u>Section</u>		<u>Page</u>
1	OVERVIEW.....	65
2	SUPPLYING LCS.....	65
3	LCS OPERATIONS.....	65
4	NEW YORKER MULTIVERSAL.....	66
5	APPARATUS DECKPIPE.....	69
6	TOWER LADDER.....	70
7	BLITZFIRE OSCILLATING MONITOR.....	72

THIS PAGE INTENTIONALLY LEFT BLANK



LARGE CALIBER STREAMS

1. LARGE CALIBER STREAM OVERVIEW

- 1.1 A Large Caliber Stream (LCS) is a fire stream that delivers 350gpm of water flow or more. They can be ground based (New Yorker multiversal), engine apparatus based (deckpipe), or applied thru an elevated position (tower ladder or aerial ladder pipe).
- 1.2 The versatility and increased flow rates of LCS can dramatically impact operations. At fast-moving fires, early use of LCS can limit fire growth and spread.
- 1.3 Only the Incident Commander may order the use of LCS, which may be the first arriving officer. This includes the first arriving engine using its apparatus deckpipe.

2. SUPPLYING LCS

- 2.1 Whenever possible, an engine company supplying LCS should be dedicated to that task and not engaged in supplying handlines.
- 2.2 LCS should be supplied with the largest available hoselines. Most commonly, this will be 3 ½" hose.
- 2.3 Engine companies supplying a LCS may require additional augmentation, especially when in-line pumping is used. This can be accomplished through the use of a 2 ½" single gate attached to a hydrant for the purpose of possible self-augmentation.

3. LCS OPERATIONS

- 3.1 If LCS use is ordered after units are operating within a building, all operating forces must be notified and time permitted for their safe withdrawal to unexposed positions. Confirmation of their safe withdrawal will be verified by way of a Roll Call and all officers should be prepared to account for the members of their company.
- 3.2 As an additional safety measure, the LCS should be quickly swept through the building without stopping at any window or other opening to serve as a warning to any members left in the area of operation.
- 3.3 LCS use requires strict adherence to operating procedures to avoid serious injury or unnecessary property damage. LCS can cause structural stress when driven into building components and may dislodge building materials, turning them into dangerous projectiles. Additionally, water accumulation can add significant weight to a building and can precipitate structural collapse.

- 3.4 LCS can entrain large amounts of air into a structure with stream application. The effect of air movement resulting from LCS use must be considered by the IC and operating members as conditions may deteriorate in remote areas of the building.

4. NEW YORKER MULTIVERSAL



Figure 1

- 4.1 The New Yorker Multiversal (Figure 1) is carried by all engine companies and has a two-piece design:
- 4.1.1 The top section contains the tips, stream shaper, lock, and wheel.
 - 4.1.2 The base section contains the folding legs, attachment points, pins, and supply connections.
- 4.2 The multiversal is equipped with three stacked tips (1 ¼", 1 ½" and 2").
- 4.2.1 When the 1 ¼" tip is used, it will flow roughly 465 GPM with 100 psi at the tip
 - 4.2.2 When the 1 ½" tip is used, it will flow roughly 560 GPM with 70 psi at the tip. When supplied with 100 psi at the tip, it will flow roughly 660 GPM.
 - 4.2.3 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip
- 4.3 Assembling the Multiversal
- 4.3.1 Extend the three leg supports and the place the base section on the ground. The front leg (with safety chain attached) points in the direction of operation.

- 4.3.2 Attach the top section to the base section by placing the top section on top and inserting the two locking plungers fully, one on either side of the appliance.

4.4 Securing the Multiversal

- 4.4.1 Due to the significant back pressures caused by the nozzle reaction, the multiversal must be secured to ensure a safe operation.
- 4.4.2 The primary means of securing the multiversal is the proper placement of the supply hose. All hose supplying the multiversal should be brought straight back from the appliance for 15 feet. This configuration of hose will effectively absorb the nozzle reaction and prevent lateral movement of the multiversal.
- 4.4.3 An additional measure to prevent backward movement of the multiversal is to secure it in position with a utility rope. The following procedure should be used before the supply hose is attached:
 - A. Before attaching the supply hose, place the middle of the rope on top of the supply connection (Figure 2).
 - B. Bring the two sides of the rope around the supply connection and up between the two inlets.
 - C. Bring the two sides of the rope up over the connection and bring each side forward to the large leg of the ground base on each side of the front leg. Make a half hitch on each of these two legs (Figure 3).
 - D. Bring the rest of each end of the rope forward, and secure each end to a substantial object which is forward and at an angle to the multiversal, using a clove hitch and binder on the taut part of the rope.



Figure 2



Figure 3

- 4.4.4 If there is no substantial object readily available in the area, the supply hose itself can be used as a substantial object. This is done by looping the supply hose in front of the multiversal and tying the rope to it. The supply hose should be laid straight back for 15 feet before it is looped in front of the multiversal.
 - 4.4.5 Additionally, the safety chain can be secured to a substantial object, if one is close enough. The safety chain alone should never be relied on to secure this appliance.
- 4.5 Supplying the Multiversal
- 4.5.1 The multiversal is equipped with two 3” female connections
 - 4.5.2 The multiversal should be supplied with two supply lines whenever possible, though it can be operated when supplied with only one line.
 - 4.5.3 The multiversal should be supplied with the largest size hose available. Generally, this is 3 ½” hose, though it is possible to supply it with 2 ½” hose.
 - 4.5.4 The maximum allowable pressure supplied to the appliance base is 200 psi.

4.6 Operating the Multiversal

- 4.6.1 Do not move the multiversal or the 15 feet of supply hose while it is in operation.
- 4.6.2 The multiversal can rotate horizontally 90 degrees in each direction.
- 4.6.3 The vertical range of the nozzle is from 15 degrees below the horizontal to 90 degrees above the horizontal. The elevation is adjusted by the operating wheel.
- 4.6.4 There is a safety stop at 35 degrees above the horizontal. To operate below 35 degrees, release the safety stop by pulling up the release pin.

5. APPARATUS DECKPIPE



Figure 4

- 5.1 The apparatus deckpipe is permanently affixed to engine apparatus and supplied directly by a 3-inch pipe from the pump (Figure 4).
- 5.2 The deckpipe has 4 stacked tips (2 ½”, 2 ¼”, 2”, 1 ½”).
 - 5.2.1 When the 1 ½” tip is used, it will flow roughly 660 GPM with 100 psi at the tip.
 - 5.2.2 When the 2” tip is used, it will flow roughly 840 GPM with 50 psi at the tip.
 - 5.2.3 The maximum flow of 2,000 GPM is reached when the 2 ½” tip is supplied with 116 psi.

5.3 The deckpipe should be maintained with a single gate connected. The single gate allows the ECC to supply the deckpipe with water prior to operating the stream.

5.4 Deckpipe Operations

5.4.1 In situations where fast water on a rapidly expanding fire is required, the IC may consider using the engine deckpipe for a quick knock-down. This may be the first arriving officer.

5.4.2 Prolonged usage of the deckpipe LCS may necessitate augmentation, especially when in-line pumping. An engine company using a LCS should attach 2 ½ gate to the hydrant for possible self-augmentation

6. TOWER LADDERS



Figure 12

6.1 All tower ladder apparatus in the FDNY are equipped with a basket-based monitor capable of delivering a large caliber stream when supplied by an engine company (Figure 12).

- 6.2 The tower ladder monitor has 2 stacked tips (2", 1 ½"). A fog tip may also be attached to the monitor.
 - 6.2.1 When the 1 ½" tip is used, it will flow roughly 660 GPM with 100 psi at the tip
 - 6.2.2 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip
 - 6.2.3 The maximum solid stream flow of roughly 1,200 GPM is reached when the 2" tip is supplied with 100 psi.
 - 6.2.4 When the Akron Turbomaster fog tip is used, the flow can be up to 1,250 GPM.
- 6.3 Suppling the Tower Ladder
 - 6.3.1 Generally, only one source at the base of the tower ladder should be used.
 - A. A Satellite Water Unit is the best source of supply if available
 - B. When supplied with 3 ½" hose, ensure the male end is stretched to the gated inlet
 - C. 200 – 250 psi is the recommended pressure at the gated inlet
 - 6.3.2 Water flow is controlled by the supply pumper
 - A. The gated inlet at the TL should not be used to control water flow
 - B. Water should always be shut down at the supply pumper
 - 6.3.3 Refer to *Tower Ladder Operations* for more information

7. BLITZFIRE OSCILLATING MONITOR



Figure 13

- 7.1 The Blitzfire Oscillating Monitor is a compact portable monitor that is carried only by the following specialized engine companies:
 - 7.1.1 Satellite Engine Companies,
 - 7.1.2 Foam Tanker Engine Companies
 - 7.1.3 Haz-Mat Technician Engine Companies
 - 7.1.4 Haz-Mat Company 1
- 7.2 The inlet and the outlet of the Blitzfire are both equipped with 2 ½” threads. There is one 2 ½” supply inlet which should be supplied with only one 2 ½” hoseline.
- 7.3 The maximum pressure to be supplied to the Blitzfire is 175 psi.
- 7.4 The Blitzfire comes supplied with its own Max-Force Dual Pressure fog tip. This is the only tip that may be used on the Blitzfire for exterior water stream application.
- 7.5 The fog tip can flow approximately 500 GPM at its maximum pressure of 175 psi.
 - 7.5.1 The fog pattern ranges from straight stream to a 120-degree fog pattern
 - 7.5.2 The fog tip may be switched from a standard mode of 100 psi to a low pressure mode of 55 psi
 - 7.5.3 The fog tip may also be used to apply finished firefighting foam
- 7.6 The Akron 500 GPM foam nozzle may also be used with the Blitzfire to apply foam.

- 7.7 The Blitzfire has the following range of motion:
 - 7.7.1 The vertical range is approximately from 10 degrees to 45 degrees
 - 7.7.2 The horizontal range is 20 degrees from center in either direction.
 - 7.7.3 It also has an oscillation feature providing an automatic horizontal sweep of either 20, 30, or 40 degrees.
 - 7.7.4 A minimum flow of 175 gpm is required for proper oscillation.
 - 7.7.5 The speed of oscillation is a function of the flow rate
- 7.8 The Blitzfire has a flow control handle that can be used to control water flow and act as a safety shut-off feature. The handle is closed when pushed fully forward and open when pulled back. The flow control handle also has 6 flow positions, allowing the water flow (gpm) to be regulated at different positions.
- 7.9 The flow control handle also has a safety shut-off valve. The safety shut-off valve will automatically shut off the monitor's water flow if the monitor starts to move sideways. Once the safety shut-off is tripped, the flow control handle will automatically move to the fully closed position. To resume operations, push the handle fully forward to ensure the safety shut-off valve has been reset.
- 7.10 If the monitor is positioned on a sloped surface, the safety mechanism may activate preventing the flow control handle from remaining open. This can happen because it appears the monitoring is moving. If this occurs, the flow control handle will have to be manually held open by a firefighter. In these situations, it is dangerous to attempt to utilize utility rope, webbing or any other device to hold the flow control handle open.
- 7.11 When in operation, the Blitzfire should only be secured using the tie down strap. The loop end of the strap will be secured to an anchor point and the hook will be snapped into the hole at the front of the Blitzfire. This is the safest method to secure the monitor because if the monitor slides, its travel is limited by the length of the strap



ENGINE COMPANY OPERATIONS

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize the firefighter with basic engine company operations..
CONTENTS:	<ul style="list-style-type: none">• Engine Company Operations: Engine Officer, Backstep, Stretching hoselines, Cockloft Nozzle, Standpipe, Highrise Nozzle, Air Pressurized Standpipe
SOURCE:	<ul style="list-style-type: none">• FDNY Firefighting Procedures• FDNY Evolutions
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Firefighting Procedures, Engine Co. Ops• FDNY Evolutions 1, 1A, 8,9,10,22

PART ONE **ENGINE OPERATION** **OPERATIONS**

<u>Section Title</u>	<u>Page</u>
ENGINE COMPANY OFFICER.....	1
ENGINE COMPANY CHAUFFEUR.....	17
THE BACKSTEP.....	35
STRETCHING HOSELINES.....	59
COCKLOFT NOZZLE <i>ADDENDUM 1</i>	87
STANDPIPE OPERATIONS.....	93
HIGHRISE NOZZLE <i>ADDENDUM 2</i>	119
AIR PRESSURIZED STANDPIPE <i>ADDENDUM 3</i>	125
HOSELINE PLACEMENT GUIDE <i>ADDENDUM 4</i>	129



ENGINE COMPANY OFFICER

1. OVERVIEW OF THE ENGINE OFFICER

1.1 The primary function of the engine company officer is to facilitate fire extinguishment by overseeing the placement of a hoseline to the fire area and directly supervising its operation to extinguish the fire.

1.2 In the fulfillment of this primary function, the engine officer is responsible to make a number of critical decisions and take decisive action. While the decisions to be made will differ depending on the specific operation, the following is an outline of the actions the engine officer should expect to make at a fire operation. They are listed here and will be further discussed in the sections to follow.

1.2.1 Determine if a hoseline needs to be stretched

1.2.2 Determine the size of the hoseline to be used

1.2.3 Determine the placement of the hoseline

1.2.4 Determine the path by which the line will be stretched

1.2.5 Call for the hoseline to be charged

1.2.6 Begin fire attack

1.2.7 Supervise fire extinguishment

1.2.8 Ensure relief of operating members

2. CALLING FOR A HOSELINE

2.1 As soon as the Engine Officer has determined a hoseline is needed, they should contact the nozzle firefighter via the handie-talkie and order a hoseline to be stretched. With this transmission, the Engine Officer should include the following information:

2.1.1 The location to which the line is to be stretched

2.1.2 The size of the line to be stretched

2.1.3 The route and method by which the line should be stretched (if not obvious).

- 2.2 If possible, this information should be communicated by handie talkie, even if the nozzle firefighter is within voice contact. This ensures all units on the fireground are aware a line is being stretched and where it will be located.
- 2.3 If the need for a hoseline is evident before the exact location of the fire is confirmed, the engine officer may elect to call for a line to be initially stretched to the front of the fire building. This can save time, as the line will be readily available to be advanced to the fire area as soon as it is located.
- 2.4 Before the engine officer can direct the hoseline to the fire area, they must know where the fire area is. While a line may be called for before the exact location of the fire is discovered, the officer must identify the location as soon as possible, so as to ensure the hoseline is stretched to the correct location.
- 2.5 As searching for the fire location is a primary function of the ladder company, the engine officer will work in close coordination with the ladder company and will often rely on information from them to effectively lead the hoseline to the fire.
- 2.6 If the apparatus will be performing a back stretch and will proceed to a position at a hydrant more distant from the fire building, the Engine Officer can consider calling for a 2nd hoseline to be placed in the street as the first line is being stretched.

3. LINE PLACEMENT

- 3.1 The engine officer must determine the proper placement of their hoseline. The location to which the line is stretched must be clearly communicated to their nozzle firefighter, as well as the engine company that will be assisting them in stretching the line.
- 3.2 1st hoseline placement
 - 3.2.1 Generally, the purpose of the first hoseline is to extinguish the main body of fire. This line should be placed to attack the main body of fire while also protecting the primary egress of the building. This position will allow the hoseline to extinguish the fire while enabling civilians and firefighters to safely use the primary egress.
 - 3.2.2 One exception to this may be a situation in which fire is actively endangering civilians that are evacuating the building via windows or fire escapes and the immediate application of water from the exterior is needed to protect them. In this case, the first line may be operated from the street to partially extinguish or knockdown fire and protect the fleeing civilians (this is further discussed in a later section).

3.3 2nd hoseline placement

3.3.1 The placement of the 2nd hoseline will depend on the purpose of the line. Generally, the 2nd hoseline will be stretched for one of the following purposes:

- A. Back-up the 1st hoseline
- B. Address extending fire
- C. Attack the main body of fire from an alternate access point
- D. Protect a life hazard from fire

3.3.2 *Back-up the 1st hoseline* – At most fires, the primary purpose for the 2nd hoseline will be to back up the 1st line.

- A. This line will protect the 1st line in case of a burst length or other water loss.
- B. This line can also be used simultaneously with the 1st line if warranted by advanced fire conditions.
- C. When the 2nd hoseline is stretched to back up the 1st line, it should be stretched to the same location as the 1st line and use the same path to get there.
- D. If the 2nd hoseline is not needed to back up the 1st line, it can be advanced to address possible fire extension. Most commonly, this will be on the floor above the fire.

3.3.3 *Address extending fire* - The 2nd hoseline may be stretched to address extending fire when it is not needed to back up the 1st line, or when the need to address extending fire demands the immediate placement of a hoseline.

- A. When stretched to address extending fire, the 2nd hoseline will be stretched to a different location than the 1st line.
- B. If the 2nd hoseline is stretched to address vertical fire extension, the likely location will be the floor above the fire. This occurs often at multiple dwelling fires (tenements, brownstones, row frames, etc.) when heavy fire has extended above the fire floor due to internal voids or auto exposure. If this line is to be stretched above the fire, the officer must confirm the existence of a safe area to flake and charge the line.
- C. If the 2nd hoseline is stretched to address horizontal fire extension, it may be stretched to a different building than the 1st line. This occurs often in structures (private dwellings, row frames, etc.) in which horizontal fire extension is an immediate concern due to heavy fire extending laterally via windows, combustible exteriors, or shafts.

- 3.3.4 ***Attack from alternate access point*** - The 2nd hoseline may be stretched to attack the main body of fire from a different access point if the fire can be more readily accessed from a different location than the position of the 1st line, or if the 1st line is having difficulty advancing to the seat of the fire.
- A. If a second access point is identified as providing a more effective attack on the fire, the 2nd hoseline can be stretched to this point. This may be common at a cellar fire (private dwellings, tenements, places of worship, etc.), where multiple access points to the fire area might exist.
 - B. If the 1st hoseline has difficulty gaining access to the fire area due to heavy fire conditions, obstructions, or other delays, an alternative access point may allow the 2nd hoseline to reach the fire. This may be the case at an advanced cellar fire, when fire conditions prevent the advancement of the hoseline down the interior stairs. It may also be the case when a fire escape or balcony provides access to the fire area, or if stretching the 2nd line by way of a ladder is possible.
 - C. If the fire is on the building exterior in the rear (deck or patio fire, etc.), the fire might be more effectively attacked with a 2nd hoseline stretched to an access point in the rear of the building.
 - D. When stretched to attack the main body of fire from a different access point, the operation of the 2nd hoseline must be closely coordinated with the operation of the 1st line.
- 3.3.5 ***Protect life hazard from fire*** - This may be done if a person is at a window, fire escape, or other exposed position and the immediate application of water from the exterior is needed to protect them while the 1st hoseline is being put into operation.
- A. If the 1st hoseline is already committed to extinguish the fire, an immediate life threat to a person seriously exposed at a window or other location may require the 2nd hoseline to be operated as an exterior hoseline from the street level.
 - B. In this situation, the 2nd hoseline should be operated so as not to drive heat, smoke, or fire into the building. This is accomplished by operating the hoseline into the window at a steep angle, directing the stream at the ceiling. The stream should be kept stationary; it should not be moved in the circular motion that is used to advance an interior hoseline. This circular motion can create an air current into the fire area and negatively affect conditions opposite the stream.

3.4 Additional hoseline placement

- 3.4.1 At larger operations, additional hoselines may be stretched to meet a variety of different needs. Generally, the placement of a 3rd hoseline (and above) will be

done as determined by the Incident Commander. The following sections discuss situations that may require the placement of an additional hoseline.

- 3.4.2 **Cellar fires** – If a hoseline is operating in a cellar or similar area below grade, an additional charged hoseline must be positioned at the top of the cellar stairs.
- A. This position may be covered by the 2nd hoseline, but if the 2nd hoseline is stretched elsewhere, an additional hoseline must be stretched to this location.
 - B. This hoseline is critically important because it is protecting potentially the only egress for the members operating in the cellar. In this case, all members operating in the cellar may need to pass through the floor above the fire to get to safety.
- 3.4.3 **Additional exposure protection** – If fire is extending to more than one location, additional lines will be required at each location of extension.
- A. These additional locations may be located in different buildings, as in the case of fire extension horizontally into exposures 2 and 4, in one or both directions (private dwellings, row frames, old law tenements, etc.)
 - B. These additional locations may also be in the original fire building, as in the case of fire extension horizontally within larger buildings via voids or the cockloft (new law tenements, H-types, or taxpayers etc.). In this case, the engine officer should be sure that no more than two hoselines are stretched in a stairway. If there are no additional stairways available, an alternative hose stretch may be required (rope stretch, fire escape stretch, etc.).
- 3.5 Typically, the 2nd arriving engine company will team up with the 1st arriving engine to operate the 1st hoseline. However, there are situations in which the 2nd arriving engine company may stretch and operate a 2nd hoseline. This should only be done when all of the following conditions exist:
- 3.5.1 The 1st arriving engine company must have secured a positive water source. The 2nd arriving engine officer can communicate with the 1st arriving chauffeur to confirm this.
 - 3.5.2 The 1st arriving engine company does not require the help of the 2nd arriving engine to get the 1st line in operation. The 2nd arriving engine officer must communicate with the 1st arriving engine officer to confirm this.
 - 3.5.3 The hose stretches are sufficiently short, so the 1st arriving company will not require immediate assistance in operating the line once it is charged.
 - 3.5.4 There is an immediate need for a 2nd hoseline to address fire extension or a life hazard.

Note: The Incident Commander (Chief Officer or Acting Chief Officer) may order the second engine in any situation to immediately stretch a second line for any purpose including the need for a backup line or exposure protection.

- 3.5.5 Generally, this situation will only occur in 1 or 2 story structures where the length of the stretch is manageable. The decision by the second engine officer to immediately stretch a 2nd line, even in these buildings, must be weighed against the need to assist the 1st arriving engine in quickly getting the 1st hoseline in operation. Getting the first line into operation is the primary tactical concern.
- 3.6 Typically, the 3rd arriving engine company will team up with the 4th arriving engine to stretch and operate the 2nd hoseline at an operation. However, if the 2nd arriving engine has already begun stretching a 2nd hoseline (as described above), the 3rd arriving engine should team up with the 1st arriving engine and assist in the operation of the 1st hoseline.
- 3.6.1 There may be situations in which the 3rd arriving engine may need to assist the 1st and 2nd arriving companies in getting the 1st hoseline in operation. This may be the case if there is an excessively long or difficult stretch, or if there was a problem with the stretch. The 3rd arriving engine officer should make sure their assistance is not required with the 1st line before ordering a 2nd line stretched.
- 3.6.2 In extreme situations where fire extension in multiple occupancies is an immediate threat, there may be a need to quickly stretch a 3rd hoseline to address extension. If both the 1st and 2nd arriving engine companies are able to stretch and operate their own hoselines and do not require assistance, it may be necessary for the 3rd arriving engine to stretch and operate a 3rd hoseline.
- 3.6.3 The 3rd arriving engine should only stretch a 3rd hoseline when ordered by the Incident Commander.

4. DETERMINING THE SIZE OF THE HOSELINE

- 4.1 Determining the size of the hoseline to be stretched is a critical decision to be made by the engine officer.
- 4.1.1 When making this decision, the advantages of the speed and mobility of the smaller 1 ¾" hoseline need to be weighed against the limitations of the flowrate provided.
- 4.1.2 Similarly, the advantages of the increased flowrate of the larger 2 ½" hoseline need to be weighed against the limitations of the heavier weight and decreased maneuverability of the hoseline.

- 4.2 The engine officer should determine the size of the hoseline stretched based on the conditions faced and the specific purpose of their hoseline.
- 4.2.1 All hoselines stretched at an operation do not need to be the same size; if the initial hoseline stretched is a 2 ½” line, subsequent hoselines are not required to also be 2 ½” hose. If the engine officer determines the use of a smaller hoseline would be appropriate, subsequent hoselines may be 1 ¾” hose.
- 4.3 To aid the engine officer in making this decision, the following sections discuss the capabilities of both the 1 ¾” and 2 ½” hoselines, as well as their applicability to various situations. These guidelines are intended to assist the engine officer in making a difficult and important decision.
- 4.4 1 ¾” hoseline is the primary attack line in the FDNY.
- 4.4.1 The 180 GPM flowrate provided by the 1 ¾” hoseline is sufficient to extinguish the majority of fires encountered.
- 4.4.2 When the 1 ¾” hoseline is supplied with 50 psi at the 15/16” tip, the nozzle reaction is 68 lbs. This is the force felt by the nozzle firefighter.
- 4.4.3 The increased speed and mobility of the 1 ¾” hoseline enables the nozzle firefighter to more effectively operate the hoseline and direct the water stream as needed.
- 4.5 There exist situations where the flowrate provided by the 1 ¾” hoseline may not be sufficient and the larger flowrate provided by the 2 ½” hoseline is needed.
- 4.5.1 When supplied with a nozzle pressure of 40 psi, the 2 ½” hoseline will provide a flowrate of 235 GPM and a nozzle reaction of 78 lbs. This is the force felt by the nozzle firefighter.
- 4.5.2 If this flowrate proves inadequate, the engine officer can request an additional 10 psi be supplied to the 2 ½” hoseline. This will provide a nozzle pressure of 50 psi and a Flowrate of 265 GPM. The nozzle reaction will be 98 lbs, which is nearly 50% greater than the nozzle reaction of the 1 ¾” hoseline.
- 4.6 While the elevated flowrates of the 2 ½” hoseline provide increased extinguishment power, the resultant nozzle reactions reduce the maneuverability of the hoseline. The advance of the line will be slower and it may be more difficult for the nozzle firefighter to maneuver the stream as needed.

- 4.7 There are five situations in which the use of the 1 ¾” hoseline would not be appropriate and a larger hoseline should be used:
- 4.7.1 *Purely Defensive position*
 - 4.7.2 *Unknown size or extent of the fire area*
 - 4.7.3 *Advanced fire conditions*
 - 4.7.4 *Large, uncompartmented fire area*
 - 4.7.5 *Standpipe operations*
- 4.8 Each of these situations is further described below:
- 4.8.1 *Defensive position* – If a hoseline is to be used from a purely defensive position, a 2 ½” hoseline should be used. This includes hoselines stretched at an exterior operation, when the line will be operated exclusively from outside the building, such as from an adjoining rooftop, or from street level.
 - 4.8.2 *Unknown size or extent of the fire area* – If the size of the fire area cannot be determined by the engine officer, a 2 ½” hoseline should be used. This situation could be encountered in larger, non-typical buildings, where the size or extent of the fire area cannot be readily determined at the outset of the operation.
 - 4.8.3 *Advanced fire conditions* – If the fire conditions on arrival are advanced to such a degree that the officer feels the flow provided by the 1 ¾” line would not be sufficient, the 2 ½” hose may be used. The reduced maneuverability of the 2 ½” line should be considered in this case, especially if the fire is above the first floor or the fire is in a smaller, compartmented building like a Brownstone or Row Frame.
 - 4.8.4 *Large, uncompartmented fire area* – If the fire area is large and is uncompartmented, a 2 ½” hoseline should be used. While the officer should use their discretion in assessing the size of the fire area, a general guideline is that a fire area over 50 feet wide can be considered “large”. The area should also be “uncompartmented”, which means that it largely consists of open areas and floor space. An uncompartmented fire area may also have high ceilings, or directly access a potential roof vent. This may include large industrial or commercial occupancies, such as warehouses, places of worship, large stores, or one-story taxpayers. In such cases, the large, uncompartmented area will allow the reach of the stream to be unimpeded and hit the seat of fire from a distance.

- 4.8.5 ***Standpipe operations*** – When a hoseline is stretched from a standpipe system, the 1 ¾” hose must not be used due to its high friction loss. In order to achieve a reliable and effective firefighting stream, larger hose with less friction loss must be used from a standpipe system. For residential occupancies, the lead length of the stretch from the standpipe outlet should be 2” lightweight hose, as the relative speed and mobility is more appropriate for the compartmented conditions encountered in these occupancies. In all other situations (commercial, subways, etc.), all lengths stretched should be 2 ½” lightweight hose.
- 4.9 Considering the above guidelines, further clarification may be required for specific situations, as follows:
- 4.9.1 Commercial occupancies
- A. The presence of a commercial occupancy (OLT with a store, etc..) does not mandate the use of a 2 ½” hoseline. Unless one of the conditions described above is met, the use of 1 ¾” hose may be appropriate. If any of the above described conditions are met, the officer may use their discretion to use 2 ½” hose, but it is not required simply because a commercial occupancy is present.
 - B. For fires in a 1 or 2 story taxpayer, the large fire area will require the use of a 2 ½” hoseline. Also, the high ceilings and availability of a roof vent directly over the fire area constitute an uncompartmented fire area.
 - C. For fires in a commercial portion of a mixed occupancy building (two or three story building with a store on the first floor and one or two apartments above), the use of 2 ½” hose may not be necessary. These commercial occupancies are not a taxpayer, and they generally do not have a large fire area. Such commercial occupancies are commonly less than 50 feet wide, do not have a direct opening to a roof vent, and may have narrow aisle space with limited open area. This situation may not fit the above described criteria of a “large, uncompartmented fire area”. Unless the fire area is sufficiently large, or one of the other described conditions is present, the use of 1 ¾” hose may be appropriate in these occupancies.

4.9.2 Standpipe-equipped buildings

- A. When a hoseline is hand stretched from the apparatus into a building with a standpipe system, the use of 2 ½” hose is not mandated. Unless one of the conditions described above is met, the use of 1 ¾” hose may be appropriate.
- B. Larger diameter hose (2” and 2 ½”) is used from standpipe systems in order to achieve a firefighting stream from the limited pressure available at the standpipe
- C. Outlet. 1 ¾” hose is not used from a standpipe.
- D. If the standpipe system is not used, and none of the other above conditions is met, 1 ¾” hose may be appropriate in these buildings.

4.9.3 Fireproof multiple dwellings

- A. Similar to other standpipe equipped buildings, when a hoseline is hand stretched from the apparatus into a fireproof multiple dwelling, the use of 2 ½” hose is not mandated. Unless one of the conditions described above is met, the use of 1 ¾” hose may be appropriate. This is true for high rise and low rise fireproof multiple dwellings alike.
- B. The flowrate provided by 1 ¾” hose is sufficient to extinguish the majority of fires in fire proof multiple dwellings. Due to the fireproof construction, these fires will involve the contents only. Considering the compartmented layout common in multiple dwellings, the speed and mobility of 1 ¾” hose may be most effective in these buildings when hand stretched from the apparatus.
- C. In the event of wind-impacted conditions, in which fire or high heat is driven down the hallway, even the increased flow of a 2 ½” line has proven ineffective. Consequently, alternative fire attack procedures will be implemented (such as the KO curtain, or the high-rise nozzle). The practice of combating wind-impacted conditions with one or more hoselines operating down a hallway is not a primary tactic, regardless of the size of the hoseline.

5. DETERMINING THE PATH OF THE HOSELINE

- 5.1 When ordering a hoseline stretched, the engine officer is responsible for determining the path by which the hoseline is stretched. If the path is not obvious, it will need to be clearly communicated to the nozzle firefighter when the line is called for.
- 5.2 When stretching the first hoseline, the hoseline should be stretched in such a way to protect the primary egress of the building while accessing the fire area. Generally, this will require the path of the hoseline to be via the stairway.

- 5.2.1 In rare situations, unique building characteristics may necessitate the first hoseline to be stretched via an alternative method (such as a rope stretch). In these cases, the path of attack should protect the primary egress as best as possible. These situations should be noted in CIDS.
- 5.3 If multiple stairways are available, the engine officer should choose the stairway that will provide the most efficient stretch and attack possible. Most commonly, this will be the stairway that provides the shortest path to the fire area.
 - 5.3.1 Consideration should be given to using the stairway that provides the shortest stretch on the fire floor. This is particularly relevant when scissor stairs are used.
 - 5.3.2 If a more remote stairway would provide an easier stretch, consideration should be given to using that stairway instead. This is relevant if the closer stairway provides a difficult stretch (such as a wrap-around stretch), or if a more distant stairway provides a much easier stretch (such as a well-hole stretch).
 - 5.3.3 Consideration should also be given to reserving an evacuation stairway for building occupants. This is relevant if there are multiple stairways, but only one is enclosed, in which case it should be used as an evacuation stairway and not for fire attack. The hoseline will have to be stretched via a different stairway.
- 5.4 The engine officer determines when a well-hole stretch is to be executed. The presence of a well-hole and the intention to use it should be clearly communicated to the nozzle firefighter. This information is also critical to the control firefighter for estimating the stretch.
 - 5.4.1 The presence of a well-hole does not mean it must be used.
 - 5.4.2 The engine officer will need to determine the location at which the hoseline will be taken out of the well hole and secured with a hose strap. The following locations should be considered:
 - A. ***On the floor below*** – Hose can be secured on the floor below the fire if conditions or limited space on the fire floor prevent it from being secured on the fire floor. This will provide a safe area to flake out hose. From this location, the hose will be stretched via the stairway to the fire floor, providing an element of protection to the primary egress.
 - B. ***On the half landing*** – If there is a half-landing present in the stairway (which is common when a well-hole is present), the hose may be secured at this point. This will provide a safe area to stage the hose, but may provide limited space to flake the hose out.

5.5 Path of the 2nd hoseline

- 5.5.1 If the 2nd hoseline is stretched to the same location as the 1st line, it should be stretched using the same path as the 1st hoseline and access the fire floor using the same attack stairway. A second dry hoseline should not be stretched into a building until the first hoseline has been charged with water. This is because this practice may cause confusion at operations as to which line is being referred to. Additionally, it may cause the two lines to get tangled with each other.
- 5.5.2 If the second hoseline is stretched to a different location (to address extending fire, to attack the main body of fire from an alternate access point, or to protect life), it will be stretched via the most effective path for that destination, as determined by the engine officer.

5.6 Path of additional hoselines

- 5.6.1 At a fire operation, only 2 hoselines should be stretched on a stairway. If a 3rd line is to be stretched, it will need to be stretched by an alternative means.
- 5.6.2 If additional lines are to be stretched in the fire building, the engine officer should consider other options available, which may include using a different stairway, or possibly an exterior stretch.
- 5.6.3 For exterior stretches (such as a rope stretch, fire escape stretch, or stretch via aerial or portable ladder), the engine officer will have to determine the location at which the line will be brought into the building.
 - A. In most situations, the line will be brought in the building on the floor below the fire. This ensures the hoseline is flaked out in a safe area below the fire. The hoseline will then be advanced to the point of operation via the interior stairs.
 - B. Depending on the situation and building characteristics, it may be possible to bring the line in the building on the floor on which it will be operated. This should only be done if the hose can be flaked out and charged in a safe area before being advanced to the point of operation.
 - C. In the case of a fire escape stretch or a stretch via a ladder, it may be possible to charge the hoseline outside the building and advance it directly into the building on the fire floor while charged. This operation must be closely coordinated with all other units operating on the fire floor.

5.7 Priority order of stretching hoselines

5.7.1 Depending on the situation, the engine officer may have several options available for stretching hoseline. In the event that multiple methods are available, the following is the priority order of methods for stretching hoselines:

- A. Interior stairs
- B. Rope
- C. Fire escape
- D. Portable ladder
- E. Aerial ladder

6. CHARGING THE HOSELINE

- 6.1 As the hoseline is being stretched, the engine officer must determine the point at which the hoseline will be flaked out and charged. This point should be in a safe area, as close to the fire area as possible.
- 6.2 In some occupancies and building types there are no public hallways to flake out and charge the hoseline before entering the fire area, thus the hoseline will be charged outside the fire building. In these cases, the hoseline should be flaked out and charged as close to the building entrance as possible. This includes hoselines stretched at private dwelling fires, place of worship fires, and taxpayer fires (among others), where hoselines are flaked out and charged outside the fire building.
- 6.3 If the hoseline is to be stretched dry into the building, it should be flaked out and charged in a safe area as close to the fire area as possible. This includes fires in all types of multiple dwellings, as well as fires in lofts, and other large commercial or industrial spaces.
- 6.4 If the door to the fire apartment (or fire area) is controlled and conditions in the public hallway are tenable, the hose should be flaked out and charged at the apartment door.
- 6.5 If the door is not controlled and conditions in the public hallway are not tenable, the hoseline may have to be flaked out and charged before entering the hallway. If the stairway is a safe area, the hoseline may be flaked out and charged in the stairway. If the stairway is not a safe area, or there is no space to flake out the hose, it may be necessary to charge the hoseline in a safe area on the floor below the fire.

7. EXTERIOR WATER APPLICATION

- 7.1 The application of exterior water into an occupied structure is a valuable tactic under the right set of circumstances
- 7.2 In the FDNY, the first hoseline is normally stretched at fires to the interior of the structure to protect the primary egress route, and to confine and extinguish the fire. The NFPA compliant staffing of FDNY Engine Companies greatly contributes to the FDNY's ability to quickly and efficiently stretch and operate handlines to protect life and property with little delay.
- 7.3 On occasion, when heavy fire is venting out a front window or door on arrival, the first hoseline may be used to momentarily extinguish venting fire. This is tactic of opportunity which does not unnecessarily delay interior operations.
- 7.4 There are situations where the standard approach of interior attack may not lead to a quick extinguishment of the fire enabling the fire to grow larger. In these situations, the proper application of water from an exterior stream may facilitate the rapid advance of interior attack hoselines by partially extinguishing the fire.
- 7.5 Exterior stream application may significantly improve interior conditions that may have otherwise been untenable. It may also provide a limited amount of additional time for the interior attack team to overcome obstacles and facilitate advance for final extinguishment.
- 7.6 The single best way to always improve conditions at any fire is to apply water on the fire. In structures that are not built with fireproof construction, the failure to rapidly apply water on the fire allows a contents fire to extend to the structure. This creates a greater fire problem because the structure is weakening, fire is extending, and heat and smoke conditions are becoming worse.

- 7.9 The acronym to allow for easy mental recall of the manual technique of applying water correctly from an exterior handline to the interior of a building is “**S.S.S**”
- 7.9.1 **Solid** (bore) stream – fully open, do not partially open, do not use a fog tip (occlusion)
- 7.9.2 **Steep** Angle – will assist with breaking up and cooling the hot gases at the upper levels of the room as it strikes the ceiling
- 7.9.3 **Steady** – no circular or whipping motion (occlusion/entrainment) to allow hot gases and smoke to exit as well as preventing less air being drawn inward to fuel (feed) the fire
- 7.9.4 **Sprinkler** – a solid stream held steady and positioned at a steep angle will create a “sprinkler effect” to cool the hot gases and knock back the fire
- 7.10 Engine company officers should develop a physical communication system with the nozzle firefighter for use when voice communications cannot be heard. The following system of touch signals can be used in conjunction with verbal commands to relay orders:
- 7.10.1 ***open or close the nozzle*** – one or two slaps on the back or shoulder
- 7.10.2 ***direction of stream*** – tug on the arm or nozzle, either left or right
- 7.10.3 ***advance hoseline*** – steady push on back or SCBA
- 7.10.4 ***stop line advance*** – pull back on shoulder, bunker coat, or SCBA
- 7.10.5 ***emergency withdrawal*** – 4 slaps on the shoulder and pull in direction of retreat
- 7.11 After final extinguishment, the engine officer may order a fog or broken stream directed out a window in the fire area to assist in removal of heat and smoke conditions. A broken stream can be produced for venting purposes by removing the MST and partially shutting down the control handle.

THIS PAGE WAS INTENTIONALLY LEFT BLANK



ENGINE COMPANY CHAUFFEUR

1. ENGINE COMPANY CHAUFFEUR OVERVIEW

- 1.1 The primary responsibilities of the Engine Company Chauffeur (ECC) involve three general areas:
 - 1.1.1 The safe delivery of the members and apparatus to the scene of a fire or emergency
 - 1.1.2 Locating and establishing a positive water source
 - 1.1.3 Delivering and maintaining a water supply to the firefighting force throughout the operation
- 1.2 To effectively fulfill these responsibilities, the ECC must be thoroughly familiar with the engine apparatus, all the tools and equipment carried on board, and the layout of the hose beds.
- 1.3 The ECC must also be familiar with the various methods of establishing a positive water source, as well as the procedures and requirements for properly supplying water to a firefighting operation.

2. RESPONDING TO A FIRE

- 2.1 Upon receiving a call for report of a fire, the ECC is to determine the best route to the reported site of the fire. Consideration should be given to the response patterns of other incoming units. If other units are already 10-84, this may require coordination with the officer, as well as with the other units on scene.
- 2.2 When entering the block of the reported fire, the ECC should immediately check the building addresses, so as not to pass the building by too great a distance. Once on the block, the ECC should coordinate with the officer to locate hydrants to be used.
- 2.3 The first due engine company should strive to enter the block ahead of the first ladder company and from the same direction. This will allow for optimal apparatus positioning.
- 2.4 Apparatus positioning
 - 2.4.1 Proper apparatus positioning is a critical component of an effective response and requires a coordinated effort between the ECC, Engine Officer, and first arriving ladder company to ensure optimal apparatus placement.

- 2.4.2 The engine apparatus should be positioned as close to the fire building as possible to reduce the time, effort and number of lengths needed for the stretch. However, consideration must be given to ladder company response and the engine apparatus should be positioned so that it will not interfere with ladder company positioning.
- 2.4.3 The engine apparatus can be positioned to hook up to a hydrant either past the fire building, or before reaching the fire building. A hydrant in the immediate vicinity of the fire building may also be used if it will not interfere with ladder company positioning.
- 2.5 Hydrant past the fire building
 - 2.5.1 The ECC should position the apparatus to hook up to a hydrant past the fire building whenever possible. This allows for an efficient hose stretch, while providing engine company members with a view of the entire frontage of the fire building before they stretch their line.
 - 2.5.2 When the hydrant is in close proximity to the fire building, the ECC may elect to initially position the apparatus directly at the hydrant itself. An initial position at the hydrant will facilitate hooking up to the hydrant, but may result in a longer hose stretch from the apparatus to the fire building.
 - 2.5.3 When the ECC plans to use a hydrant more distant from the fire building, they may elect to initially position the apparatus in the immediate vicinity of the fire building, so as to facilitate the stretch of the attack line. In this case, the hose stretch will begin at this initial position and the ECC will reposition the apparatus to the hydrant while the stretch is in progress. This evolution is called a “backstretch” (Figure 1).
 - 2.5.4 When executing a backstretch, the ECC will initially position the apparatus in the vicinity of the fire building, but so as not to impede ladder company positioning. In most cases, this will be a proper distance past the front entrance and is normally based on the type of ladder apparatus responding directly from behind. At most structural fires, the location of the ladder apparatus turntable normally dictates how far past the front entrance of the building the engine backstep should initially be placed on arrival. For longer stretches in larger buildings (such as H-types), an initial position just opposite the front entrance may significantly facilitate a more efficient stretch.

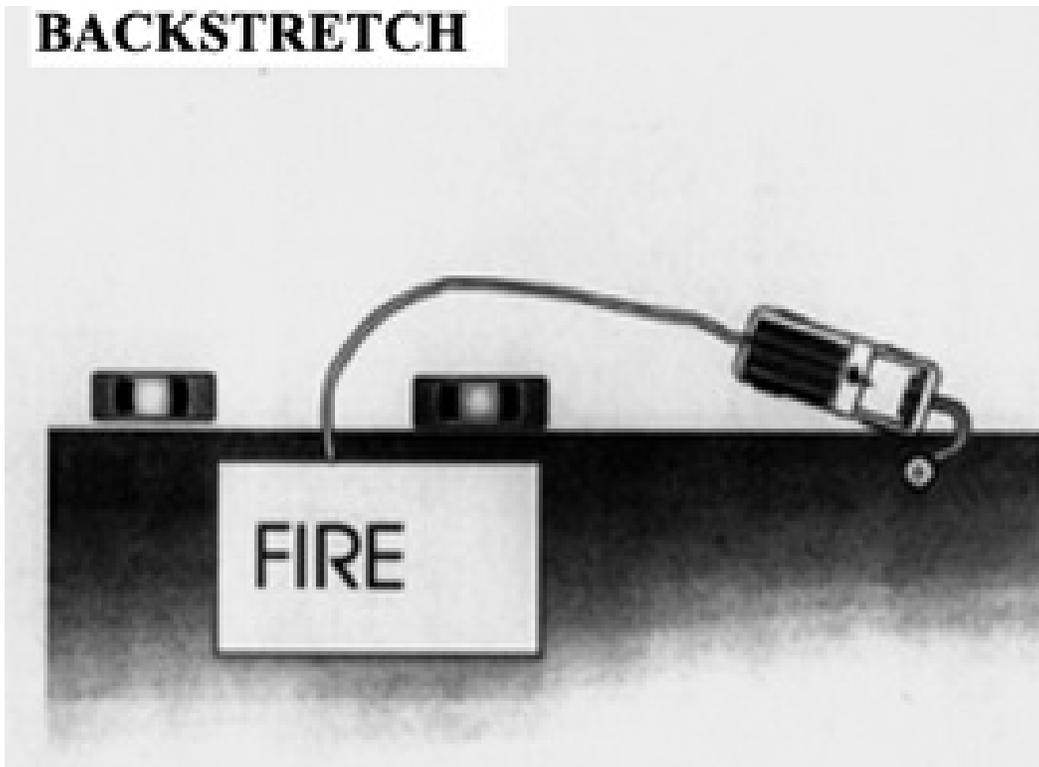


Figure 1

- 2.5.5** After firefighters remove sufficient hose to reach and cover the fire area, the ECC proceeds with the rig to the hydrant to be used, playing out hose as the rig moves. If deemed advantageous, a 2nd hoseline may also be removed before the engine repositions to the hydrant.
- 2.5.6** When positioned for a backstretch, the ECC should be mindful of any company approaching from the opposite direction that might prevent the engine from reaching their desired hydrant and should be prepared to contact them via Handie Talkie to coordinate their response, if necessary. Similarly, if engine company positioning prevents access for a ladder company responding from the opposite direction, the ECC should inform them either via Handie Talkie, or through the dispatcher.
- 2.5.7** Another benefit of positioning for a backstretch is that the apparatus will be positioned in close proximity to the fire building at the outset. This initial positioning allows for the use of the deck gun, when needed. This is important when the immediate application of exterior water could facilitate life-saving operations due to extreme fire conditions.

2.6 Hydrant before the building

- 2.6.1 When the ECC elects to use a hydrant located before the fire building, a more challenging stretch will result, as members will be forced to stretch the line around the apparatus. This forces the hoseline to make an extra turn and commonly requires a member to remain at the backstep until sufficient hose has been stretched to reach and cover the fire area.
- 2.6.2 When the hydrant is in reasonable proximity to the fire building, the hose stretch may be initiated from a position directly at the hydrant. This also may be required if ladder apparatus positioning prevents the engine from moving closer to the fire building.
- 2.6.3 When there is room to reposition the apparatus closer to the fire building without blocking out ladder apparatus, in-line pumping may be used to facilitate a shorter and more rapid hose stretch. This is executed by stretching 3 ½” hose to the hydrant to be used. This can either be hand stretched back to the hydrant, or stretched using the apparatus.

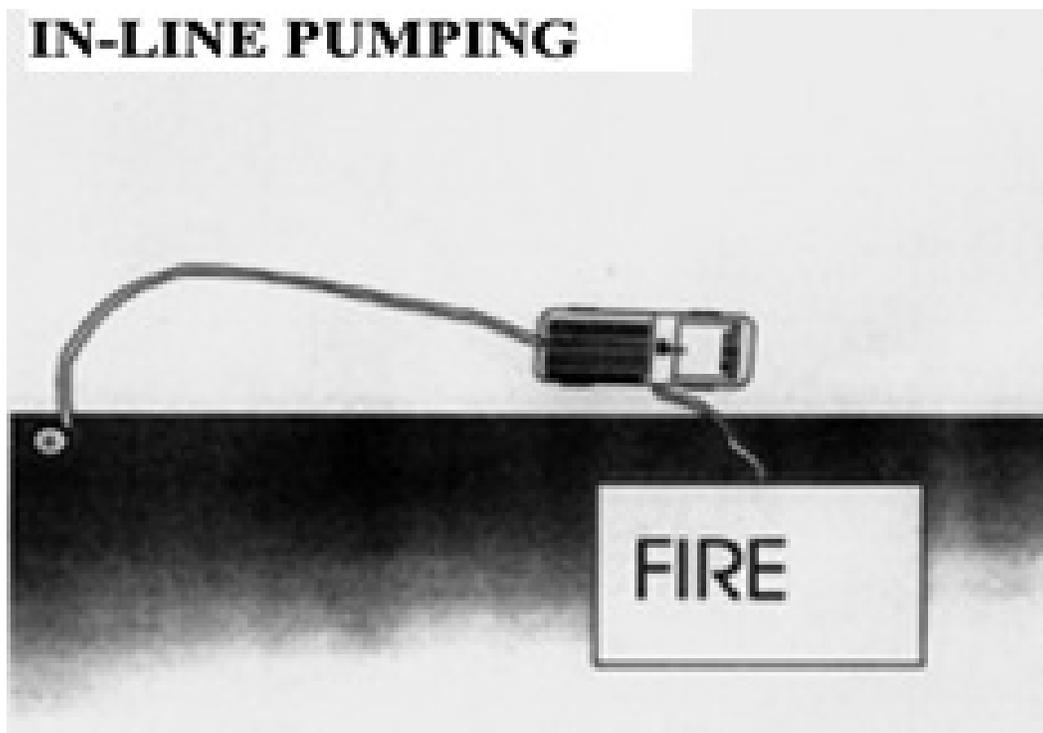


Figure 2

- 2.6.4 When the apparatus is used to stretch the 3 ½” hose, the Control firefighter will first “key” the hydrant with the 3 ½” hose, wrapping it around the hydrant to anchor it in place. The apparatus will then proceed to a more advantageous position closer to the fire building. The 3 ½” hose will play out as the apparatus is repositioned. If time permits, the Control firefighter should connect a 2 ½” gate to the hydrant’s 2 ½” outlet for possible augmentation.

2.6.5 When the apparatus is repositioned, in-line pumping can result in shorter hose stretches to the fire area, but longer stretches from the apparatus to the hydrant. This also necessitates the use of the smaller 3 ½” hose as a hydrant connection, which may limit water supply.

2.7 In-line pumping

2.7.1 The term “in-line pumping” refers to any situation in which 3 ½” hose is used to connect to a hydrant (Figure 2). In these situations, the apparatus will be more distant from the hydrant and will be pumping “in-line” between the hydrant and the fire building.

2.7.2 In-line pumping is not exclusive to a situation with a hydrant before the fire building and can be used regardless of the position of the hydrant or apparatus. In-line pumping can be used if the hydrant and apparatus are positioned past the fire building as well.

2.7.3 It is important to specifically identify “in-line pumping” because the smaller size of the 3 ½” supply hose may limit the available water supply. Whenever in-line pumping is used, the ECC should be mindful of the possible need to augment their water supply. If intake pressure drops below 15 psi, the ECC must have their water supply augmented.

3. LOCATING A WATER SOURCE

3.1 Hydrants are the primary source of water in the FDNY. Before connecting to a hydrant, it must be visually inspected for obvious defects, properly flushed, and tested to ensure sufficient water supply.

3.1.1 Flushing a hydrant allows for any debris inside the barrel to be removed. The hydrant should be opened slowly to allow water to flow from the outlets without having the outlets completely filled with water. This will permit debris trapped inside the barrel to flow out with the water. If large debris is noted inside the barrel, all efforts must be made to remove it.

3.1.2 After the hydrant is properly flushed out, it must be flow tested for proper pressure. This is done by opening the hydrant until sufficient water flow under pressure is observed, indicating there is appropriate water volume available for supply. Once sufficient flow is noted, the hydrant is shut down. The hydrant is now ready for connection

3.2 To connect to a hydrant, the ECC has four options available:

- 3.2.1 **10-foot soft suction** – This 3 ½” soft suction has 4 ½” couplings, so it can be connected directly to a hydrant. It can be bent, but will straighten when charged with water and is very difficult to kink. At 10 feet long, it is the shortest hydrant connection and requires accurate positioning close to the hydrant.
 - 3.2.2 **10-foot semi-rigid suction** – This 4 ½” semi-rigid hose has 4 ½” couplings, so it can be connected directly to a hydrant. It can be bent and will straighten when charged.
 - 3.2.3 **35-foot soft connection** – This 5” synthetic hose is yellow and has 4 ½” couplings for direct connection to a hydrant. It is 35 feet long, so it allows for some distance from the hydrant and provides the ability to maneuver around obstructions. It provides the largest flow of any hydrant connection, but has the potential to kink, so it needs to be properly flaked out.
 - 3.2.4 **3 ½” hose** – Standard 50-foot lengths of 3 ½” hose can be used to hook up to a hydrant through the use of a specialized hydrant connection fitting (4 ½” to 3” double female). There is no limit on the number of lengths that can be used, so this option allows for the greatest flexibility, but provides the least water flow.
- 3.3 Hydrants are operated using a hydrant wrench. It is placed over the five-sided operating nut on the top of the hydrant and turned clockwise to open. If the hydrant is equipped with a Custodian Lock, the magnetic cup feature of the Custodian hydrant wrench is placed over the Custodian lock and turned clockwise to open.
- 3.4 White hydrant discs are used to identify inoperable hydrants. If the ECC encounters a hydrant with a white disc, it should be considered unserviceable. Yellow hydrant discs are used to identify frozen hydrants. If a hydrant is discovered to be inoperable or frozen, the ECC should use the proper disc to identify it.

- 3.5 If increased water supply is anticipated, the ECC may consider attaching a 2 ½” single gate to the 2 ½” outlet of the hydrant before the hydrant is initially opened for water supply. This will make it possible to later self-augment if the need for elevated water flow arises. If needed, a second supply hose can be connected to this single gate, which can be opened to further supply the engine apparatus. This maximizes the water supply from a single hydrant.
- 3.5.1 Self-augmentation by way of a 2 ½” single gate can also be used to bypass the initial supply line in the event an obstruction in the supply line interrupts water flow to the apparatus. In this case, a second supply line from the 2 ½” single gate can ensure continued water supply.
- 3.6 Signal 10-70: no positive water source
- 3.6.1 In the event an ECC cannot hook up to a positive water source, the ECC should transmit a signal 10-70 via handie talkie. The EAB should be used and the signal transmitted as per *Communications Chapter 7: Company Unit Communications*. This will alert all on-scene units that the 1st due engine does not have a positive water supply and they require assistance in obtaining one.
- 3.6.2 It’s important to also transmit the 10-70 on the department radio, which informs incoming units of the situation and allows dispatch to assign a water resource unit. The second arriving engine will be the water resource unit when a 10-70 is transmitted by the first arriving engine.
- 3.6.3 Once the 10-70 is transmitted, the ECC should coordinate with assisting units, including the water resource unit, and make clear what assistance is needed.
- 3.7 Receiving a Relay
- 3.7.1 In a variety of situations, an engine apparatus may not be able to hook up to a positive water source and may have to receive water from another engine company. This could happen when there are no hydrants available in the area, if access is blocked to a hydrant, or if a hydrant is found to be inoperable. There are also times when an engine may have a water source, but needs to be augmented via a relay.
- 3.7.2 When receiving water via a relay, the engine apparatus delivering the water is called the “supply pumper” and the engine apparatus receiving water is called the “operating pumper”. The supply pumper and operating pumper should both remain in the “Volume” position. However, at standpipe operations where head pressure needs to be overcome, the supply pumper remains in volume while the operating pumper switches to the pressure position.
- Note:** Head pressure is the static pressure (the pressure when water is not flowing) caused by the weight of water solely due to its height above the measuring point.

- 3.7.3 The ECC of the operating pumper opens the inlet gate and should verify incoming water with the ECC of the supply pumper. The ECC of the operating pumper must also open the air bleeder valves to the inlet being used, so as to prevent air from the supply hose from entering the pump.
 - 3.7.4 The ECC of the operating pumper then sets the reading on the Pro Pressure Governor (PPG) to match the idle pressure on the pump pressure gauge. The operating ECC will coordinate with the supply ECC to ensure enough water is supplied to meet pressure demands of the operating pumper.
- 3.8 Drafting
- 3.8.1 Engine companies can also use a standing body of water as a positive water source. This can be used when there are no hydrants available, or in situations where more water is required than can be supplied by the hydrant system.
 - 3.8.2 FDNY apparatus carry 3 connections intended exclusively for use in the drafting evolution. Each of the connections is 10 feet long and one is a smooth connection, while the other 2 are ridged connections.
 - A. The 10-foot smooth connection is hooked up to the 6” ungated inlet on the rig
 - B. The ridged connection equipped with a strainer is lowered into the water
 - C. The 2nd ridged connection is connected between the other two connections.
 - 3.8.7 The connection equipped with the strainer is secured in the water with a rope. The rope is tied to the connection just above the strainer using a clove hitch and binder and lowered until the strainer is at least 2 feet under the water’s surface. The other end of the rope is secured to a substantial object, using the substantial object knot.
 - 3.8.8 A limiting factor on the apparatus’ ability to draft water is the vertical distance water needs to travel from the water’s surface to the apparatus. In practice, a pumper can draft water a maximum distance of roughly 22 feet, though lifting water vertically beyond 10 feet reduces the Gallons Per Minute (GPM) capability of the pumper.

4. SUPPLYING WATER

- 4.1 The ECC is responsible for supplying water to firefighting forces via hoselines and maintaining the provision of sufficient operating pressure throughout the operation. This occurs in a number of different ways:
 - 4.1.1 Supplying water to handlines
 - 4.1.2 Supplying water to a standpipe system

- 4.1.3 Supplying water to a sprinkler system
- 4.1.4 Supplying water to a large caliber stream (LCS)
- 4.1.5 Supplying water to another pumper via a relay
- 4.2 Supplying handlines
 - 4.2.1 In order to properly supply a hoseline, the ECC must know the number of lengths stretched, the size of the hose stretched, and the elevation to which the line is being stretched. Generally, this information is confirmed by communicating directly with the control firefighter.
 - 4.2.2 Supplying water to a hoseline is the responsibility of the ECC, however, all members should be capable of placing the apparatus in pump and supplying a hoseline, in case of an emergency. To accomplish this, the following steps should be taken:
 - 4.2.3 Before pressure can be supplied to a hoseline, the apparatus pump must be engaged using the following steps: (see Figure below)
 - A. Place the apparatus transmission in “neutral”
 - B. Engage the apparatus maxi-brake
 - C. Move the “pump shift control” to the pump position (located in the cab)
 - D. Place the apparatus transmission in “drive”



*Transmission
Selector*

Pump Shift

- 4.2.4 Once the apparatus pump is engaged, water can be supplied to a hoseline using the following steps:
- A. Press the “Push to Prime” button (Figure 3) on the pump panel (this expels air from the pump system)



Figure 3

- B. Press the preset button on the Pro-Pressure Governor (Figure 4) (this engages the PPG)

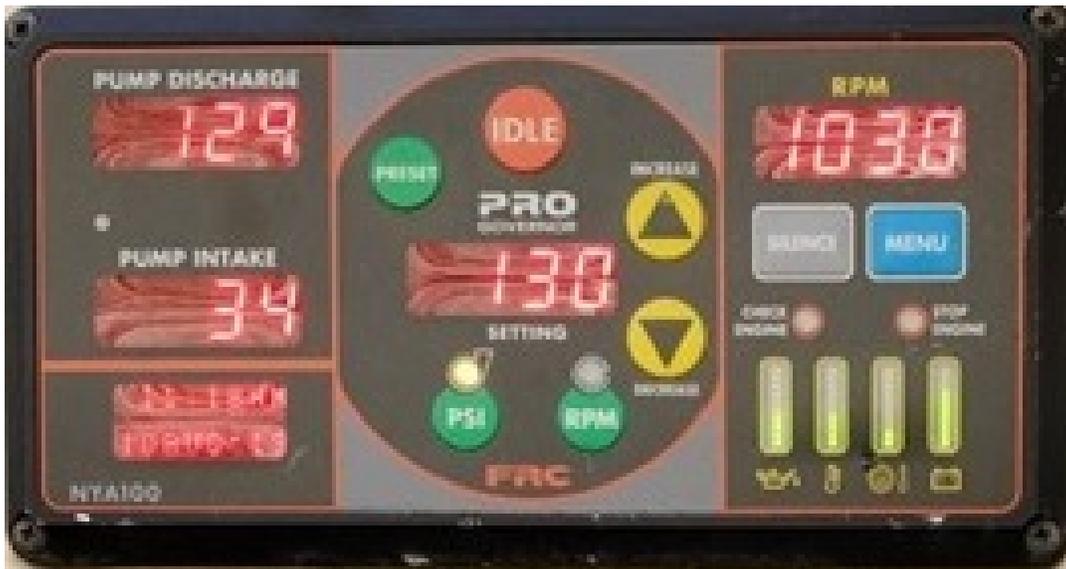


Figure 4

- C. Open the desired discharge gate to charge (Figure 5) a hoseline



Figure 5

- 4.2.5 The maxi-brake on the apparatus must be set for the apparatus pump to be engaged. The pump will not engage if the maxi-break is not set.
- 4.2.6 The ECC ensures proper pressure is supplied to the handline by calculating the pressure needed to overcome the friction loss in each length of hose and the pressure loss due to the elevation of the hoseline, while still providing the correct nozzle pressure “at the tip”. This practice is known as “street hydraulics”.
- 4.2.7 The following are the rules of thumb that govern the quick calculations involved in street hydraulics:
- A. add 20 psi friction loss per length of 1 ¾” hose
 - B. add 5 psi friction loss per length of 2 ½” hose
 - C. add 5 psi per floor of elevation (one floor is roughly 10 feet)
 - D. subtract 5 psi per floor of elevation loss below grade (one floor is roughly 10 feet)
 - E. 1 ¾” hoseline nozzle (15/16” tip) requires 50 psi at the tip
 - F. 2 ½” hoseline nozzle (1 1/8” tip) requires 40 psi at the tip
 - G. Fog nozzle requires 100 psi at the tip

- 4.2.9 The ECC should inform the engine officer via handie talkie when water is being supplied. In this transmission, the ECC should also inform the officer whether they are being supplied by a hydrant or if they are only supplied by the booster tank. (for example: “255 Chauffeur to 255, Here comes your water...you’re on hydrant water”).
- 4.2.10 In a situation where there is delay in hooking up to a hydrant and the officer calls for the hoseline to be charged, it may be necessary for the ECC to supply the line with the booster tank. This may also occur if the officer calls for quick water in an attempt to immediately protect life. When the officer calls for water, the ECC must supply water as soon as possible. Supplying water to a hoseline from the booster tank should not be delayed by the ECC continuing to hook up to a hydrant after the officer has called for booster water.
- 4.2.11 Whenever a line is supplied with the booster tank, the ECC must communicate to the Engine Officer that they are on booster water. The Engine Officer should also be notified when the water level in the booster tank is half empty. Once they are hooked up to a hydrant, the “tank to pump” valve is closed, and there is sufficient intake static pressure (pressure when water is not flowing) and residual pressure (pressure remaining after a line is charged), the ECC must notify the officer that they are now on hydrant water.
- 4.3 Supplying a standpipe system
- 4.3.1 When a hoseline is to be operated from a standpipe outlet, the ECC must hook up to the standpipe system and augment the system. This supply line should be the first line stretched from the apparatus.
- 4.3.2 Exception: Most modern and some older high-rise buildings may have unique standpipe system considerations that first alarm units have become aware of. The reliability, or unreliability of such systems may be knowledge that local units are cognizant of. These buildings may require Pre-Incident Guidelines, Familiarization Drills and identification in CIDS with specific instructions regarding standpipe supply tactics for such buildings. Division Commanders are authorized to approve CIDS and Pre-Incident Guidelines for those buildings that have unique standpipe systems requiring adjustments to the standard FDNY policy.
- 4.3.3 When supplying water to a standpipe system, the ECC should use 3 ½” hose (or 3” hose if high-pressure pumping) to supply the appropriate Fire Department Connection (FDC, formerly known as Siamese connections). The standpipe FDC is entirely painted red or may just have red caps (Figure 6A). If part of a combination system (Figure 6B), the FDC is entirely painted yellow or may just have yellow caps.



Figure 6A



Figure 6B

- 4.3.4 ECC's can encounter a wide range of difficulties when connecting hose to a FDC. This can include defective or damaged threads, frozen female swivels or swivel that will not turn, caps that cannot be removed, broken clapper valves, or outlets stuffed with debris. In these situations, there are various possible solutions to this problem:
- A. Tapping the swivel(s) on the FDC with a tool (spanner) may loosen paint, dirt, etc...and allow the swivel to operate
 - B. Twist the supply hose 4-5 turns to the left, insert the male end, then twist the male end to the right (clockwise) into one of the female swivels of the FDC
 - C. Insert a 3" x 3" x 3" Siamese into one of the female swivels of the FDC, this provides a female coupling for the male coupling of the 3 1/2" supply hose to attach to.
 - D. Using a 3" double male fitting and a 3" double female fitting. The double male fitting is attached to the malfunctioning female coupling of the FDC (the fitting will be turned, not the broken swivel). The double female fitting is then coupled to the double male, which provides a female coupling for the male coupling of the 3 1/2" supply hose to attach to.
- 4.3.5 If the FDC is found to be inoperable, or if the position of the FDC in relation to the hydrant makes connection to the FDC impractical, the standpipe system can be supplied by way of the first-floor standpipe outlet as an alternative.
- 4.3.6 The ECC must provide for sufficient pressure available at the standpipe outlet, but should also strive to minimize the amount of excess pressure supplied to the system. When the standpipe system is charged with excessive pressure, it can become more difficult for the control firefighter to set the proper pressure in the handline at the standpipe outlet.

- 4.3.7 With this in mind, the ECC should generally supply the standpipe system with a pressure of 100 psi, plus an additional 5 psi per floor of elevation. This is measured to the floor on which the hoseline will be operating.
- A. Example—If fire is on the 26th floor of a HRFPMMD, the ECC should supply 225 psi to the standpipe system (100 psi-baseline + 125 psi for 25 floors of elevation)
- 4.3.8 The guideline of supplying standpipe systems with 100 psi, plus an additional 5 psi per floor of elevation should be used as the primary guide at most operations in buildings that are known to be older, traditional construction.
- Note:** Chapter 8, Addendum 2 provides two standpipe supply charts:
- 4.3.9 It is important to note that these supply charts are approximations and adjustments must be considered as the height of the fire floor increases. This is particularly pertinent in modern high-rise construction located mostly in the Borough of Manhattan, but now starting to be seen in the outer boroughs.
- 4.3.10 It is critical that units with unique high-rise construction familiarize themselves with the standpipe systems provided, and develop appropriate Pre-Incident Guidelines, Familiarization Drills and CIDS messages so that appropriate standpipe supply decisions can be made at operations.
- 4.3.11 For a full discussion of ECC operations at a standpipe operation, please see *Standpipe page 93*
- 4.4 Supplying a sprinkler system
- 4.4.1 Upon being ordered to supply a sprinkler system, the ECC should supply the system with a 3 ½” hoseline to the FDC. Not all sprinkler systems have a FDC, so only those with an available connection need to be supplied.
- 4.4.2 Automatic sprinkler system FDC’s are painted green (Figure 7), or are equipped with green caps. If part of a combination system, either the FDC or the caps are painted yellow. If the FDC is aluminum or has aluminum caps, it indicates a non-automatic sprinkler, or a system of perforated pipe.



Figure 7

- 4.4.3 The ECC should supply the sprinkler system with 150 psi, but should be prepared to increase pressure upon any indication that the system requires more water. This can be based on reports of system performance from operating members.
 - 4.4.4 While the flowrate provided by sprinkler heads will vary, a standard sprinkler head can be expected to provide a flowrate of 13 – 18 GPM.
 - 4.4.5 When the building is equipped with both a standpipe and a sprinkler system, the first supply line stretched should be to supply the standpipe FDC. Once the standpipe FDC is supplied, a second line should be stretched to supply the sprinkler FDC.
 - 4.4.6 When the first due engine is supplying both the standpipe and sprinkler systems, both systems should be augmented by later arriving units. If a sprinkler/standpipe combination system is being used, it should similarly be augmented by later arriving units. The water demanded by this system will be much higher, as it supplies both the standpipe and the sprinkler systems.
- 4.5 Supplying a Large Caliber Stream (LCS)
- 4.5.1 LCS are streams that deliver at least 350 GPM of water. Streams of this size are delivered through several different appliances, including tower ladder monitors, aerial ladder pipes, engine apparatus deck pipes, Blitzfire Oscillating Monitors, and the New Yorker Multiversals.
 - 4.5.2 ECC's should supply LCS with 3 ½" hose. When their use is anticipated, or if the LCS apparatus is not yet in position, the ECC may stretch 3 ½" hose to the location.
 - 4.5.3 During LCS operations, all valves and gates should be opened slowly to avoid a "water hammer". This sudden force that results when a water supply is quickly shut down can result in damage to pump, appliances, and hose.

4.5.4 Whenever possible, an engine company supplying a LCS should be dedicated exclusively to that task to ensure LCS flow demands are met. Engine companies supplying LCS may require augmentation to achieve required flows for the LCS stream.

4.6 Supplying a relay operation

4.6.1 When performing a relay operation, the pumper that is hooked up to a water source and supplying water to the operating pumper is called the “supply pumper”.

4.6.2 The ECC of the supply pumper supplies the operating pumper using 3 ½” hose and should maintain the supply pumper in the “volume” setting. This will ensure the operating pumper can properly receive the relay and supply the required water flow.

4.6.3 The supply ECC should set their Pro Pressure Governor to idle pressure and inform the operating ECC of the pressure that is being sent (this should be roughly 55 psi plus hydrant pressure).

4.6.4 The operating ECC will tell the supply ECC if more pressure is required. The supply ECC should increase the relay pressure in increments of 10 psi until sufficient pressure is achieved, or until the incoming pressure on the supply pumper drops to 15 psi.

5. TROUBLESHOOTING

5.1 A critical component of the ECC’s job is the ability to quickly recognize and address problems that could jeopardize the supply of water to firefighting units. The following section will highlight common issues ECC’s can expect to encounter at an operation.

5.2 Once the ECC has properly charged a hoseline, they must continually monitor the status of the line. This includes monitoring of intake pressure, as well as the pressure and flow of each line supplied. The ECC must be able to identify a problem from the pump panel that could compromise the maintenance of water in the hoseline. Some indications of loss of pressure can include:

5.2.1 Intake pressure decreases = possible blockage, or insufficient water supply

5.2.2 Flow on flowmeter decreases, rig RPM decreases = possible kink in the hoseline

5.2.3 Flow on flowmeter increases, rig RPM increases = possible burst length

5.3 The ECC needs to ensure the rig is receiving enough water to meet the demands of the hoselines it is supplying. The rig will “run away from water” if it attempts to pump out more water than it is taking in. To prevent this from happening, the ECC should not allow the intake pressure to drop below 15 psi. Once 15 psi intake pressure is reached, the apparatus should be augmented with an additional water supply.

- 5.4 One option for augmentation is to “self-augment”, which is accomplished when an engine hooks up to both the 4 ½” and 2 ½” outlets of a single hydrant. To do this, a 2 ½” single gate needs to be attached to the 2 ½” hydrant outlet before the hydrant is opened. Then, when augmentation is needed, a 3 ½” hose (with an increaser) can be used to further supply the rig using the single gate on the hydrant.
- 5.5 Often times, a hydrant can be especially difficult to open with a standard custodian wrench. To overcome this, a “breaker bar” can be used to generate additional torque when using the wrench. A breaker bar is a section of pipe that fits over the handle of the wrench and acts as an extension of the handle, creating more force when opening a hydrant.
- 5.6 For further discussion on troubleshooting in emergency situations, refer to *Chapter 13: Engine Company Emergencies*.

THIS PAGE WAS INTENTIONALLY LEFT BLANK



THE BACKSTEP

1. OVERVIEW

- 1.1 “The Backstep” is a term used to describe the team of firefighters in an engine company whose primary purpose is to stretch and operate hoselines to extinguish fire.
 - 1.1.1 The Backstep is comprised of the following 4 firefighters and does not include the Engine Company Chauffeur (ECC):
 - A. Nozzle firefighter
 - B. Back-up firefighter
 - C. Door firefighter
 - D. Control firefighter
- 1.2 The duties of each of these positions is described in the sections below. Additionally, all firefighters should be able to perform the following basic operations (which are fully discussed in *Chapter 3: The Engine Company Chauffeur*):
 - 1.2.1 Properly operate and connect to a hydrant
 - 1.2.2 Engage apparatus pump and properly supply a hoseline
 - 1.2.3 Supply and operate the apparatus deck pipe
- 1.3 All firefighters should be familiar with buildings within their districts which pose extreme difficulties when stretching hoselines (interconnected buildings, wrap-around stretches, etc.).
- 1.4 All firefighters must be proficient in executing all types of hose stretches and must be familiar with the proper usage of all related tools and equipment.
- 1.5 All firefighters must be proficient in forcible entry and must be familiar with the proper usage of the halligan, axe, and all related forcible entry equipment.
- 1.6 All firefighters must conduct many individual size-ups during any incident, each of which may have a direct impact on the success or failure of the operation. This includes reading the response ticket for all relevant information, including CIDS, as well as a thorough size-up of the fire building itself.
- 1.7 The following sections will describe the general responsibilities and techniques relevant for the positions of the Backstep. The techniques specific to the various types of hose stretches will be discussed in *Stretching Hoselines p.59*.

2. THE NOZZLE FIREFIGHTER

- 2.1 The firefighter assigned the nozzle occupies one of the most challenging and dangerous positions on the fireground. The duties associated with the nozzle position routinely take this firefighter in close proximity to the fire and require a determined and experienced member.
- 2.2 This position is assigned by the officer at the start of each tour, but can be flexible throughout the tour, allowing a less experienced firefighter to move up to the nozzle position at a minor fire to gain valuable “on the job” experience.
- 2.3 In addition to their standard size-up, the nozzle firefighter should pay particular attention to the various factors that influence the hoseline stretch and operation. This includes the location of the fire apartment within the building, the type of stretch to be executed, the type of stairway present, and the size of public hallways and stairway landings.
- 2.4 Stretching the line
 - 2.4.1 The Nozzle firefighter stretches the first length of hose with the nozzle attached via the route and to the location determined by the officer (Figure 1). If the hosebed is maintained using a horseshoe arrangement, the nozzle firefighter takes their length by carrying the first horseshoe. If horseshoes are not used, the nozzle firefighter takes their first length by grabbing the top 3 folds of the hosebed.



Figure 1

- 2.4.2 The hose should be stretched to a safe location in proximity to the fire area. If the line is to be charged inside the building, such an area could be a stairway landing, hallway, or adjoining area. From this point, it is the nozzle firefighter's responsibility to flake out the lead length of hose.

2.5 Flaking out hose

- 2.5.1 The nozzle firefighter is responsible for flaking out the lead length of the hose stretch. A determining factor in the technique used to flake out the lead length will be whether the hose is to be charged inside the structure (as in multiple dwellings, etc.), or outside the structure (as in private dwellings, taxpayers, etc.).
- 2.5.2 In either scenario, the nozzle firefighter should carry the entire lead length intact to the entrance to the fire area and flake out the hose from that location. This should be in a safe area, but as close to the fire area as possible.
- A. If the line is being charged inside the building, this point may be the door to the fire apartment.
 - B. If the line is charged outside the building, this point will be the entrance to the building.
- 2.5.3 When stretching hose carried in a horseshoe, an effective technique is to use the midpoint of the length to efficiently flake the hose out. This is accomplished by laying the horseshoe down at the point of deployment and pulling the hose from the middle "ring" of the horseshoe (which is approximately the midpoint of the length). The midpoint can then be walked or tossed away from the point of deployment for a smooth flake out (Figure 2).



Figure 2

- 2.5.4 When properly flaked out, the nozzle and first coupling should be side by side at the entrance to the fire area, ensuring an entire 50-foot length of hose is available for the interior of the fire area.
- A. This “U-shaped” orientation will facilitate a smooth advance into the fire building by allowing the lead length to pivot at the first coupling. This allows the lead length to advance without having to pull the weight of the entire line. In effect, the nozzle team only has to advance the weight of one length of hose, rather than the weight of the entire stretch.
- 2.5.5 When flaking out hose outside the structure (private dwellings, taxpayers, etc.), consider the following:
- A. The availability of space to flake the hose is not usually a problem when flaking out outside the structure.
 - B. If possible, hose should be flaked out in line with the entrance to be used. This is especially important when stretching 2 ½” hose, which is heavier and more difficult to maneuver.
 - C. Avoid areas where the hoseline could be damaged by falling glass, heat, or fire.
- 2.5.6 When flaking out hose inside the structure (multiple dwellings, etc.), consider the following:
- A. The availability of space to flake out hose is a central concern when flaking out inside a structure.
 - B. The condition of the public hall is also a critical concern. If conditions in the hall allow, the nozzle length should be carried to the door to the fire area and flaked out from there. If the public hall is untenable, the lead length will need to be flaked out elsewhere (Figure 3).
 - C. If conditions allow, hose should be flaked out in the hallway on the fire floor. If necessary, other apartments on the fire floor, on the same side of the public hallway as the fire apartment, can be used for additional space.
 - D. If more space is needed, hose can be flaked up the interior stairway to the half landing or the floor above, which allows gravity to assist with the advance of the hose line into the fire apartment. Hose can also be flaked down the interior stairway to the half landing or to the floor below the fire. When flaking out on the floor above the fire, be mindful to allow space for the possibility that an additional hoseline may be stretched to that area. When flaking hose out above the fire floor, the nozzle firefighter should ensure the door to the fire area is being controlled.
 - E. When hallways and landings are extremely small, hose can be flaked out on the floor below the fire and advanced to the fire area.



Figure 3

- F. The hose needed to reach the fire area should be supplied by the length carried by the back-up firefighter. This ensures the nozzle firefighter's length is reserved for the fire area itself. Additional hose from the back-up firefighter's length will be used to make sure there is enough extra hose available and flaked out to facilitate a smooth advance into the fire area.
 - G. While most apartments require one length of hose, it is possible for larger apartments or duplexes to require additional hose for the fire area. With this in mind, the nozzle firefighter should estimate the amount of line needed to cover the entire fire area and communicate this need to the back-up firefighter, who may have to adjust the location of their drop point to accommodate the additional hose required for the fire area.
 - H. When the public hall on the fire floor is untenable, the lead length will have to be flaked out in a safe area elsewhere. This may be on the floor below, or possibly inside the stairway (if the stairway is enclosed). Ideally, the lead length should be flaked out in the same manner at the point of deployment, with the nozzle and first coupling next to each other as close the fire area as practical.
- 2.5.7 When flaking out the lead length, the hose should be laid out as neatly as possible to reduce the chances of kinking or snagging the line once the line is charged.

2.6 Charging the line

- 2.6.1 After flaking out the line in preparation for its advance, the nozzle firefighter should keep a knee on the nozzle to protect it from being kicked or moved while they don their SCBA facepiece.
- 2.6.2 Once their protective equipment is donned and the line is flaked out, the nozzle firefighter should signal the engine officer that they are ready for water. The decision to charge the line is ultimately made by the engine officer.
- 2.6.3 When the engine officer calls for water the nozzle firefighter must prepare for a “long bleed” of the hose line. This allows for the release of air trapped in the hose, confirms serviceability of the nozzle, and allows the operating pressure to be accurately set.
 - A. To bleed the line, the nozzle is fully opened after water reaches nozzle, allowing water to flow. While waiting for the line to be charged, the nozzle can either be kept closed or cracked slightly open, allowing air to escape.
 - B. When bleeding the line, it should be directed towards the fire area, if possible. In buildings with elevators, an attempt should be made to direct the bleed away from elevator shafts. This can help keep elevators serviceable for firefighting operations.
 - C. The long bleed is especially important at standpipe operations, as it allows the control firefighter to accurately set the operating pressure at the standpipe outlet while water is flowing.
 - D. The long bleed is also particularly important when a 2 ½” hoseline is stretched from the apparatus. At these operations, the lower friction loss of the 2 ½” hose will require lower discharge pressures and the operating pressure may be below the preset on the Pro Pressure Governor. In such cases, the ECC will need to manually set the operating pressure at the discharge gate while water is flowing. Without a long bleed, the ECC may not have the opportunity to set the pressure properly.
- 2.6.4 The nozzle firefighter must be at a position at the door to the fire area crouched low and out of the doorway opening itself, regardless of conditions. A sudden ceiling collapse, rapid self-venting or a fire driven by wind could create a blowtorch effect at the entrance door and seriously injure any firefighter in its path.
 - A. This position also allows unobstructed access and egress for the ladder company operating in the fire apartment prior to the line being charged. After entry is made into the fire area, the advancement technique may be adjusted based on conditions encountered.
- 2.6.5 The nozzle firefighter should never enter the fire area without a charged hoseline. To do so could allow the fire to rapidly extend and overtake the nozzle team causing burns to them and any firefighters operating behind or above them.

2.7 Operating the hoseline

- 2.7.1 There are a number of decisions the nozzle firefighter is empowered to make while operating a hoseline. They are as follows:
- A. Direction of the stream
 - B. Rate of advancement
 - C. Sweeping the floor with the stream
 - D. Calling for more line
 - E. Partially closing the nozzle to reduce nozzle reaction and regain control
 - F. Opening the nozzle in an emergency
 - G. Communicating the need to be relieved on the nozzle
- 2.7.2 The nozzle firefighter must understand that the decision to open or close the nozzle is made by the engine officer. Based on the conditions encountered, the officer may decide to have the nozzle opened on smoke and high heat, or they may decide to advance the line until the nozzle can be opened on visible fire.
- 2.7.3 Opening the nozzle on smoke is a preventive measure taken so that hidden fire can be extinguished while reducing the chance of flashover. If there is a smoke condition with high heat, the nozzle should be opened on the smoke and operated as necessary to cool the area and advance toward the fire. This is done only at the direction of the engine officer.
- 2.7.4 Advancing a hoseline under a smoke layer without opening the nozzle is not unusual at fires. In the absence of high heat and turbulence in the smoke, conditions may be such that advancing the charged line in the smoke condition without opening the nozzle would be more effective. The line can be advanced with the nozzle closed until the fire can be hit directly with the stream.
- 2.7.5 Once fire is visible, the nozzle should be opened and the fire extinguished, as ordered by the engine officer. Never pass fire; extinguish it and continue to advance the line. This includes fire visible in the upper levels of a smoke condition, which should be extinguished to prevent a pre-flashover condition from reaching flashover.

2.7.6 Operating the 1 ¾" hoseline

- A. When operating the 1 ¾" line (Figure 4), the nozzle firefighter should keep one hand firmly holding the hoseline just behind the nozzle coupling and the hoseline itself should be held tight under the opposite side armpit.



Figure 4

- B. The nozzle firefighter should keep the nozzle out ahead of their body at a distance such that they can comfortably operate the nozzle handle with their arm extended (Figure 5). This distance allows them to manage the movements of the nozzle, giving them the ability to achieve complete coverage of the fire area from ceiling to floor.



Figure 5

- C. When using the 1 ¾" hose, most movements of the nozzle are made by the nozzle firefighter simply turning the nozzle itself. The bend in the hoseline will occur in the distance of line between the nozzle itself and the nozzle firefighter's body.
- D. Using the pistol grip while operating the hoseline is not recommended, as it will limit the nozzle firefighter's effective maneuverability.

2.7.7 Operating the 2 ½" hoseline

- A. When operating the 2 ½" hoseline, the nozzle firefighter's hand position will be the same as with the 1 ¾" line. The nozzle should be out ahead of their body, with one hand firmly behind the nozzle coupling and the hoseline held tight under the opposite side armpit.
- B. When turning the 2 ½" hoseline, the nozzle firefighter will have to make the turn by using their body, not just by moving the nozzle itself (as is done with the 1¾"). As the nozzle firefighter turns, the back-up firefighter must quickly move in the opposite direction into a position behind the nozzle firefighter, keeping the line as straight as possible.
- C. By keeping the line as straight as possible (Figure 6), the hoseline itself will help overcome nozzle reaction. This will also decrease the chance of a kink developing behind the nozzle firefighter.



Figure 6

- 2.7.8 In the FDNY, there are two basic nozzle advancement techniques used: “Flow and Move” and “Stop and Flow”. Both of these techniques are effective with both the 1 ¾” hose and the 2 ½” hose.
- 2.7.9 **“Flow and move”** is a technique that involves opening the nozzle and advancing the line with the nozzle open and water flowing until extinguishment is reached. This is the standard technique taught in the FDNY Fire Academy and is effective in nearly all fire situations.
- A. This technique makes for a rapid advance on the fire while providing a reduced temperature environment in which to travel. Additionally, temperature rebound does not occur, as the line will not be shut down and the fire will not have a chance to regain strength.
 - B. This technique provides for increased nozzle team safety by enabling the nozzle team to direct a flowing nozzle as the need arises, as in the situation of the discovery of an additional room of fire. It also allows the nozzle team to pace their rate of advancement to meet conditions encountered; once an area is cool enough to enter, the line can be quickly advanced.
 - C. By flowing water as the nozzle team advances down the hallway towards the fire area, the reach of the stream is being used to facilitate extinguishment. Additionally, surface cooling and gas contraction will be maximized, both of which contribute to effective extinguishment.
- 2.7.10 **“Stop and Flow”** is a technique that involves opening the nozzle and operating from a stationary position while extinguishing fire. The nozzle is then partially closed as the line is advanced further without water flowing. Upon reaching the next point of operation, the advance is stopped and the nozzle is re-opened for extinguishment.
- A. This is the primary technique to be used when advancing a 2 ½” hoseline.
 - B. This technique is useful in situations where obstructions or other physical obstacles create a difficult path of advancement for the line, such as heavy clutter conditions. It is also useful when faced with fire in multiple, separate locations.
 - C. “Stop and Flow” has the effect of cooling an area so the nozzle can be further advanced to a position from which the main body of fire can be extinguished.
 - D. “Stop and Flow” should not be used when faced with heavy fire conditions or high heat. It requires sufficient knockdown of the fire to allow for the advancement of the line before the fire can regain strength.

- 2.7.11 The nozzle firefighter must constantly be aware of the need to sweep the floor ahead of the advancing nozzle team. This is true when using either nozzle advancement technique.
- A. This should be a quick and deliberate side to side motion to achieve good coverage of the floor area ahead of the nozzle team.
 - B. Sweeping the floor will clear the path of debris, burning embers, and hot water. It also allows the nozzle firefighter to detect a change in the impact noise of the stream, which could indicate an obstacle or the lack of a solid floor ahead of the nozzle team.
 - C. The nozzle firefighter should sweep the floor (Figure 7) each time the nozzle team makes another forward push, and not just a single sweep when entering the fire area.



Figure 7

- 2.7.12 While operating, the nozzle firefighter can use the stream impact noise as a guide to which direction to advance or direct the hoseline.
- A. The lack of impact noise, while operating the nozzle above the floor level, could indicate an opening such as a doorway or a window. Conversely, an increase in impact noise could indicate an obstruction and the need for the nozzle to be operated in a different direction. The nozzle firefighter should have the ability to ‘see what they hear’ when deciding on direction of the stream.
- 2.7.13 When advancing the hoseline, the nozzle firefighter should normally operate from a “knee-up” position, with one knee up in front of them and one knee down.
- A. This position provides a stable platform that allows the nozzle firefighter to keep the hose line in tight and close to their body as they operate. This is especially important in cluttered areas where unsure footing could cause the nozzle firefighter to lose balance.
 - B. This position also naturally forces the nozzle to be directed upward toward the ceiling, which causes the line behind them to be directed downward toward the floor. This can assist the nozzle firefighter in handling the nozzle reaction.
- 2.7.14 When using this “knee-up” position, the hoseline can be advanced using two methods:
- A. **Step forward** - The nozzle firefighter can use the forward leg, which has the knee up, to step forward while lifting and dragging the other knee
 - B. **Alternating knees** - The nozzle firefighter can roll one knee forward and down, while raising the other knee, thereby alternating knees which have contact with the hot floor surface
- 2.7.15 As an alternative to the knee-up position, the nozzle firefighter can also operate with their front leg outstretched, while their other knee is down.
- A. This method gives the nozzle firefighter a lower profile, which can provide more control of nozzle and direction of the stream. It also allows them to check the integrity of the floor surface ahead of the advancing hose line
 - B. However, the outstretched leg method can make it more difficult to continually advance the line, especially in clutter conditions.
- 2.7.16 While it is possible to operate the hoseline with both knees off the ground in a “duckwalk” technique, this can be difficult to execute while wearing bunker pants. The duckwalk was primarily used before the development of bunker pants, which provide the knees with a degree of protection that makes it possible for them to stay in contact with the floor.

- 2.7.17 Advancing a hoseline down a flight of stairs can be an especially challenging operation for the nozzle firefighter. While descending stairs with a hoseline, the following techniques should be considered:
- A. Before advancing down the stairs, the nozzle firefighter should communicate with the back-up firefighter to ensure enough hose is available to reach the bottom of the stairs without delay.
 - B. Do not delay the descent once initiated, as a position on the stairway places the nozzle team in an exposed and dangerous area.
 - C. Keep one leg out in front to check for the presence and integrity of each step as you descend. Leaning back against a wall can help guide the descent.
 - D. If high heat is present, the nozzle should be kept open during the descent and lifted upwards to cool the stairway while descending.
- 2.7.18 If fire appears behind the nozzle team as it is advancing the hoseline, it must be immediately addressed. Fire behind the nozzle is a serious threat, as it blocks the egress of the nozzle team and any other members operating ahead of the nozzle.
- A. This problem can be complicated if the nozzle team is operating in a narrow area that would prevent the nozzle firefighter from simply turning around to extinguish the fire behind them.
 - B. In this case, the nozzle firefighter should bend the hoseline back on itself and pass the line to the back-up firefighter, who is better positioned to extinguish the fire behind them. The nozzle firefighter will act as their back-up while they operate the hoseline.
 - C. When passing the nozzle back, the nozzle firefighter should be sure to turn towards the hoseline to avoid getting tangled in the line. The nozzle will pass overhead as it is bent back and should be maintained open, if possible.
 - D. Once the fire behind the nozzle team is extinguished, the back-up firefighter will similarly bend the line back in the original direction and pass the nozzle back to the nozzle firefighter to continue advancing the line.
 - E. It should be noted that the nozzle firefighter is not “giving up the line” in this case; they are simply working together with the other half of their nozzle team to temporarily address an immediately dangerous situation.

3. THE BACK-UP FIREFIGHTER

- 3.1 The back-up firefighter works together with the nozzle firefighter to form the “nozzle team” and is responsible for providing the nozzle firefighter with physical and moral support as the hoseline is advanced.
- 3.2 In addition to their standard size-up, the back-up firefighter should pay particular attention to the various factors that influence their ability to properly execute the stretch and flake out the hoseline. This includes sizing up the specific route of the stretch, as well as the size and location of public hallways and stairway landings.
- 3.3 Stretching the hoseline
 - 3.3.1 The member assigned the back-up position is the second firefighter on the hoseline. This firefighter is responsible for removing the second length of hose from the hosebed and then proceeds, in unison with the nozzle firefighter, to the fire area. If the hosebed is maintained with the 2nd length in a horseshoe, the back-up firefighter carries the second horseshoe. If there is no horseshoe, the back-up firefighter takes their length by grabbing the next 3 folds of the hosebed.
 - 3.3.2 The back-up firefighter will drop and flake out their length of hose in coordination with the nozzle firefighter. The proper deployment of the length of hose contained in the back-up firefighter’s horseshoe is essential, as it is the hose the nozzle firefighter will need to reach the fire area with their full length intact.
 - 3.3.3 Once their length is properly deployed and flaked out, the back-up firefighter should also help flake out hose from the nozzle firefighter’s length.
- 3.4 Charging the hoseline
 - 3.4.1 Before the hoseline is charged the back-up firefighter should ensure the hoseline near the fire area is properly flaked out and that the nozzle firefighter has enough hose available to make an advance on the fire.
 - 3.4.2 When the line is charged, the back-up firefighter should make a quick check for kinks and take a position behind the nozzle firefighter providing physical as well as moral support as the fire attack is commenced.
- 3.5 Operating the hoseline
 - 3.5.1 It is the back-up firefighter’s responsibility to absorb as much nozzle reaction as possible. This enables the nozzle firefighter to more effectively handle the nozzle and advance the line.

- 3.5.2 The back-up firefighter should avoid pushing the nozzle firefighter forward as they operate the line. Instead, they should work to absorb the backwards thrust of the nozzle reaction and advance at the pace set by the nozzle firefighter.
- 3.5.3 In order to achieve this, the back-up should be on the same side of the hose as the nozzle firefighter and as close as physically possible behind them (Figure 8).



Figure 8

- 3.5.4 In a situation in which the line is flowing but not advancing, the back-up firefighter can pin the line to the floor and achieve the same desired results (Figure9).



Figure 9

- 3.6 The back-up firefighter should be positioned so they can look forward as they advance. This allows the back-up firefighter to see what the nozzle firefighter sees and enables them to anticipate the nozzle firefighter's movements.
- 3.7 The back-up firefighter should maintain a firm grip of the advancing hoseline at all times. If this member was to lose control of the line, the reaction of the opened nozzle could pull it through the grasp of the nozzle firefighter and leave the nozzle team unprotected from the fire.
- 3.8 When the nozzle firefighter wants to change the direction or elevation of the stream, the back-up member should maneuver the section of hose behind the nozzle firefighter in the opposite direction. This is especially true when operating a 2 ½" handline, in which the back-up firefighter can hinder the operation if they do not coordinate their movements with the nozzle firefighter.
- 3.9 During the initial hoseline advance, the back-up firefighter should maintain the hoseline below the level of the operating nozzle and keep the line as straight as possible. Any change in direction could lead to a severe kink between the back-up firefighter and the nozzle.
- 3.10 In the event the advance of the hoseline is stalled due to insufficient available hose, the back-up firefighter may need to momentarily leave the nozzle firefighter to retrieve the hose necessary to continue the fire attack. This must be coordinated with the officer and nozzle firefighter.

4. THE DOOR FIREFIGHTER

- 4.1 The door firefighter is responsible for supplying the nozzle team with sufficient hose to make the fire attack and ensures the proper flaking out of the hoseline.
- 4.2 In addition to their standard size-up, the door firefighter should pay special attention to the particular route of the stretch and the size and location of areas to flake out excess hose.
- 4.3 Stretching the hoseline
 - 4.3.1 The member assigned the door position is the third firefighter on the hoseline. This firefighter is responsible for removing the third length of hose from the hosebed and carrying it to an appropriate drop point in the hose stretch. If the hosebed is maintained with the 3rd length in a horseshoe, the door firefighter carries the third horseshoe. If there is no horseshoe, the door firefighter takes their length by grabbing the next 3 folds of the hosebed.
 - 4.3.2 After dropping their hose, the door firefighter assists with flaking out the hoseline in preparation for it being charged. The door firefighter is also responsible to check the stretch for kinks while proceeding to the entrance of the fire area.

4.4 Charging the hoseline

- 4.4.1 The door firefighter should also identify any potential pinch points the hoseline will encounter. Any potential pinch point should be dealt with by placing extra hose in the area of the pinch point itself, prior to advancing to the entrance of the fire area. Such pinch points can include a stairway newel post, a doorway, or any abrupt turn.

4.5 Operating the hoseline

- 4.5.1 After the nozzle team enters the fire area with the charged line, the door firefighter takes a position at the entrance of the fire area and slowly feeds line into the advancing nozzle team. The door firefighter must not push the hoseline to the nozzle team, but instead provide enough slack in the line so that they can advance easily.
- 4.5.2 The door firefighter should maintain a bow in the section of hoseline between the door and the nozzle team. This tactic will allow the door firefighter to monitor the advance of the nozzle team by observing the straightening of the hoseline. As the hose straightens the member restores the bow in the line (Figure 10).
- 4.5.3 When maintaining bow in the line, avoid placing the hose high up against a wall where it will be subjected to high heat levels and possible burn through. Additionally, a firefighter attempting to exit the area by following the hoseline may lose contact with the hoseline if the bow is maintained high against the wall.



Figure 10

- 4.5.4 In large rooms or open areas, it may be possible to maintain a horizontal bow in the line, rather than a vertical bow. This will look like a large loop in the line, laid horizontally on the floor. As the line is advanced, the door firefighter can feed hose to the nozzle team the same way as with a vertical bow (Figure 11).



Figure 11

- 4.5.5 In larger apartments or private homes the door firefighter may be forced to move into the fire area to keep line of sight with the nozzle team. Maintaining visual contact with the nozzle team is necessary to ensure they are supplied with enough line as they advance.
- 4.5.6 If either member of the nozzle team requires relief or is injured, the door firefighter can quickly move into position and the attack on the fire can continue. The door firefighter should consider leaving their flashlight on which would serve as a guide for members exiting the fire area.
- 4.5.7 An important task of the door position is to monitor and observe heat, smoke and fire conditions at the entrance doorway. Undetected or extending fire could suddenly erupt or appear between the entrance and the nozzle team. The door firefighter is in a prime location to detect this situation and warn the nozzle team. This position at the entrance to the fire area also gives the door firefighter the ability to monitor and warn the firefighters going above the fire in the case of a sudden change in conditions or water loss.

5. THE CONTROL FIREFIGHTER

- 5.1 The member assigned the control position is the last firefighter on the hoseline. The control firefighter's primary function is to ensure the correct amount of hose is stretched to enable the nozzle team to advance to the seat of the fire.
- 5.2 The success of an engine company hoseline operation relies greatly upon the actions of the control firefighter. Where possible, only experienced and knowledgeable firefighters should be assigned the control position. This will assure a more accurate hose estimate and removal from the apparatus.
- 5.3 In addition to their standard size-up, the control firefighter should pay special attention to the route of the stretch and the various factors that influence the number of lengths of hose required to reach the fire area. This includes sizing up the location of the fire apartment, type of stairway present, and any possible obstacles in the stretch.
- 5.4 Estimating the stretch
 - 5.4.1 The control firefighter is responsible for the accurate estimation of the amount of hose to be stretched. Their objective is to ensure enough hose is stretched to reach the seat of the fire, while minimizing the number of excess lengths used. Excessive hose increases both friction loss and the potential for kinks, which can cause a considerable reduction in both flow and stream quality at the nozzle.
 - 5.4.2 The control firefighter must pay close attention to the particular route of the stretch in order to accurately estimate the amount of hose to be used. This includes consideration of the following:
 - A. Distance from apparatus to building entrance
 - B. Distance from building entrance to foot of stairs
 - C. Type of stairs to be used
 - D. Number of floors to ascend or descend
 - E. Distance to fire area from stairs or building entrance
 - F. Size of fire area

- 5.4.3 When estimating the amount of hose to be used, the distance involved in each of the building features listed above needs to be accounted for. The following are guidelines to be considered:
- A. At least 1 full length of hose is needed to cover the fire area. Larger apartments or fire areas may require 1 ½ lengths.
 - B. Roughly 1 length is needed to travel up (or down) 1 floor.
 - C. For a wrap-around stretch, roughly 1 ½ lengths are needed to travel 1 floor
 - D. For a well hole or rope stretch, 1 length of hose stretched vertically can travel roughly 5 floors.
 - E. Generally, return type stairs may require more hose than straight run stairs.

5.5 Controlling the stretch

- 5.5.1 To effectively control the hose stretch, the control firefighter must remain last in the stretch. This is true even when they are assisted by another unit in the stretch. When the 2nd engine arrives to assist the stretch, the 1st control firefighter should not delegate or transfer the control position to the 2nd control firefighter. Instead, they should maintain a position at the hose bed and complete the hose estimate and removal.
- 5.5.2 The control firefighter's position at the hosebed is especially critical when performing a backstretch, as the ECC may be waiting for the necessary hose to be removed prior to proceeding to a hydrant.
- A. If the control firefighter was to abandon this position, it may delay the ECC in securing a water source. It may also give the ECC the false impression that sufficient hose has already been stretched, which could lead to the apparatus being prematurely repositioned to a hydrant. If this occurs before enough hose is removed, a short stretch could result.
 - B. To avoid the above mistakes, direct face to face communication between the control firefighter and ECC regarding the number of lengths removed should take place prior to moving onto the hydrant.
- 5.5.3 The control firefighter shall remove hose from the hosebed in a manner that allows for later arriving firefighters to easily pick up their length of hose in the street.
- A. After the nozzle, back-up, and door firefighter take their lengths from the hosebed, the control firefighter shall remove additional required lengths of hose individually and place them on the ground in the direction of the stretch. Later arriving firefighters can more readily stretch these lengths, as needed.
 - B. The control firefighter should avoid simply pulling hose off the hosebed and piling it on the ground. This complicates the stretch and delays the positioning of the line.

- 5.5.4 After sufficient hose is removed from the hose bed, the line must be broken and connected to a pump discharge outlet. The control firefighter must inform the ECC of the size of hose, total number of lengths stretched, and which floor the hose is stretched to.
 - A. If a backstretch is performed, once sufficient hose has been stretched, the control firefighter will signal the ECC to proceed to the hydrant to be used. At this point, the line will be broken and connected to a discharge outlet.
 - B. When a second hoseline is dropped at the same time as the first hoseline, the control firefighter must be sure to correctly identify to the ECC which hoseline each unit is operating.
- 5.5.5 If the hydrant used is in close proximity to the fire building, the control firefighter may assist the ECC with hydrant connection after controlling the hose stretch. This should only occur after the hose stretch has been completed.
 - A. If in-line pumping is used, the control firefighter may similarly assist the ECC with connections as necessary after the stretch is completed.
- 5.6 Charging the hoseline
 - 5.6.1 After sufficient hose has been stretched and the ECC does not require their assistance, the control firefighter should assist in flaking out hose between the apparatus and the building entrance door, in addition to feeding slack toward firefighters ahead on the line. In doing this, they should remain mindful of the following:
 - A. Minimize the number of turns made by the hoseline outside the building.
 - B. Hose should not be stretched or flaked out in the middle of the street.
 - C. If apparatus positioning or the presence of cars makes stretching in the street difficult, bring the hoseline onto the sidewalk close to the apparatus and stretch by way of the sidewalk.
 - D. If the hoseline needs to cross the street, cross over as close to the fire building as possible, while remaining mindful of ladder company positioning.
 - E. Leave room for the hoseline to move around any obstructions or pinch points, such as parked cars, trees, fences, or doorways. Be especially mindful of car tires, which can easily snag the hoseline.
 - 5.6.2 Once the line is charged, the control firefighter will eliminate kinks in the hoseline as they move along the line toward the fire area. This may require repositioning of hose in halls and stairways and straightening any bends that are restricting the water flow.

5.7 Operating the hoseline

5.7.1 Once the line is charged and the stretch is checked for kinks the control firefighter should take a position at the entrance to the fire area, this allows the door firefighter to move into the fire area allowing them to better supply the nozzle team with line.

5.7.2 When an engine is staffed with four firefighters the control firefighter will also assume the responsibilities of the door firefighter.

5.8 Standpipe operations

5.8.1 The responsibilities of the control firefighter differ significantly when the hoseline is stretched from a standpipe outlet. In this case, the control firefighter is responsible for supplying the proper pressure to the hoseline from the outlet.

5.8.2 The control firefighter's responsibilities at a standpipe operation are fully discussed in *Standpipe Operations page 93*.

6. 2ND ARRIVING ENGINE

6.1 Generally, the backstep of the 2nd arriving engine will assist the 1st arriving engine in stretching and operating the 1st hoseline. Members should maintain their assigned order as they assist in the stretch, with the nozzle firefighter closest to the 1st arriving company, followed by the back-up, door, and control firefighters

6.2 If the 2nd engine arrives on scene before the 1st engine begins the stretch, they should join the 1st arriving engine at the back of the apparatus and assist in the stretch. If necessary, members of the 2nd arriving engine should carry a full length each by grabbing 3 folds of hose from the hosebed. This may be needed for a long stretch.

6.3 If the 2nd engine arrives after the 1st engine has begun stretching, the 2nd arriving members should begin assisting with the stretch only after they have confirmed the position of the 1st arriving engine and the progress of the stretch. This may require the 2nd arriving members to enter the building and follow the line to determine the progress made by the stretching members.

6.4 When backing up a hoseline in operation, the members of the 2nd arriving engine should ensure the smooth advance of the hoseline. This will require the members be positioned in proximity to the 1st arriving company, while remaining adequately spaced out on the hoseline.

6.5 However, members of the 2nd arriving engine should also strive to conserve air and remain outside of an IDLH atmosphere as much as possible, as they may be assigned to relieve the 1st arriving engine on the nozzle at a prolonged operation. Their position should consider both the need to advance the charged line and the need to conserve air for possible relief.

7. LATER ARRIVING ENGINES

- 7.1 For later arriving engine companies at a fire operation, the hoseline operations of the members of the backstep will be determined by whether the company is stretching and operating their own hoseline, or whether they are the company backing the hoseline up.
- 7.2 Engine companies that are stretching and operating their own hoselines should operate similar to the 1st arriving engine company, as described above.
- 7.3. Generally, this will include the 3rd arriving engine, who is usually responsible for stretching and operating the 2nd hoseline at a fire operation.
- 7.4. Any company stretching their own hoseline must determine the destination of their hoseline and the location of the apparatus from which they will stretch the hoseline. Depending on the location and availability of engine apparatus, this may not necessarily be the same apparatus from which the 1st hoseline was stretched.
- 7.5 Engine companies that are backing up additional hoselines should operate similar to the 2nd arriving engine company, as described above. They must confirm the identity of the unit who is stretching the hoseline they will be backing up.

THIS PAGE WAS INTENTIONALLY LEFT BLANK



STRETCHING HOSELINES

1. STRETCHING HOSELINES

- 1.1 In the FDNY, the primary method of fire extinguishment is by way of a hoseline hand-stretched from the engine apparatus. The method used to stretch the hoseline depends on a variety of factors, including the fire situation encountered, building construction, and stairway type.
- 1.2 When stretching hoselines from an apparatus, the FDNY stretches either 1 ¾" hose or 2 ½" hose to extinguish fires. The decision of which line to stretch is made by the engine officer and is further discussed in *The Engine Company Officer page 1*. All of the hose stretching techniques discussed in this chapter are effective for stretching either size hoseline.
- 1.3 The placement of the hoseline and the path of travel are also determined by the Engine Officer and are also discussed in *The Engine Company Officer page 1*. However, the 1st and 2nd hoselines are generally stretched to the fire area by way of the building's primary means of egress.
- 1.4 The interior placement of the first hoseline by way of the primary means of egress provides protection for evacuating occupants and firefighters alike, while allowing direct fire extinguishment. However, in some situations (cellar fire in a private dwelling, fire in a place of worship, etc.), hoselines are stretched by way of the entrance which provides the quickest access to the fire.
- 1.5 Depending on the occupancy and conditions encountered, the first hoseline may either be flaked out and charged outside the fire building, or it may be stretched into the fire building and flaked out in a safe area in proximity to the fire area before it is charged.
 - 1.5.1 Generally, the hoseline is charged outside the fire building for fires in buildings that do not contain public hallways or stairs which are separated from the occupancy areas. This includes private dwellings, places of worship, taxpayers, and similar occupancies. This tactic may also be necessary if units are met with fire at the main building entrance of any occupancy type.
 - 1.5.2 For fires in buildings that contain public hallways or stairs which are separated from the occupancy areas, like multiple dwellings, lofts, and similar occupancies, primary hoselines will be stretched dry inside the fire building and will be flaked out and charged in a safe area as close to the fire area as practical.
- 1.6 When stretching hoselines inside the fire building, the most critical factor in determining the manner in which the first and second hoselines are stretched is the type of interior stairs to be used. The concerns that are of the greatest consequence for stretching hoselines are the following (which will be further described in the sections below):

- 1.6.1 Does the stairway provide a safe area to operate from?
(Is the stairway open, or enclosed?)
- 1.6.2 What portion of the building does the stairway access?
(Is the stairway transverse, wing, or isolated?)
- 1.6.3 Is the layout on each floor identical in relation to the stairway?
(Are return stairs present? Scissor stairs?)
- 1.6.4 Does the layout of the stairway complicate the stretch, or can it make it easier?
(Is there a well hole? Does it wrap around an elevator shaft?)

2. TYPES OF STAIRWAYS

- 2.1 Each of the concerns listed above should be determined when a stairway is to be used to stretch a line. This is accomplished by categorizing the stairway based on the following questions:
 - 2.1.1 Is the stairway open, or enclosed?
 - 2.1.2 Is the stairway straight run, return, or scissor stairs?
 - 2.1.3 Is the stairway transverse, wing, or isolated?
 - 2.1.4 Does the stairway have a well hole?
 - 2.1.5 Does the stairway wrap around an elevator shaft?
- 2.2 Each stairway type is further described in the sections below.
- 2.3 Open Stairways (Figure 1)
 - 2.3.1 Open stairways are directly exposed to the public hallway and generally extend from the ground floor to the roof. They do not have doors separating them from the public hallway and cannot be isolated to provide a safe area on the fire floor.
 - 2.3.2 It is common to have a roof vent at the top of an open stairway (skylight, bulkhead, scuttle, etc.), which can be used to relieve the early upper level smoke travel that is common in an open stairway.
 - 2.3.3 The floors above the fire will become quickly filled with smoke, which can complicate stretching and operating additional hoselines on upper floors.

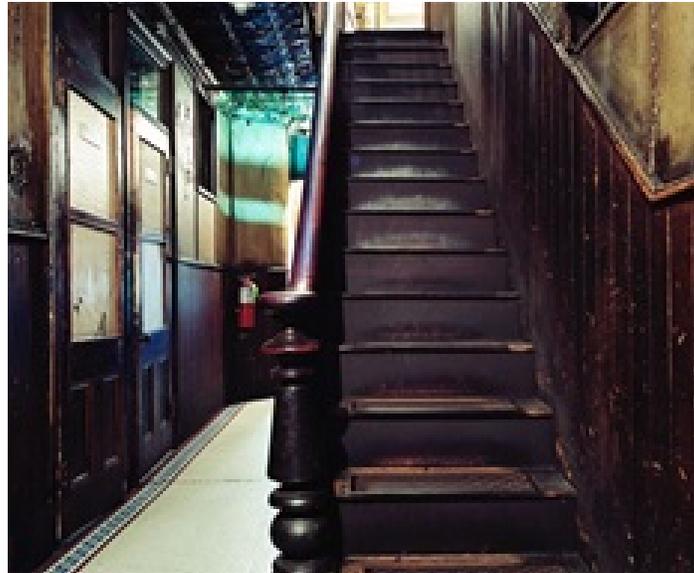


Figure 1

2.4 Enclosed stairways (Figure 2)

- 2.4.1 Enclosed stairways are separated from the public hallway on each floor by a door (Figure 3). If conditions in the public hallway are untenable, this stairway door can be controlled to provide a safe area from which to operate on the fire floor.
- 2.4.2 This stairway provides a barrier to smoke travel and allows safe passage for egress on all floors (in stairways other than the attack stair).
- 2.4.3 Smoke conditions on floors above the fire can be less severe in the case of an enclosed stairway, as each floor will be isolated from the path of smoke travel.

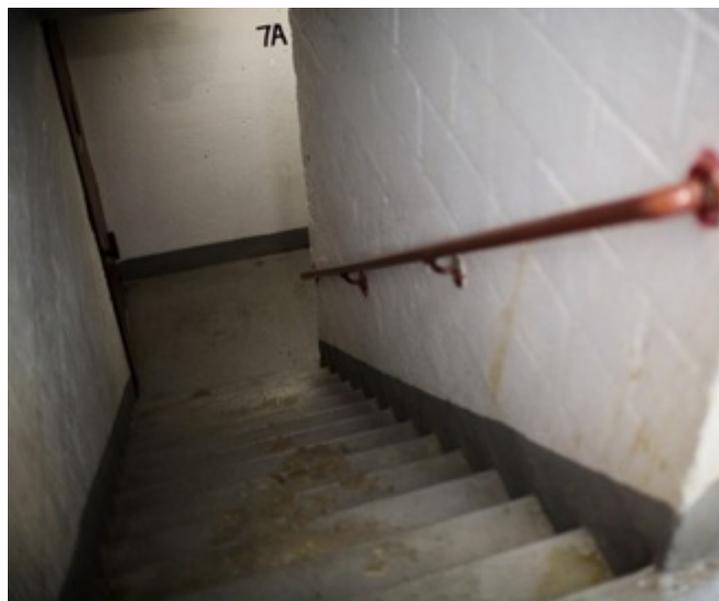


Figure 2



Figure 3

2.5 Straight run stairways

2.5.1 Straight run stairways are stairs that run in a single direction from floor to floor (Figure 4). As a result, the entrance to the stair at the bottom of the stairway will not be directly beneath the exit from the stairway on the floor above.

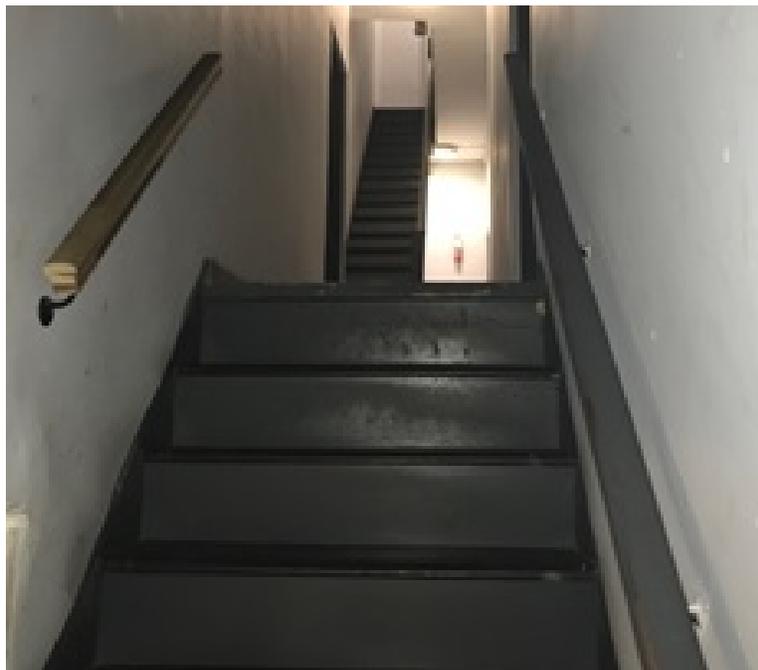


Figure 4

2.5.2 Typically, these stairs are stacked over each other in most buildings. Sometimes, the straight run stairs are oriented so the stairway is a continuously straight run for a number of floors. While climbing a continuous straight run staircase, the access point on each floor will be increasingly further away from the original stairway entrance. This type of stairway can be found in loft buildings and other large occupancies (such as theaters).

2.6 Return stairways

2.6.1 The defining characteristic of a return stairway is that the stairway's access point is located at the same place on each floor. When using this stairway, you will "return" to the same spot when you enter each floor.

2.6.2 Return stairs generally exist in one of three possible orientations: straight run stacked stairs, half-landing return stairs, or wrap-around stairs.

2.6.3 Straight run stacked stairs involve a straight run stairway connecting each floor. However, the stairway is not continuous; to continue up the stairway, you will have to walk down a hallway on each floor to return to the bottom of the next flight. The result is a series of straight run stairs oriented in the same direction and stacked on top of each other.

2.6.4 Straight run stacked stairs can be found in a variety of occupancies, but are common in brownstones, old law tenements, and some styles of private dwellings.



Figure 5

- 2.6.5 Half-landing return stairs have a platform (half-landing) between floors, which allows the stairway to change direction and return to the same access point location on each floor (Figure 5). In effect, there are two sets of stairs between each floor: one going from the floor to a half-landing, and another going from the half-landing to the next floor (facing the opposite direction).



Figure 6

- 2.6.6 Half landing return stairs (Figure 6) can be found in a variety of occupancies, but are commonly found in new law tenements, larger apartment houses, and high-rise multiple dwellings (including Class 2 buildings).
- 2.6.7 It is possible for a half landing return stair to have more than one platform (half-landing) between floors. If there is more than one change-of-direction platform, the result will be a “wrap-around” staircase that wraps around between floors as it returns to the same access point on each floor.
- 2.6.8 These “wrap-around” stairs can exist in larger buildings of various occupancies, including new law tenements and larger apartment houses. The stairway may wrap around an elevator shaft, or it may have a large well-hole.

- 2.6.9 Wrap-around staircases (Figure 7) can have one or more half-landings between floors. In either case, it will also be necessary to walk around the remaining turns on each floor to access the next flight of stairs. In essence, these wrap-around stairs combine the elements of straight run stacked stairs and half-landing return stairs. When wrapped around an elevator shaft (or other obstruction), wrap-around stairs present a challenging stretch.



Figure 7

2.7 Scissor stairs

- 2.7.1 Scissor stairs are a series of continuous stairs (Figure 8) that change direction at each floor. A flight of stairs will run in one direction up to the next floor where a landing is found, allowing the stairway to change direction. The direction of the stairway changes at the landing and the next flight of stairs will be oriented in the opposite direction. These stairs are continuous in the sense that you don't have to leave the stairway to continue to the next floor.
- 2.7.2 The result is that the stairway access point in the public hallways will not be the same on each floor. Rather, the location of the access point will alternate from floor to floor. However, the access point on alternating floors will be in the same location (if you climb two flights up, the stairway exit will be in the same location). This can be a source of confusion at a fire operation.



Figure 8

- 2.7.3 Typically, scissor stairs exist in pairs; there will be two stairways that mirror each other as they continue from floor to floor. The staircases will crisscross as they go between floors and their access points will be at opposite (Figure 9) and alternating locations on each floor.



Figure 9

- 2.7.4 Scissor stairs must be properly labelled. Mislabeled scissor stairs can cause great confusion at an operation. Each stairway should have the same letter designation throughout its span; it does not alternate as you climb from floor to floor. Instead, the orientation of the lettered staircases in relation to each other on each floor will alternate. The Incident Commander must be notified immediately when members find stairs mislabeled at an operation so that all units can be made aware of this matter.
- 2.7.5 Scissor stairs are most commonly found in high-rise multiple dwellings, high-rise commercial buildings, and other large occupancies. They can also be encountered in various styles of newly constructed low-rise multiple dwellings.
- 2.8 Transverse stairs
 - 2.8.1 Transverse stairs are stairways that provide access to all apartments on a floor. By using a transverse stairway, access is possible to all apartments.
 - 2.8.2 Transverse stairs are a key concern in buildings with multiple stairways, such as new law tenements or larger apartment houses. Typically connected by a “transverse hallway”, these stairs are often located at the ends of the hall. The hallway allows members to transverse to all apartments and all stairways.
- 2.9 Wing stairs
 - 2.9.1 Wing stairs are stairways that provide access to only the apartments found in a specific section (or “wing”) of a building. By using wing stairs, there will be apartments in the building that cannot be accessed.
 - 2.9.2 Wing stairs can access a “wing hallway”, which only provides access to apartments in that specific section (wing) of the building. While smaller than transverse hallways, these wing hallways are often large enough to accommodate flaking out hose.
 - 2.9.3 Wing stairs are often found in new law tenements and larger apartment houses and are a key concern when stretching hose. Care must be taken to ensure the correct stairway is used to access the fire apartment.
- 2.10 Isolated stairs
 - 2.10.1 Isolated stairs are stairways that access only a small number of apartments and are isolated from other areas of the building. By using isolated stairs, there will only be access to the apartments immediately accessed by the stairs.

2.10.2 There is typically no hallway associated with isolated stairs. Rather, these stairs open onto a landing on each floor, from which the apartments are accessed. This landing area can be small and may present difficulty in flaking out hose.

2.10.3 Isolated stairs can be found in a number of building types, including new law tenements, apartment houses, and other newly constructed multiple dwellings. When faced with isolated stairs, care must be taken to ensure the correct stairway is used to access the fire apartment.

2.11 Well hole stairway

2.11.1 While a “well hole stairway” is not a specific type of stairway in a strict sense, the presence of a well hole is a critical concern when stretching hose. A well hole stretch can save time, energy, and minimize the amount of hose needed.

2.11.2 A well hole is the empty area in the center of the stairway that serves as a vertical void spanning the length of the stairs. If the space is large enough, this area can be used to aid in the hose stretch.

2.11.3 Well holes can exist in all three types of return stairways (straight run stacked stairs, half-landing return stairs, or wrap-around stairs) and may also exist in some scissor stairways.

3. TYPES OF STRETCHES

3.1 Typically, at fires above the first floor, the first hoseline at a fire operation is stretched by way of the main building entrance and the interior stairs. This is done to protect the primary means of egress.

3.2 However, there may exist specific building characteristics or situational considerations may necessitate a variation from stretching via the primary means of egress and an alternative method may be appropriate (such as a rope stretch or fire escape stretch). Buildings where these alternative methods may need to be employed should be identified in CIDS.

3.3 The following sections describe various techniques to stretch hoselines using different types of interior stairways and various techniques of exterior stretches.

4. TRADITIONAL STAIRWAY STRETCH

4.1 In a traditional stairway stretch, the hoseline is stretched by carrying the hose up the interior stairway and to the fire area (Figure 10). As the hose is stretched, each member carries their length (in folds or a horseshoe) and the hose plays out on the stairway behind them.



Figure 10

- 4.2 In this type of stretch, two critical concerns are managing the turns on the staircase and determining the proper drop point for the length of hose carried by each member.
- 4.3 To properly manage the turns on the stairway, the hose should be carried in the outside arm of the stretching members. This will help the members make wide turns with the hose as they climb the stairs. This is important because, if stairway turns are taken too tight, the hose can get caught on the turns as the members climb. If this happens, the back-up firefighter or other members may have to go back to loosen the hose around the caught turn.
- 4.4 The nozzle firefighter will carry their length (folds or horseshoe) intact to the point of deployment, which will be as close to the fire area as possible. They should keep their length intact to be used in the fire area itself. If the hallway is tenable and if there is enough room, the hose should be flaked out in the hall.
- 4.5 If there is not enough room in the hallway on the fire floor, the length can be flaked up to the half-landing (if present) or all the way up to the next landing. Hoselines can also be laid out in adjoining apartments (on the same side as the fire apartment) on the fire floor if additional space is needed. Alternatively, the hose can be flaked out on the floor below the fire and advanced up to the fire floor.
- 4.6 If the public hallway on the fire floor is untenable the hoseline may need to be flaked out and charged on the floor below the fire.

4.7 The back-up firefighter carries their length (in folds or a horseshoe) and must determine the proper drop point at which to deploy their length. This should be coordinated with the nozzle firefighter. The proper deployment of the length of hose contained in the back-up firefighter's folds or horseshoe is essential, as it is the hose the nozzle firefighter will need to reach the fire area with their full length intact.

4.7.1 The location of the back-up firefighter's drop point will depend on the distance of the fire area from the stairway. If the hallways are long, this may be on the fire floor. If the hallways are small, or if the fire area is close to the stairway, the back-up firefighter may need to drop their length on the floor below the fire.

4.8 Similarly, the hose carried by the next firefighter in the stretch should be deployed at the proper drop point. This will depend on the type of stairway present, as some stairways can require more hose than others. Generally, the next length of hose should be dropped on a floor below the fire.

5. WELL HOLE STRETCH

5.1 The presence of a well hole in the stairway makes it possible to execute a well hole stretch as an alternative to a traditional stairway stretch. This type of stretch will use significantly less hose, will take less time, and will be less physically demanding, while still protecting the primary egress of the building.

5.2 In order for the well hole to be used, it must be large enough to accommodate the hose. An effective test for size is a closed hand (Figure 11); if you can fit your gloved fist inside a well hole, it should be large enough to execute a well hole stretch.



Figure 11

- 5.3 The presence of a well hole does not require the execution of a well hole stretch. The decision to use the well hole is made by the engine officer and should be clearly communicated to the members executing the stretch.
- 5.4 Before the decision is made to use the well hole, be sure the path of the well itself is clear. This is accomplished by looking up from the bottom of the well. Obstructions in the well hole (such as metal bars) can complicate the stretch. Also, be sure the well continues above the first floor, as variations in layout may impact the well hole. Conversely, be mindful that variations in layout may create a well hole that begins on the 2nd floor. If desired, the well hole stretch can begin from that point.
- 5.5 The engine officer should also determine the point at which the hose will be pulled out of the well and flaked out for fire attack. This point should be in a safe area as close to the fire apartment as practical. Most commonly, this will be on the floor below the fire (or half landing) and stretched to the fire apartment by way of the stairs. In larger buildings, it may be possible to pull the hose out of the well hole and secure it on the fire floor, if the stairs are sufficiently remote from the fire apartment to allow for members to flake out the required lengths and secure the hose.
- 5.6 Before the hose is secured, the engine officer must confirm that enough hose is available on the fire floor to reach the fire area.
- 5.7 ***Well hole technique 1: Nozzle firefighter carries their length***
- 5.7.1 The nozzle firefighter will carry their entire length intact to the fire apartment, where it will be flaked out for fire attack. Only the “tail” of the hose that leads from the nozzle length towards the back-up firefighter should be placed inside the well. There is no need to carry the folds or horseshoe in the well hole itself.



Figure 12

- 5.7.2 This is best accomplished by carrying the length in their outside arm as they walk up the stairs. This allows the nozzle firefighter to use their inside hand to guide the “tail” of the hose into the well and avoid obstructions (such as newel posts).
- 5.7.3 By using this technique, the entire lead length can be carried up to the fire floor intact, regardless of the size of the well. The “tail” hose of the nozzle firefighter’s length can easily fit in a narrow well. This ensures an entire lead length of hose is readily available to cover the fire apartment and eliminates the need for the nozzle firefighter to hoist an entire length of hose up the well.
- 5.7.4 Before the nozzle firefighter can begin climbing the stairs, there needs to be a length of hose available at the bottom of the well. This is the hose that will be hanging in the well hole. This hose will be provided by the back-up firefighter, who will drop their length at the base of the well. As the nozzle firefighter begins to climb the stairs, the back-up firefighter should ensure the smooth advance of hose up the well hole.
- 5.7.5 Upon arrival at the fire floor, the nozzle firefighter will set their length aside (keeping it intact), step on the hose to prevent it from falling down the well, and pull up any additional hose needed on the fire floor, being mindful that their entire lead length should be reserved for advance into the fire apartment. If there is enough room in the hallway, line can be more easily pulled up by simply walking with the hose away from the well hole.
- 5.7.6 Once enough hose is on the fire floor, the hose hanging in the well hole needs to be properly secured using a hose strap. A girth hitch is placed around the hose, and the hook/carabiner is used to secure it to the stairway railing. Allow the weight of the hose to hang freely on the hose strap to ensure it is properly secured. Ideally, the hose strap should be placed just below a hose coupling, but this exact placement is not necessary.



Figure 13A

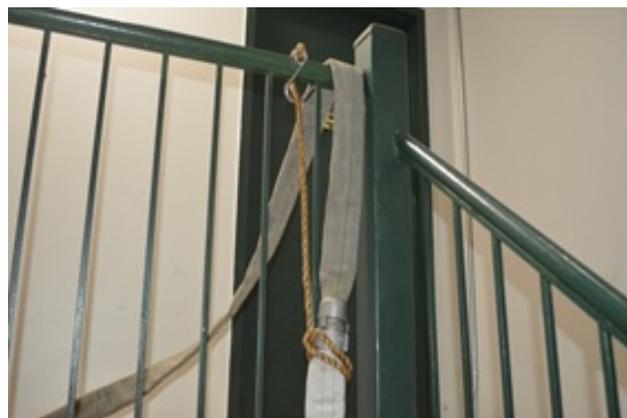


Figure 13B

- 5.7.7 Once the hose is secure, the nozzle firefighter should pick up their length, carry it intact to the fire apartment, flake it out, and prepare to advance, as described in *The Backstep* page 35.
- 5.7.8 As the stretch is being executed, the back-up firefighter should ensure the smooth deployment of hose up the well hole and make their way up to the fire floor as soon as practical. Once there, assist the nozzle firefighter in pulling up the necessary hose, securing the hose strap, and flaking out the hose before preparing to advance as in *The Backstep* page 35.

5.8 ***Well hole technique 2: Nozzle and back-up firefighters both carry their lengths***

- 5.8.1 When conditions allow, a more efficient alternative to the above evolution would allow both the nozzle and back-up firefighters to carry their lengths up the stairs (Figure 14). This technique should be considered when the floors are larger and more hose is required on the fire floor.



Figure 14

- 5.8.2 To do this, the control (or door) firefighter would supply the length of hose at the bottom of the well hole and guide the hose up the well. This is the 3rd length in the stretch and the control (or door) firefighter would stretch it to the base of the well hole behind the nozzle and back-up firefighters.

- 5.8.3 With the 3rd length on the floor at the bottom of the well, both the nozzle and back-up firefighters will carry their lengths up the stairs (in their outside arms) and the “tail” of the back-up firefighter’s hose would be placed inside the well, as described above. The “tail” of the nozzle length will hang between the nozzle and back-up firefighters on the stairway as they climb. Working together, the nozzle and back-up firefighters would then carry two entire lengths up to the fire floor, being careful not to entangle the hose hanging between them.
- 5.8.4 Upon reaching the fire floor, two lengths will already be present, so it is likely that no additional lengths will need to be pulled up. The hose can be secured using the hose strap and the line stretched to the fire apartment as described above.

5.9 ***Well hole technique 3: Nozzle firefighter carries nozzle only***

- 5.9.1 When there is an obstruction in the well hole, the line will need to be passed around the obstruction at every turn. Such an obstruction may be a pole or other construction feature. If there is a hoseline already stretched in the well hole, it will also be an obstruction. For this reason, a second hoseline stretched in a well hole should be executed as described below.



Figure 15



Figure 16

- 5.9.2 Even if it is possible to pass an entire length around an obstruction, it is not easily accomplished and greatly complicates the stretch. To avoid this, the nozzle firefighter should drop their length at the base of the well hole and carry only the nozzle itself up the well, passing it around the hanging hose (or other obstruction) as necessary.
- 5.9.3 Upon arrival on the fire floor, all hose required for operation will need to be hoisted up and properly secured. This is likely at least 2 lengths, as at least one length will be needed to reach the fire area and another entire length will be needed to cover the fire area itself.

6. ROPE STRETCH

- 6.1 If the stairway is not to be used to stretch the hoseline, an alternative method is to use a rope to hoist the hoseline into position. This can commonly occur when two lines have already been stretched on a single stairway, or when a hoseline is stretched to a roof.
- 6.2 The decision to execute a rope stretch is made by the engine officer and should be clearly communicated to the members executing the stretch.
- 6.3 In some cases, the first hoseline may be stretched using a rope stretch. This may be appropriate when a rope stretch would greatly facilitate line placement due to unique building characteristics or other similar circumstances. In this case, the engine officer should be aware that the primary egress to the building will not be fully protected. Buildings where these alternative stretches may need to be employed should be identified in CIDS.
- 6.4 To execute a rope stretch, the engine officer carries the rope to the drop location to which the hose will be hoisted. This will be a window (or similar opening), balcony, or roof parapet. The officer must ensure windows are sufficiently opened, which may involve removing child gates or other obstructions.
- 6.5 The rope is carried in a bag or a similar container. Commonly, a modified bleach bottle may be used (this evolution is sometimes called a “bottle stretch”).
- 6.6 The hoseline will be stretched to a point directly below the drop location and the nozzle and back-up firefighters will arrange their lengths neatly on the ground (Figure 17). The back-up should be careful not to place their hose on top of the nozzle firefighter’s hose.



Figure 17

- 6.7 If the hose is going to be stretched from outside the building, the nozzle and back-up firefighters will drop their lengths on the ground outside the building, directly underneath the drop point.
- 6.8 A rope stretch may also be executed from inside the building. This can be beneficial in cases of long and difficult stretches (such as a wrap-around stretch) and would require a window available on the ground floor, in addition to another window available directly above this window to serve as the drop point.
- 6.8.1 If the hose is going to be stretched from inside the building, the nozzle and back-up firefighters will carry their lengths inside the building and neatly drop them next to the window to be used on the ground floor.
- 6.8.2 The rope will be lowered to this window from the drop point above and the nozzle firefighter will pull the rope into the window on the ground floor and secure their length of hose (as described below).
- 6.8.3 The rope will then be lifted out of the window on the ground floor and hoisted up to the deployment point above. On the ground floor, the hose should pass through the upper pane of the window, while the hose should pass through the lower pane on the upper floor.
- 6.9 The engine officer will send the rope to the members below. This can be accomplished two different ways:
- 6.9.1 **Toss the rope** - The officer can hold the working end of the rope and toss the rope container itself to the members below. This may be necessary if the rope needs to be thrown a distance away from the building, but it introduces the possibility of the rope becoming caught in an obstruction, or not reaching the ground if it does not play out of the container properly. It also requires the members in the street to make a more complex knot to secure the hose.
- 6.9.2 **Lower the rope** - The officer can lower the working end of the rope to the members below, keeping the container upstairs with him. This ensures a smooth play-out of the rope as it is lowered and allows the members below to use a carabiner or clip on the working end of the rope to secure the hose.
- 6.10 Once the rope reaches the ground, the nozzle firefighter secures it to the hose. If the working end of the rope is lowered, this can be done using a carabiner or clip, if present. If there is no carabiner or clip, a clove hitch or slipknot can be tied to secure the hose. If the working end is not lowered, the hose will need to be secured in the middle of the rope. To do this, either a slip-over clove hitch or a slipknot can be used (Figure 18 and Figure 19).



Figure 18



Figure 19

- 6.11 When the hose is secured, the rope is hoisted up. The engine officer may start this process, but either the nozzle or back-up firefighter should make their way to the drop point as soon as possible to hoist the hose up. Enough hose will need to be hoisted to reach and cover the fire area.
- 6.12 When available, a hose roller can be used to help hoist the hose. This will remove the friction of pulling the hose over the window or roof edge. The hose roller is placed over the window sill (or roof edge) and serves as a channel through which hose is pulled, allowing it to roll smoothly over the edge. When the hose roller is used, the attached rope should be properly secured with a substantial object knot.
- 6.13 One member should stay at ground level to ensure enough hose is available below the drop point to allow for a smooth and complete stretch (Figure 20).



Figure 20

- 6.14 Once sufficient hose has been hoisted into the window (or onto the roof), the hose must be properly secured. This should be done directly below a hose coupling. Generally, a hose strap secured to a substantial object inside the building will effectively secure the hose.
- 6.15 At higher elevations, the increased weight of the hose may make it necessary to use a rolling hitch to secure the hose. The rolling hitch is used when the weight of the line hanging vertically is heavy enough to cause the hose to kink when a hose strap is used. The width of the rolling hitch (wrapped 4 times around the hose) prevents such kinking. When used, the rolling hitch must be properly tied directly below a hose coupling and properly placed in a vertical position outside the window. It is anchored with a substantial object knot inside the building.
- 6.16 Once the line is secured, the nozzle and back-up firefighters will stretch and flake out their hose for fire attack, as described in *The Backstep* page 35.

7. WRAP-AROUND STRETCH

- 7.1 When stretching up a wrap-around stairway, the technique used needs to be modified somewhat from the traditional stairway stretch. Due to the additional turns in the stairway and limited visibility, these stretches are more time consuming, demand greater coordination, and require additional hose.
- 7.2 These stairways require 4 turns to be made for each floor, which is twice as many as typical return stairways. In addition to being obstacles themselves, the added turns demand more hose per floor. Instead of a single length per floor, a more accurate estimate would be 1 ½ lengths per floor for a wrap-around stretch.
- 7.3 Commonly, wrap-around stairways are located around an elevator shaft. This further complicates the stretch by hampering communication between members on the line. The solid walls of the elevator shaft eliminate visibility between members on different floors and make verbal communication difficult.
- 7.4 The keys to this stretch are adopting a methodical pace and keeping the lead lengths intact for deployment on the fire floor. The numerous turns on the staircase will invariably catch on the hose and stop forward progress. When this happens, stretching members may need to put down their length (without deploying it) and go back down the stairs to help move the line forward. This is especially true for the back-up firefighter, but it may be necessary for the nozzle firefighter as well.
- 7.5 After the line has been advanced on the floors below, the back-up (and possibly the nozzle) firefighter should return to their folds, pick them back up, and continue the stretch without prematurely deploying their lengths.
- 7.6 To minimize the incidence of the hoseline being caught on the wrap-around turns, both the nozzle and back-up firefighters should carry their lengths in their outside arms and make their turns around the elevator shaft as wide as possible. This will allow the stretch to progress as far as possible before the hose becomes caught up on the turns of the staircase.
- 7.7 A technique that is effective in maintaining the methodical pace necessary to minimize hose being caught up is to use visual contact between members to execute the stretch one turn at a time. This is accomplished as follows:

- 7.7.1 The nozzle firefighter climbs the stairs to the first turn, at which point they turn back to make visual contact with the back-up firefighter (Figure 21).



Figure 21

- 7.7.2 Once they make visual contact, the nozzle firefighter proceeds to the next turn and waits there until they can make visual contact with the back-up firefighter again (Figure 22).



Figure 22

- 7.7.3 The back-up firefighter does the same (Figure 23); they await visual contact from the next member in the stretch below them (this may be the door firefighter, control firefighter, or the 2nd due nozzle firefighter).



Figure 23

- 7.7.4 If there is no one there, they may have to go back and lighten up on the line themselves (if necessary). If another member is in the stretch, the back-up only moves forward when they have visual contact with them.
- 7.8 By using this technique, the pace of advancement is driven by the back of the hoseline, which ensures methodical, but steady progress as hose becomes available and prevents the nozzle and back-up firefighters from prematurely deploying their lengths.
- 7.9 Once the fire floor is reached, the nozzle and back-up firefighters will flake out their line and prepare for fire attack as described in *The Backstep* page 35.

8. FIRE ESCAPE STRETCH

- 8.1 When stretching a hoseline up a fire escape, the hose is not stretched up the fire escape in the same manner as a stairway; rather the line is stretched vertically, brought in over the side, and secured with a hose strap.
- 8.2 To execute this stretch, members can use a six-foot hook to pass the hoseline up the exterior of the fire escape. As an alternative, a rope stretch may be executed, as described in the previous section.

- 8.3 Initially, the hose is stretched to an area near the fire escape drop ladder. Once the hose is available below the fire escape, one member will climb to the second floor of the fire escape and wait for the line to be passed to them.
- 8.4 Using an inverted six-foot hook to hold the shut-off handle of the nozzle (Figure 24), the line will be passed up to the member on the fire escape. As this is happening, another member will climb to the 3rd floor of the fire escape. Once there, the hook will be used to pass the line up to them (Figure 25). This procedure will continue until the floor below the fire is reached.

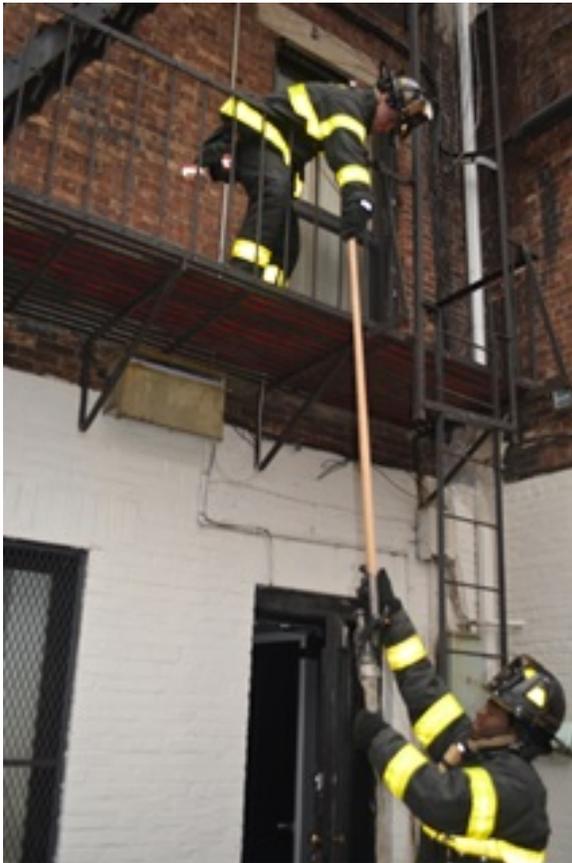


Figure 24

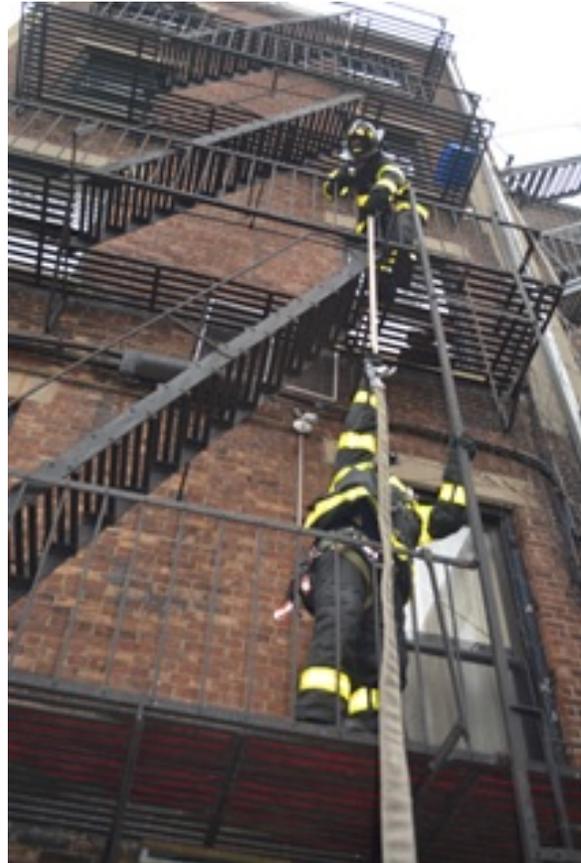


Figure 25

- 8.5 On the floor below the fire, the member receiving the hoseline will pull up sufficient hose to reach and cover the fire area. The hose will then be secured with a hose strap to the fire escape railing. This one hose strap will effectively secure the hose; additional hose straps are not necessary.
- 8.6 If the hoseline is to be stretched directly to the fire floor by way of the fire escape, the necessary hose needs to be flaked out on the fire escape balcony on the floor below. This would occur if the line was to be charged outside the building (on the fire escape) and the fire attack made via the window.

8.7 If the hoseline is to be stretched to the fire floor by way of the interior stairs from the floor below the fire, then the line will be brought in the window on the floor below and stretched to the fire area via the stairs.

9. AERIAL LADDER STRETCH

9.1 Using an aerial ladder is an additional option for stretching hose to a roof, upper floor window, or other elevated position. The hoseline may be stretched to the desired location via the aerial ladder or the hoseline may be operated from the aerial ladder itself.

9.2 Stretching a handline up an aerial ladder requires that the aerial not move during the stretch or throughout the operation of the hoseline.

9.3 The engine officer should proceed to the elevated location via the aerial ladder.

9.4 The hoseline is stretched to the area near the turntable of the aerial apparatus and is placed neatly on the ground. The back-up firefighter should be sure not to place their hose on top of the nozzle firefighter's hose. Enough hose to complete the stretch should be brought to this point.

9.5 The nozzle firefighter will leave their length on the ground and carry the nozzle with them as they climb the aerial with the hose playing out behind them. The hose is carried under the left arm (Figure 26) and the nozzle is draped upward across the front of their torso and back over their right shoulder (Figure 27). This technique will allow the hose to advance smoothly and prevents the nozzle from being caught in the rungs as the nozzle firefighter keeps both hands on the rails of the ladder.



Figure 26



Figure 27

- 9.6 Once the nozzle firefighter has reached the destination, they should momentarily pass the nozzle to the engine officer, allowing them to safely dismount the aerial. Once off the aerial ladder, the nozzle firefighter pulls sufficient hose onto the roof (or into the building).
- 9.7 As the nozzle firefighter climbs the aerial, the back-up firefighter climbs the ladder behind them, advancing hose as they climb. The hose should be maintained on the left side of the aerial ladder.
- 9.8 Initially, the control firefighter should guide hose onto the aerial from the position on the ground. When there is a member available to guide hose (possibly the 2nd due nozzle firefighter), the control firefighter should climb the aerial and advance hose behind the back-up firefighter.
- 9.9 Once the nozzle firefighter has dismounted the aerial and begins to pull hose into the building or onto the roof, the members on the aerial will advance hose from a stationary position on the ladder, keeping the hose on the left side of the ladder. Before doing this, members on the aerial must clip the hook of their personal harness to the rungs of the aerial ladder.
- 9.10 When sufficient hose has been stretched, a hose strap is used to secure the hoseline to a rung of the aerial ladder at the window or roof level. Once secured, all members on the aerial will complete the ascent up the ladder and proceed to the point of operation.
- 9.11 The engine officer will wait until all of the firefighters are off the aerial before calling for water in the line. The line should be charged gradually.
- 9.12 When firefighters are going to operate the hoseline from a position on the aerial ladder, all members must have the hooks of their personal harness clipped to the rungs of the ladder. A hose strap must be used to secure the line in the vicinity of the nozzle firefighter.

10. PORTABLE LADDER STRETCH

- 10.1 A portable ladder is an additional option for stretching hose to a roof, upper floor window, or other elevated position.
- 10.2 Hose may also be advanced up portable ladders to access difficult-to-reach places to extinguish fire (such as attic fires or mezzanine areas fires).
- 10.3 When using a portable ladder, the hoseline may be either stretched dry and charged once in position, or it may be advanced up the ladder while charged.
- 10.4 When the line is to be stretched dry up the portable ladder, the technique will be similar to the aerial ladder evolution. The engine officer should proceed to the location to which the hoseline will be stretched. This may be by way of the portable ladder, or other route, if more practical.

- 10.5 Enough hose to complete the stretch should be stretched to the base of the portable ladder. The nozzle firefighter will climb the ladder with the hose under the left arm and the nozzle is draped upward across the front of their torso and back over their right shoulder. This technique will allow the hose to advance smoothly and prevents the nozzle from being caught in the rungs as the nozzle firefighter keeps both hands on the rails of the ladder. The hose is maintained on the left side of the ladder to facilitate a smooth advance.
- 10.6 Once the nozzle firefighter has reached the destination, they should momentarily pass the nozzle to the engine officer, allowing them to safely dismount the portable ladder. Once off the ladder, the nozzle firefighter pulls sufficient hose onto the roof (or into the building). When sufficient hose is stretched, the hose is secured to a substantial object using a hose strap.
- 10.7 The back-up firefighter will feed hoseline to the nozzle firefighter from a position on the ground at the base of the ladder. Once sufficient hose has been advanced, the back-up will climb the ladder and assist the nozzle firefighter in flaking out the line.
- 10.8 When a charged hoseline is advanced up a portable ladder, the nozzle firefighter should carry the hose in their left hand and the hose should be maintained on the left side of the ladder.
- 10.9 When the nozzle firefighter is to operate the hoseline from a position on the portable ladder, they should clip the hook of their personal harness to a rung of the ladder and the base of the ladder must be secured.
11. **Cockloft nozzle stretch**—see Addendum 1, page 87 for a complete discussion.

THIS PAGE WAS INTENTIONALLY LEFT BLANK



COCKLOFT NOZZLE

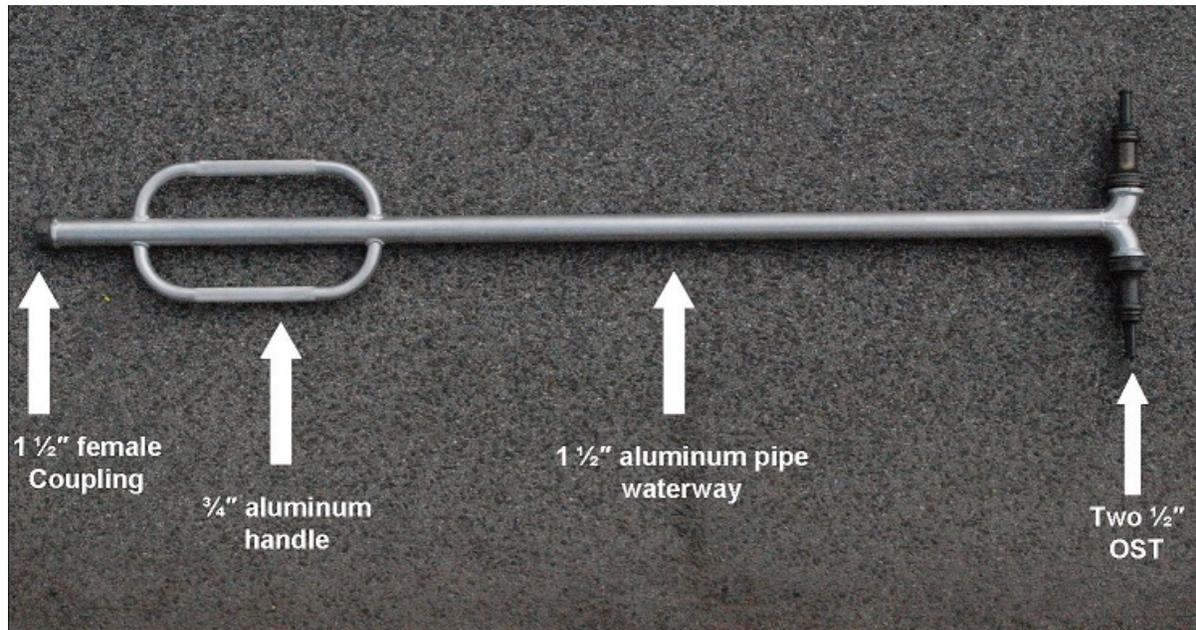


Figure 1

1. DESCRIPTION

FDNY Designation:	Cockloft Nozzle (Figure 1)
Material:	Waterway—1 1/2" Diameter Aluminum Pipe
Length:	6' 3" (overall)
Width:	10"
Weight:	Approx 10 lb
Misc:	1 1/2" male threaded ends receive 15/16" Main Stream Tips (MST) to which 1/2" Outer Stream Tips (OST) are connect.

- 1.1 The cockloft nozzle is a 6' 3" aluminum pipe with two 1/2" OSTs. Attached to the body is a 3/4" aluminum handle allowing members control during operation.
- 1.2 The cockloft nozzle has a 1 1/2" female coupling at one end which connects directly to any controlling nozzle shut-off. After removing the MST from the shut-off, members then connect the 1 1/2" female coupling of the cockloft nozzle to the shut-off.
- 1.3 The other end has two 1/2" OST's. The configuration of these two 1/2" OST's eliminates backpressure. These two OST's should not be removed when the nozzle is being used to extinguish fire in a horizontal area like a cockloft. The design of the OST's enables the stream to reach in excess of 60 feet. (Figure 1)



Figure 2

2. INTRODUCTION

- 2.1 The cockloft nozzle (Figure 2) is a versatile tool that has proven extremely effective in applying water into a narrow, confined area (such as a cockloft). It is primarily designed for use at cockloft fires but may be used in other situations. It is carried by all Divisions and Squad companies, as well as select engines that carry a combination nozzle. Any Engine company can be tasked with placing it into operation.
- 2.2 When the cockloft nozzle is being used to extinguish fire in a cockloft, the nozzle may be placed above the ceiling on the top floor of a building or inverted and lowered into the cockloft area from the roof of the building.
- 2.3 The cockloft nozzle may also be used to extinguish fire vertically inside of a building (in a vertical shaft) or vertically on the outside of a building (for an EFIS fire) by placing the nozzle so that the OST's are in a vertical position. When used in a vertical application to extinguish fire above, the ½" OST facing downward may be removed and capped with a shut-off, if deemed necessary. This is the only time the ½" OST may be removed.
- 2.4 The design of the cockloft nozzle greatly minimizes the introduction of air into the confined area of the cockloft, often maintaining the fire in a ventilation limited state.

3. COCKLOFT NOZZLE USE

- 3.1 To place the cockloft nozzle into operation, a hoseline is needed at the point of operation. This may be an existing handline already in place that is converted to a cockloft nozzle operation, or an additional handline that is stretched and dedicated to operate the nozzle.
- 3.2 Members should be mindful that only two hoselines may be stretched up an interior stairway, so an alternative means of stretching may be necessary.
- 3.3 An 1 ¾" or 2 ½" hoseline can be utilized to supply the cockloft nozzle. It should be supplied with a nozzle pressure of 50 psi and is capable of delivering 100 GPM.

- 3.4 The cockloft nozzle should be inserted into the cockloft between the joists (Figure 3 and Figure 4). Operating members shall alternate the direction of the stream by rotating the nozzle 90 degrees and returning the nozzle to its original position to provide maximum coverage. Do not rotate the cockloft nozzle in a continuous counter-clockwise direction; this action may cause the nozzle to become unscrewed from the shut-off.



Figure 3



Figure 4

- 3.5 The cockloft nozzle may be placed into operation for fires in the cockloft areas of taxpayers, row frames, and NFP multiple dwellings like H-types. When deemed necessary, a separate, conventional protection line should be stretched, charged, and in the area of operation before the cockloft nozzle is used on a separate handline.
- 3.6 This is especially important when members are operating the cockloft nozzle in an area where ceilings may blow down or fire extension may trap members. These events have greater potential at top floor operations in H-type or similar buildings, even when members are operating in another wing.
- 3.7 There are times when the cockloft nozzle may be needed in an exposure, like a Row Frame building, as a precaution or to prevent extension, and the conditions are such that a protection line is not initially necessary during its operation.
- 3.8 Only the IC (or Sector Chief), should determine when to place the cockloft nozzle into operation, and when to shut it down. The IC and / or Sector Supervisors must use judgment based on existing conditions to determine when it is safe to operate without a protection line, bearing in mind that conditions may change.
- 3.9 The operation of the cockloft nozzle should be supervised by a Chief Officer.

- 3.10 The cockloft nozzle is generally placed into operation on the top floor of a building for use in the cockloft area above the ceiling. It may also be lowered into the cockloft from the roof of the building, when the roof is deemed safe to operate on. The Incident Commander and / or Sector Supervisors must determine which is the best location (top floor or the roof) to operate from.
- 3.11 Operating from the roof is a particularly useful tactic when there are high ceilings or difficult ceilings to pull, which often occurs at taxpayer fires. Operating from the roof may sometimes provide the opportunity for a quicker stretch and safer operation at residential building fires, depending on the existing conditions.
- 3.12 Ideally, when operating from the roof, members should begin nozzle operation from an inspection hole where fire is not venting and move toward the area of origin as conditions permit.
- 3.13 If members are operating without a separate, additional protection line, they should operate as follows
 - 3.13.1 A hoseline with a conventional nozzle should be stretched and charged in case it is needed while members are opening up the ceiling area where the cockloft nozzle will operate.
 - 3.13.2 In non-fireproof multiple dwellings, the area immediately inside the apartment door offers an extra degree of protection provided by the public hallway. This option should be employed when fire conditions dictate.
 - 3.13.3 Members should then open up an area in the ceiling into which the cockloft nozzle will be placed for operation. The hole should initially be limited in size, but large enough for the cockloft nozzle to fit into. Additional holes may need to be made to use the nozzle at different locations.
 - 3.13.4 If fire shows while opening up the ceiling, the fire should be knocked down by the hose line with the conventional nozzle. The MST should then be removed from the hose line and the female coupling of the cockloft nozzle connected directly to the shut-off of the charged line.
 - 3.13.5 The cockloft nozzle should then be placed into the opening, the shut-off handle opened, and the nozzle operated to extinguish fire in the cockloft.
 - 3.13.6 The nozzle should be maintained upright and alternately rotated 90 degrees and then back to its original position, allowing water to be distributed in all directions in the cockloft.
- 3.14 The use of the cockloft nozzle does NOT eliminate the need of pulling ceilings for final extinguishment and washdown.

- 3.15 Firewalls, division walls, nogging and other impediments may require the repositioning of the cockloft nozzle into several different areas to obtain final extinguishment.

THIS PAGE WAS INTENTINALLY LEFT BLANK



STANDPIPE OPERATIONS

1. OVERVIEW OF STANDPIPE SYSTEMS

- 1.1 In New York City, standpipes can be found in a wide range of buildings containing various occupancies. Standpipe systems can be found in the following locations:
 - 1.1.1 High Rise Buildings (over 75 feet)
 - 1.1.2 Hospitals, Warehouses, and Industrial Buildings
 - 1.1.3 Enclosed Shopping Malls
 - 1.1.4 Parking Garages
 - 1.1.5 Theaters, Stadiums, and Arenas
 - 1.1.6 Bridges and Limited Access Highways
 - 1.1.7 Subway Stations and Tunnels
 - 1.1.8 Piers and Wharves
- 1.2 All required standpipes in NYC are compatible with FDNY equipment and can be used to provide FDNY hoselines with adequate water supply. Fire companies will use standard FDNY hose and other equipment when using any standpipe system.
- 1.3 Existing 1 ½” diameter occupant-use hose should not be used, except in rare cases where life is in immediate peril and a FDNY hoseline is unavailable. This situation would most likely occur when a ladder company or rescue company is operating without an engine company.

2. KEY CHARACTERISTICS OF STANDPIPE SYSTEMS

- 2.1 A more complete discussion of the types of standpipe systems that exist in NYC and their various features and components can be found in *Chapter 3: Engine Company Equipment*. This section will focus on several key practical characteristics of standpipe systems.
- 2.2 The primary practical concern for a standpipe system is the presence of water.
 - 2.2.1 A wet system is maintained with water in the system at all times. A dry system is maintained without any water under normal circumstances. Both wet and dry systems are supplied and used by the same procedure.

- 2.3 The presence of a fire pump is also an operational concern.
- 2.3.1 While many standpipe systems are equipped with a fire pump, it is common to find a building with a standpipe system, but no fire pump.
- 2.3.2 Fire pumps are designed to supply the standpipe system with sufficient pressure to operate as needed. Some fire pumps are manually operated, some operate automatically. Units must be aware of the buildings in their response area and what types of fire pump systems exist. Firefighting Procedures High Rise Office Buildings provides detailed information regarding fire pump operations.
- 2.4 The location of floor outlets within the system impacts firefighting operations.
- 2.4.1 Regardless of the type of standpipe system encountered, floor outlets can be found in a variety of locations within the area protected and there are important operational considerations unique to each location that could provide advantages or disadvantages in the execution of the stretch.
- 2.4.2 Floor outlets inside a stairway (Figure 1) provide direct access to that stairway, but can create a more complex stretch in the event a different stairway is selected for the fire attack.
- 2.4.3 Floor outlets in a public hallway (Figure 2) can provide more space in the proximity of the outlet to hook up and arrange the lengths of hose, though the floor outlet will not provide direct access to a stairway. However, floor outlets in the hallway can provide easier access to alternative stairways, which would simplify the stretch if a different stairway was used for attack.



Figure 1



Figure 2

- 2.4.4 Standpipe outlets in open areas can present a challenging situation, especially when located in non-residential occupancies, such as subway stations and parking garages. In these cases, the outlet may be located remote from the attack stairs.

3. SUPPLYING STANDPIPE SYSTEMS

- 3.1 Standpipe systems are supplied with 3 ½" hose. The only exception to this is when 3" high pressure hose is used to supply a standpipe system as part of the High-Pressure Pumping evolution.
- 3.2 Standpipe systems may be supplied through Fire Department Connections (FDC) and/or floor outlets. While the FDC is the primary consideration, the standpipe system can be supplied by way of a floor outlet as an alternative. This should be considered in the following situations:
 - 3.2.1 FDC is inoperable (due to vandalism, disrepair, or other damage)
 - 3.2.2 FDC is located remote from the hydrant to be used to supply the system and the floor outlets are more readily accessed from the apparatus
 - 3.2.3 It is necessary to augment the system and there is no available FDC (all FDC are already being supplied)
- 3.3 When a building is equipped with both a standpipe system and automatic sprinklers, the first supply line should supply the standpipe system. If the first arriving engine is supplying both the standpipe and sprinkler systems, later arriving engine companies should stretch additional lines to augment both systems.
- 3.4 When the building being supplied is part of an interconnected building system, one building will have a gravity tank on the roof which supplies water to that building and the other interconnected buildings. These interconnected buildings have a Post Indicator Valve which is normally open to allow water supply into that building. The ECC should be aware of the possibility of a Post Indicator Valve (PIV) being closed to one of the other interconnected buildings. If the PIV is found closed, the ECC should notify the Engine Officer. A closed PIV in one of the interconnected building means that this structure is now isolated from the water supply coming from the building with the gravity tank. The standpipe in that interconnected building will have no access to a water source until the ECC supplies the building system. Until supplied by the ECC, the only water available will be the residual water in the standpipe riser itself. This water can quickly run out, which could place operating units in danger if the Engine Officer is unaware of the PIV closure.
- 3.5 Due to the possibility of a Post Indicator Valve (PIV) being closed, it is preferred that ECC's supply the FDC on the fire building when it will not result in any delay of water supply to the standpipe system.
- 3.6 When the building is equipped with an air pressurized standpipe, the pressurized air must be bled from the system before the system can be supplied with water. These systems are maintained dry and are used in buildings that are being demolished and in buildings under construction upon reaching a height of 75 feet. See *Addendum 3, page 125* for a complete description on the operations at buildings with Air-Pressurized Standpipe Systems.

3.7 Supply via Fire Department Connection (FDC)

- 3.7.1 To supply the standpipe system via the FDC, the male end of a 3 ½” hoseline should be stretched to the FDC and connected. Depending on the orientation of the 3 ½” hose on the apparatus, a double male fitting may be needed.
- 3.7.2 FDC are color coded for ease of identification (Figure 3). Either the caps or the entire FDC may be painted. The color of the connections are as follows:
- A. Red = standpipe system
 - B. Yellow = combination system (sprinkler/standpipe)
 - C. Green = automatic sprinkler system
 - D. Aluminum = non-automatic sprinkler system or perforated pipe



Figure 3

- 3.7.3 When any part of the system is out of service (OOS), the FDC will have a colored disc attached to indicate the serviceability of the system. The color coding is as follows:
- A. White disc = system fully OOS
 - B. Blue disc = system partially OOS
- 3.7.4 Whenever possible, a second apparatus should hook up to an available FDC and be prepared to augment water supply, if needed.

3.8 Supply via a floor outlet

- 3.8.1 If a standpipe system is to be supplied via a floor outlet, proper fittings must be employed to attach the 3 ½" supply hose to the 2 ½" outlet threads.
- 3.8.2 If a pressure reducing/restricting device (PRD) is found on a floor outlet, it should be removed, if possible. If the PRD cannot be removed, the outlet may still be used, so long as sufficient water can be supplied. The ECC should notify the Engine Officer if an outlet with a PRD is being supplied.
- 3.8.3 When supplying water to a floor outlet, it is important to keep the outlet valve closed until water is supplied to the outlet via the supply hose. If the outlet is opened prematurely, the water supply on the fire floor may be severely impacted.
- 3.8.4 To facilitate this operation, the company commander may consider carrying a designated "ECC standpipe kit" on the apparatus. Such a kit should include:
 - A. Necessary fittings (i.e. double female, 3 ½" to 2 ½" reducer)
 - B. Pipe wrench
 - C. Spanners
 - D. Chocks
 - E. Adapter

4. SELECTING THE STANDPIPE OUTLET

- 4.1 It is the responsibility of the Engine Officer to select the floor outlet to be used. This decision should be based on the consideration of a number of criteria, including:
 - 4.1.1 Proximity to fire area
 - 4.1.2 Proximity to attack stairs
 - 4.1.3 Operability of outlet
 - 4.1.4 Outlet is located in a protected area
- 4.2 The selected floor outlet should be located on a floor below the fire. This will ensure the outlet is in a protected, smoke free-area. Primary consideration should be given to using an outlet on the floor immediately below the fire. This will minimize the length of the stretch and facilitate verbal communication between the fire floor and the floor outlet.
- 4.3 The selected floor outlet can be located on any floor below the fire. Generally, the outlet on the floor below the fire will be used, but it may be necessary to use a more distant floor due to an unserviceable outlet on the floor below the fire in a building with a single standpipe riser. A more distant outlet may also be used if it will facilitate an easier stretch due to unique building characteristics (e.g. unusual stairway layout, duplex apartments, etc.)

- 4.4 In rare cases, using the floor outlet on the same floor as the fire may be permissible due to unusual building characteristics. This would require approval from the Division Commander. A CIDS entry is mandated in these situations. An example of this is where the stretch of the handline from the floor outlet to the fire apartment entrance is via an exterior, open air balcony, and stretching from the fire floor allows the fire apartment to be reached with 3 lengths of hose.
- 4.5 Selecting a floor outlet on the same level of the fire may also be necessary in non-residential structures with standpipe systems, such as parking garages, subway stations, or large industrial occupancies. This would require approval from the Division Commander. A CIDS entry is mandated in these situations.
- 4.6 Once selected, the engine officer should clearly communicate the floor outlet to be used to the members of their company. This can be visually communicated, or may be communicated verbally, either by handie-talkie transmission or face-to-face.
- 4.7 If the control firefighter finds a problem with the selected floor outlet and needs to move to a different outlet, the engine officer should be immediately informed. The engine officer should also ensure the 2nd due engine is aware of the new outlet, so they can assist with the stretch. If scissor stairs are used, it may be easier to move to an outlet two floors away, as this would likely be shorter than having to stretch from the opposite staircase if the immediate floor below is used.
- 4.8 If a floor outlet has a Pressure Reducing Device (PRD) attached, it should be removed, if possible. If it cannot be removed, the outlet can still be used to supply the hoseline, so long as sufficient pressure can be achieved. The Engine Officer should be notified that the outlet being used has a PRD attached.
- 4.9 If a floor outlet has a Pressure Reducing Valve (PRV) attached, it will not be removable. As long as sufficient pressure can be achieved, the outlet can still be used to supply the hoseline. The purpose of a PRV is to supply the appropriate pressure to the floor on which it is located under the operation of the building fire pump, so sufficient pressure at the outlet can be expected. The Engine Officer should be notified that the outlet being used has a PRV attached.

5. SUPPLYING THE HOSELINE

- 5.1 The 1st due control firefighter is responsible for supplying water to the first hoseline from the selected floor outlet. They shall remain at the floor outlet throughout the operation and communicate with the Engine Officer to ensure that adequate pressure is supplied to the nozzle.
- 5.2 Upon arriving at the selected outlet, the control firefighter should open the outlet and flush it thoroughly. This is to confirm a water supply is available and to clear the outlet of any possible obstructions to water flow. After confirming the availability of water, the control firefighter should connect the in-line pressure gauge and the hoseline to be supplied. The in-line pressure gauge is used to ensure the correct pressure is supplied to the hoseline.
- 5.3 For the most common standpipe hose stretches, the control firefighter should supply hoselines supplied from an outlet on the floor below the fire as follows:
 - 5.3.1 Residential 3 length stretch (2" lead length) = 80 psi
(two lengths 2 ½" hose, one length 2" hose, nozzle with 1" tip)
 - 5.3.2 Commercial or residential 3 length stretch (2 ½" lead length) = 70 psi
(three lengths 2 ½" hose, nozzle with 1 1/8" tip)
- 5.4 These standard pressures are calculated based on the guidelines of "street hydraulics" and are explained as follows:
 - 5.4.1 A residential 3 length stretch from the floor below the fire has 2 lengths of 2 ½" lightweight hose (5 psi each = 10 psi total), 1 length of 2" lightweight hose (10 psi), 1 floor of elevation (5 psi) and 55 psi at the 1" tip of the nozzle. This adds up to the target outlet pressure of 80 psi and provides 220 GPM.
 - 5.4.2 The 1" tip of the nozzle is supplied with 55 psi, which is above the minimum recommended nozzle pressure of 50 psi. This additional pressure is added to minimize the likelihood of kinking in the hose.
 - 5.4.3 A commercial 3 length stretch from the floor below the fire has 3 lengths of lightweight 2 ½" hose (5 psi each = 15 psi total), 1 floor of elevation (5 psi) and 50 psi at the 1 1/8" tip of the nozzle. This adds up to the target outlet pressure of 70 psi and provides 265 GPM.
 - 5.4.4 Since the 2 ½" lead length will be stretched primarily for commercial occupancies, which may involve a large, open floor space with a potential for a heavy fire load, the 2 ½" nozzle should be supplied with 50 psi at the tip. This is to enable the full reach of the stream to be used and to achieve the maximum available flow from the standpipe system.

- 5.4.5 If additional lengths of hose are required for a standpipe stretch, the control firefighter should supply an additional 5 psi for every length of 2 ½” hose added.
- 5.4.6 If the hoseline will be stretched from further than 1 floor away, the control firefighter should supply an additional 5 psi for every additional floor of elevation needed.
- 5.5 Pressures at the outlet should be set while water is flowing at the nozzle. When the nozzle is shut, the gauge will read the static pressure (the pressure when water is not flowing) in the hoseline, which will be higher than the actual operating pressure. In order to properly set the operating pressure, the nozzle firefighter must use a “long bleed” and bleed the line for long enough to allow the control firefighter to adjust the pressure accordingly. The long bleed is essential to ensure the proper pressure is set.
- 5.6 Operating pressure is adjusted by use of the operating wheel at the floor outlet and by observing the in-line pressure gauge. If there is no valve wheel attached to the standpipe outlet, a substitute tool can be used. Such options include a pipe wrench, vise grips, or a removable operating wheel carried in the standpipe kit.
- 5.7 The Control firefighter should be aware that a properly supplied hoseline may exceed the Hi-Flow alarm of the digital pressure gauge (which alarms when flow exceeds 250 GPM). This activation does not necessary indicate a problem with water supply. If doubt exists as to the accuracy of the supply pressure reading, the Control Firefighter can communicate directly with the Engine Officer to confirm that sufficient pressure is supplied to the hoseline.

6. STANDPIPE KIT

- 6.1 The control firefighter carries the standpipe kit. This ensures the control firefighter is in possession of all the equipment necessary to secure a water source at the standpipe outlet.
- 6.2 The standpipe kit is required to include the following equipment (Figure 4):
 - 6.2.1 2 ½” in-line pressure gauge
 - 6.2.2 Pipe wrench (18 inch)
 - 6.2.3 Spanner wrenches
 - 6.2.4 Chocks
 - 6.2.5 2 ½” nozzle with 1 1/8” MST
 - 6.2.6 1 ½” to 2 ½” increaser
 - 6.2.7 Adapters (National Standard thread and/or National Pipe thread to FDNY thread)



Figure 4

- 6.3 The following equipment may be included in the standpipe kit as deemed beneficial by the Company Commander, but are not required, as some are not provided by the FDNY:
 - 6.3.1 Spare operating wheels (to be used if wheel is missing)
 - 6.3.2 Mallet (to help remove tightened caps)
 - 6.3.3 Vice grips (to be used as an alternative to the pipe wrench)

6.3.4 Wire brush (to be used to remove paint or debris from outlet threads)

6.3.5 Fog tip (to be used to vent the fire area during overhaul)

6.3.6 Single gate (to ease operation of difficult to operate outlets)

7. STRETCHING HOSELINES FROM THE APPARATUS

7.1 The presence of a standpipe system does not mandate engine companies to use the standpipe to supply their hoselines. The Engine Officer may elect to stretch their hoseline from the apparatus as an alternative to using the standpipe system. When making this decision, the Engine Officer should consider a number of factors, including:

7.1.1 condition of the standpipe system

7.1.2 proximity of the apparatus to the building

7.1.3 location and type of stairway to be used for the attack

7.1.4 length and ease of the stretch

7.2 The 1st due Engine Officer must ensure the 2nd arriving engine company is aware of their decision to stretch from the apparatus, as they will need to assist the 1st arriving company with the stretch and will not require their standpipe equipment.

7.3 Additional hoselines may be similarly stretched from the apparatus, as determined by the Engine Officer of the unit stretching the hoseline and are not required to be stretched in the same fashion as the first line. For example, if the first line uses the standpipe, the second line may be stretched from the apparatus, as determined by the Engine Officer of the company stretching the line.

7.4 Selecting attack stairway

- 7.4.1 All hoselines should be stretched from the attack stairway and all access to the fire floor should be made by way of the attack stairway. This is in an attempt to keep all other stairways free of smoke. All stairways, other than the attack stairway, can be considered evacuation stairways.
- 7.4.2 The attack stairway does not need to be the stairway closest to the floor outlet. The stairway selected should allow for the most efficient stretch possible, with the goal of minimizing the length of the stretch, while allowing for an efficient advance on the fire floor. The selection should be made by the Engine Officer, in consideration of the following criteria:
- A. Proximity of the stairway to the fire area on the fire floor
 - B. Proximity of the stairway to the floor outlet on the floor from which the hoseline is being supplied
 - C. Type of stairway used
 - D. Conditions on the fire floor
- 7.4.3 The Engine Officer is responsible for selecting the attack stairway. Once selected, the IC must be informed of the identity of the attack stairway and operations should be coordinated with the ladder companies operating on the fire floor.
- 7.4.4 The Engine Officer should be sure of the location of the fire before committing to an attack stairway. This is especially important in situations involving a large area and multiple stairway options, such as in commercial high-rise buildings or open areas, such as parking garages. In these situations, a stretch of at least 4 lengths should be anticipated, which may require hose from the 2nd due engine company.
- 7.4.5 The type of stairway used should be a key consideration when selecting the attack stairway. Certain characteristics of various stairway types may allow for a more efficient stretch, as follows:
- A. If available, an enclosed stairway should be used. Open stairways are more readily contaminated and should be avoided, if possible. However, if the building only has one enclosed stairway, the priority will be for the enclosed stairs to be used as an evacuation stairway and an open stairway would need to be used for the attack.
 - B. Return-type stairs offer several advantages as an attack stairway. The stairway door will be at the same location on each floor, which makes it possible to visualize the path of line advancement on the fire floor by using the layout of the floor below the fire. Also, return-type stairs often have half-landings, which can provide an ideal location to flake out the hoseline. This can be helpful when the public hallway is contaminated and the hoseline needs to be charged inside the stairway.

- C. Scissor stairs are effective as an attack stairway, but may introduce an element of complication, as their orientation will vary from floor to floor. It is important to remain aware that the orientation of the attack stairway door on the fire floor will be on the “opposite side” of the scissor stairs on the floor below the fire.
- D. When using scissor stairs, consider using the stairway that provides the best access to the fire area on the fire floor, even if it is further from the standpipe outlet on the floor below the fire. This would require stretching from the floor outlet to the selected attack stairway on the floor below the fire.
- E. If the floor outlet is located inside a scissor stairway, stretching to the opposite stairway on the floor below the fire will involve additional turns and potential pinch points, as the line will have to be stretched out of the stairway, down the hall, and back into the opposite stairway. As a result, the hoseline will go through at least three stairway doors when using the opposite stairway, instead of just one.
- F. In this situation, another method to stretch the line via the opposite stairway is to hook up to the floor outlet 2 floors below the fire. By doing this, the outlet will be located inside the desired attack stairway and the hose need not be stretched around on the floor below. Instead, the hose will remain inside the stairway and be stretched straight up two floors. While the outlet is a floor further away, the total amount of hose used may actually be less and the additional turns and pinch points will be eliminated.

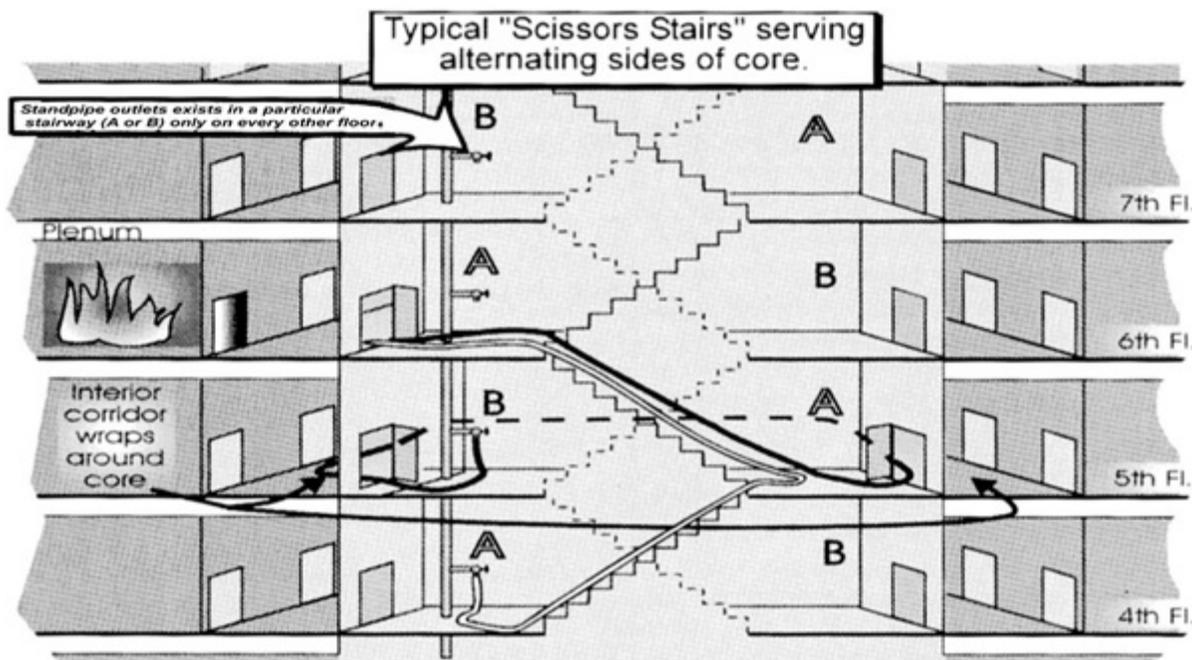


Figure 5

7.5 Estimating the stretch(Figure 5)

- 7.5.1 In a standpipe stretch, the engine officer needs to estimate the length from the standpipe outlet to the fire area in order to determine if a standard 3-length stretch will be long enough to reach the fire area.
- 7.5.2 When estimating the length of the stretch, the officer must remember that the nozzle firefighter's length is designated to be used inside the fire apartment itself and should not be included in the estimation. Consequently, the distance between the standpipe outlet and the fire area must be covered using only two lengths. This means that if the fire area is more than 100 feet away from the standpipe outlet, a 4th length will need to be added to the stretch.
- 7.5.3 The officer must be sure to estimate using the actual path the hoseline will travel. This includes ensuring the right attack stair is considered. Also, the officer must be sure to consider the vertical distance travelled, especially if a floor outlet is used on a more distant floor.
- 7.5.4 If the officer finds that a 4th length will be needed, they must notify the control firefighter and second engine that an extra length of hose will be needed for the stretch.

7.6 Stretching the 1st hoseline

- 7.6.1 The 1st due engine and the 2nd due engine will work together to stretch the first hoseline from the selected standpipe outlet to the fire area by way of the designated attack stairway.
- 7.6.2 When using the standpipe system in a commercial occupancy, all hoselines stretched from the outlet will be 2 ½". In a residential occupancy, hoselines stretched from the outlet may have a lead length of 2" hose. 1 ¾" hose must not be stretched from a standpipe outlet. The larger diameter hose is required for the purpose of minimizing friction loss in the hose and maximizing water flow from the standpipe system.
- 7.6.3 In residential occupancies, the lead length will typically be 2" hose. However, a lead length of 2 ½" hose should be considered instead in situations in which adequate pressure may not be immediately available from the standpipe outlet. Such situations may include an outlet with a PRV or a building in which the ECC will be delayed in supplying the FDC due to difficulties accessing the FDC or securing a hydrant. In these situations, the larger diameter of the 2 ½" hose will allow for better performance at lower supply pressures.

- 7.6.4 Each firefighter will bring one length of lightweight hose, folded into a roll-up. The nozzle firefighter will have a nozzle attached to their length. The roll-up is oriented such that the midpoint of the length is located directly beneath the hose couplings. This will ensure the hose is easily deployed. The midpoint is indicated with a red marking.
- 7.6.5 For most residential occupancies, lightweight hose will be used as follows:
- A. The nozzle firefighter will bring one length of 2" lightweight hose with a nozzle that has a 1" tip attached. This hose has a friction loss of 10 psi per length. The midpoint of this length is indicated with red paint. This point is called the A-fold.
 - B. This nozzle should be supplied with 55 psi nozzle pressure, which will provide a flowrate of 220 GPM and a nozzle reaction of 85 lbs.
 - C. The Back-up and Control firefighters will each bring one length of 2 ½" lightweight hose, each of which will have a friction loss of 5 psi per length.
- 7.6.6 For commercial occupancies (and some residential occupancies), lightweight hose will be used as follows:
- A. The nozzle firefighter will bring one length of 2 ½" lightweight hose with a nozzle that has a 1 1/8" tip attached. The midpoint of this length is indicated with red paint.
 - B. This nozzle should be supplied with 50 psi nozzle pressure, which will provide a flowrate of 265 GPM and a nozzle reaction of 98 lbs.
 - C. The Back-up and Control firefighters will each bring one length of 2 ½" lightweight hose. All 2 ½" hose has a friction loss of 5 psi per length.
- 7.6.7 If the door to the fire area can be controlled, the 1st hoseline should be stretched to the door to the fire area, flaked out, and charged at that location. If the door to the fire area cannot be controlled and the public hall has become part of the fire area, the hoseline should be stretched to the stairway door, flaked out, and charged inside the stairway and public hallway on the floor below.
- 7.6.8 Flaking out and charging hose in the stairwell below the floor outlet would require the weight of the charged hose to be pulled back up the stairs in a stairwell. Additionally, the turns in the staircase create a greater opportunity for a kink to occur. In these situations, these stairway areas may also become very congested.
- 7.6.9 When charging a hoseline in the stairwell at the stairway door, the public hallway on the floor below the fire near the floor outlet provides an area where the hose may be more easily flaked out, and more easily advanced under these conditions.

- 7.6.10 All three roll-ups should be connected to each other (Figure 6) in close proximity to the standpipe outlet (in the stairway, or public hallway) and the control firefighter's length should be connected to the outlet. This will provide visual confirmation that the line is intact and connected to the outlet. The roll-ups should be arranged with the nozzle length closest to the direction of the stretch.



Figure 6

- 7.6.11 The nozzle firefighter should keep their length intact in a roll-up as they carry it to the point of operation. This will ensure the entire lead length of hose is available to be used inside fire apartment and will aid in flaking out the hose.
- 7.6.12 To facilitate the efficient stretching and flaking out of the hoseline, consider “splitting” the backup firefighter’s roll-up, as follows:
- A. The backup firefighter’s roll-up can be split into a “male” section and “female” section. The nozzle firefighter can then carry the male section of the backup roll-up in addition to their own roll-up (Figure 7). The nozzle firefighter would then be carrying roughly 75 feet of hose.



Figure 7

- B. As the nozzle firefighter approaches the fire area, they can drop the portion of the roll-up at an appropriate drop point (Figure 8 and Figure 9), while keeping the lead length intact in a roll-up, to be used in the fire area itself.



Figure 8

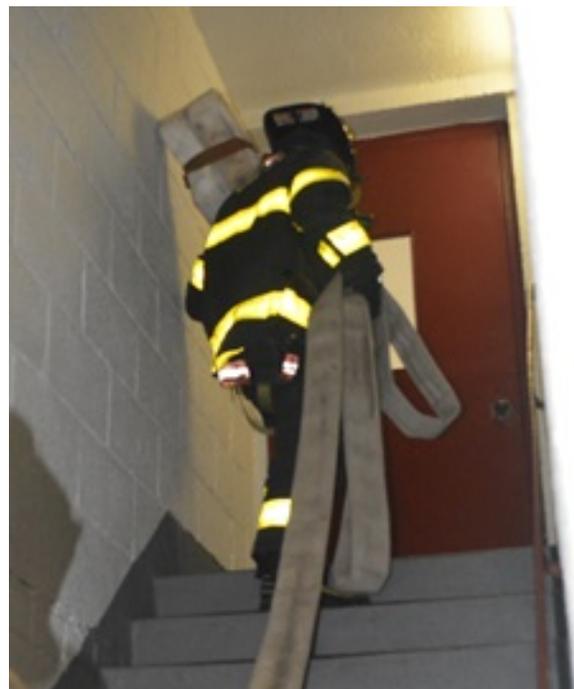


Figure 9

- C. The female section of the backup roll-up can be carried and flaked out by the backup firefighter, who is responsible for ensuring both the backup and control roll-ups are properly stretched and flaked out. The female section of the backup hose back can be similarly carried as necessary.
- D. If practical, the control roll-up can be similarly separated (Figure 10). The female section of the roll-up would connect to the outlet, while the male end could be carried by the backup firefighter to a drop point and flaked out.



Figure 10

- E. This technique allows the nozzle and backup firefighter to both carry sections of hose without being too close to each other, as their roll-ups will be coupled together and it would be impossible to carry both roll-ups intact while coupled.
- 7.6.13 The nozzle firefighter should carry their entire roll-up to the point of operation and flake out the line from that point. It is preferred that seat-belt buckles be removed from the roll-ups before leaving the protection of the stairway.
- A. The first fold of hose beneath the couplings is the midpoint of the length and can be used to flake out the line. This midpoint will be indicated with red paint. (Figure 11 and Figure 12) To flake out, grab the midpoint fold and walk or toss it away from the point of operation. This creates a large “U”, leaving the nozzle and first hose coupling at the point of operation.



Figure 11



Figure 12

- B. Depending on the length and complexity of the stretch, the back-up firefighter may be quickly available to help the nozzle firefighter flake their hose out (Figure 13 and Figure 14). In this case, the back-up firefighter can grab the midpoint of the nozzle length and flake it out by walking it away from the point of operation, allowing the nozzle firefighter to prepare for the attack.



Figure 13



Figure 14

- C. This “U” shaped configuration makes for a smooth advance into the fire area (Figure 15), as the nozzle team will only be pulling the weight of the first length as it pivots at the first coupling, instead of the weight of the entire charged hoseline.



Figure 15

- 7.6.14 If the hallway is part of the fire area, the line will need to be charged at the stairway door and the hose flaked out inside the stairway and the hallway on the floor below.
 - A. Standing inside the midpoint fold and walking it up the stairs (Figure 16) can effectively flake out the line. If possible, flake the line out up the stairs, so line advancement will be aided by gravity once the line is charged. The presence of a half-landing will be helpful and the line should be flaked out on the half-landing platform.

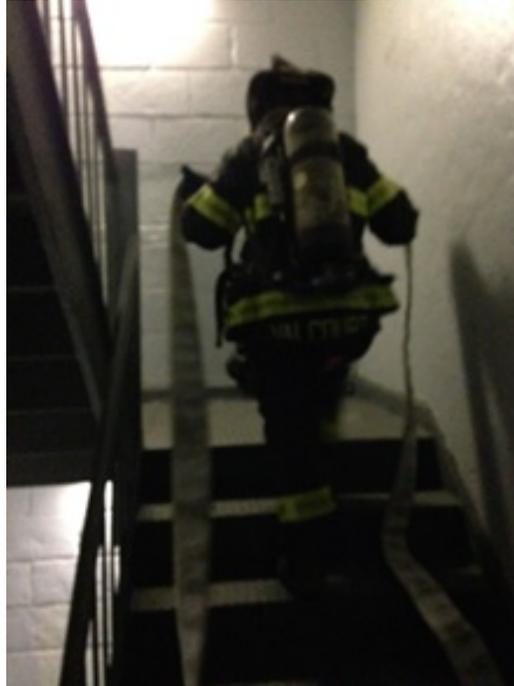


Figure 16

- B. If using a scissor staircase, the straight-run configuration of scissor stairs may prove more difficult, but the hose should be similarly stretched up to the next floor and flaked out on the landing (Figure 17). This may require more than one length of hose to be used on the stairway.



Figure 17



Figure 18

- C. When the line is charged at the stairway door, the nozzle side of the hoseline should be oriented on the outside wall of the stairway on the fire floor (Figure 18). This will reduce kinking and ease the advance of the charged hoseline.



Figure 19

- D. If more room is needed to flake out hose inside the stairway (Figure 19), it is preferred to use the hallway on the floor below rather than flaking hose down the stairs below the floor outlet.
- 7.6.15 As the nozzle firefighter is carrying their roll-up to the fire floor, the backup firefighter will flake out the 2nd and 3rd lengths of hose, allowing the nozzle firefighter to bring their entire length to the point of operation. When compatible with the building layout, the backup firefighter may carry a portion of their hose to a drop point closer to the fire area and flake their line out in a similar fashion to the nozzle firefighter. All doors should be chocked.
- 7.6.16 Once the hoseline is in position, the Engine Officer will communicate with the control firefighter to charge the line. The control firefighter will supply water and maintain adequate pressure in the line from the floor outlet.

- 7.6.17 As the line is being charged, the nozzle firefighter must “bleed the line” until the operating pressure is set.
- A. This allows air in the hoseline to escape and allows the control firefighter to set the proper operating pressure.
 - B. Allow the water entering the hoseline to reach the nozzle. The nozzle must be opened fully and carefully to ensure an accurate reading at the floor outlet while maintaining control of the line.
 - C. A “long bleed” may be necessary to allow the Control firefighter to set the proper operating pressure with water flowing. Keep the nozzle open until the Control firefighter has set the correct pressure.
 - D. If possible, avoid bleeding the line in the direction of the elevators and attempt to use the stairway or compactor chute. This will help prevent flooding in the elevator shafts in an attempt to keep all elevator cars in operation for firefighter use.
- 7.6.18 As the line is being charged, the backup firefighter should consider taking a temporary position at the stairway door on the fire floor. From this position, they can make sure the line does not become trapped beneath the stairway door as it is charged. As soon as the line is charged, the backup firefighter makes their way to the nozzle, removing any kinks or obstructions they encounter in the hoseline. By the time the nozzle firefighter finishes “bleeding” the nozzle, the backup firefighter should be in position behind them and ready to advance.
- 7.6.19 The Engine Officer must ensure sufficient pressure is available in the hoseline before committing to the fire area. Once the hoseline is properly charged and in position, the fire attack can begin.
- 7.6.20 The 2nd engine company will assist with stretching and operating the first hoseline. The 2nd Engine Officer should consider the type and length of stretch when deploying members to properly assist the first engine company.
- A. Since the 1st engine’s Control firefighter will remain positioned at the standpipe outlet, members of the 2nd engine will need to be properly positioned to assist the 1st engine’s nozzle team with their advance into the fire area.
 - B. The second engine officer must exercise proper judgment when deploying members to assist. The factors that must be considered include the status of water supply, the length of the stretch from the fire floor stairway door to the fire occupancy door, size of the fire occupancy, are there any turns in the hallway between the fire floor stairway door and the fire occupancy door, and is the first engine a four or five firefighter unit.
 - C. The second control firefighter should be positioned at the stairway door on the fire floor to ensure the hoseline does not become kinked or otherwise impeded. This also keeps them in the vicinity of the first control firefighter should water supply issues occur.

- D. The second engine officer should then deploy other members in the public hallway as necessary to assist with line advance.
- E. When there is a turn in the hallway, such as in a T-shaped hallway, another member should be positioned at that turn to ensure the hoseline does not become kinked or otherwise impeded.
- F. The second engine officer should ensure the position at the fire occupancy door is covered to insure a proper advance into the fire area.
- G. If the stretch from the fire floor stairway door to the fire occupancy door is long, members may need to be spaced along that path to ensure the line is properly advanced. This may also require the assistance of a third engine company.
- H. If the 1st hoseline is charged inside the attack stairway, members of the 2nd engine will be needed to assist with the more arduous task of advancing the charged hoseline up the stairs and then down the hallway to the fire area.

7.7 Stretching additional hoselines

- 7.7.1 Floor outlet selection can be a challenge when multiple lines are stretched at an operation. Depending on the number of standpipe risers in the building, it may be necessary to stretch additional lines from several floors below the fire. This will result in longer stretches, requiring the assistance of additional engine companies and their hose.
- 7.7.2 If the first line is stretched from an outlet on the floor below the fire, the second line may have to be stretched from 2 floors below the fire when using the same standpipe riser. If this second line is being stretched as a back-up line on the fire floor, this stretch will be at least 4 lengths long. If the second line is being stretched to the floor above the fire, the stretch will be even longer.
- 7.7.3 In the extreme case of a third line being stretched to the floor above the fire, and if the floor outlet is located in an enclosed stairway, consideration may be given to hooking up the 3rd line to the outlet on the original fire floor. This outlet will be protected by charged hoselines and the door to the stairway will be controlled, providing the control firefighter of the 3rd line with a protected environment to hook up to the standpipe. Approval by the IC or Fire Sector Supervisor is needed to hook up to an additional line to an outlet on the original fire floor.
- 7.7.4 The proper operating pressure for additional hoselines should be calculated using “street hydraulics”. The Engine Officer should communicate with the Control firefighter to ensure the hoseline is supplied with sufficient pressure.

8. OPERATING THE HOSELINE

- 8.1 While the line is operating, the control firefighter must remain at the standpipe outlet to ensure proper pressure is maintained in the line throughout the operation. It is important to recognize the difference between the higher static pressure that will exist when the nozzle is closed and the pressure reading when the nozzle is flowing water, which is the true pressure reading in the hoseline.
- 8.2 If there is inadequate pressure in the line, the Engine officer should communicate with the control firefighter to rectify the problem.
- 8.3 After the proper operating pressure has been established, if the pressure reading at the outlet is adequate, or even too high, and there is inadequate pressure at the nozzle, this is an indication of kinking in the line. Kinks should be removed manually, not by supplying more pressure.
- 8.4 After the fire is extinguished, ventilation of the fire area can be difficult. To facilitate ventilation, consideration can be given to using a fog tip on the hoseline. A small, removable tip may be carried in the standpipe kit and can replace the existing tip. The fog tip can be used to move smoke and heat out an open window in the fire area. This can also be accomplished by removing the MST from the nozzle and partially opening the shut-off handle. This should only be considered in the overhaul phase of the operation, well after the fire has been fully extinguished.

9. HIGH RISE NOZZLE

- 9.1 The 5th due engine on a 10-77 assignment is responsible to bring the High-Rise Nozzle (HRN) to the Incident Command Post (ICP) and when ordered, put the High-Rise Nozzle into operation. If they are not equipped with a HRN, they will obtain it from another unit on scene. If necessary, they should contact the dispatcher to determine which responding unit(s) are equipped with a HRN. *See Addendum 2, p.119* for a complete description on the use of the High Rise Nozzle.



Figure 20

10. ADDITIONAL INFORMATION

- 10.1 The NFPA provides national standards regarding the installation and maintenance of standpipe systems. NFPA 14 outlines standards for the installation of standpipe systems and NFPA 25 outlines standards for the maintenance of standpipe systems.
- 10.2 The New York City Building Code describes the legal standpipe requirements in NYC. Standpipe systems are described in the chapter dedicated to Fire Protection Systems.
- 10.3 The New York City Fire Code describes maintenance requirements for standpipe systems in NYC. Standpipe systems are discussed in the chapter dedicated to Fire Protection Systems.

NOTE: To simplify computing pump discharge pressure when supplying a standpipe system, a street hydraulics chart has been formulated. These calculations are based on nozzle pressure, friction loss of three lengths of 2 ½" hose, head loss, system friction loss, and friction loss of two lengths of 3 ½" hose supplying the fire department connection.

Recommended Pump Discharge Pressures for Standpipe Operations
Recommended

Fire Floor	Pump Discharge Pressure
1 – 10	150 psi
11 – 20	200 psi
21 – 30	250 psi
31 – 40	300 psi
41 – 50	350 psi
51 – 60	400 psi
61 – 70	450 psi
71 – 80	500 psi
81 – 90	550 psi
91 – 100	600 psi
101 – 110	650 psi

Variations in building and standpipe system layout, length of supply lines, etc. will impact pressure loss throughout the system. All members, particularly ECC's, should monitor the handie-talkie for indications that the pressure to the standpipe system needs to be increased.



HIGH RISE NOZZLE

1. DESCRIPTION

FDNY Designation	High Rise Nozzle (HRN)
Material	1½” Diameter Aluminum Pipe
Weight	Approx 10 lbs
Misc.	Standard 2 1/2” shut-off with 1 1/8” MST T-handle allows members control of the nozzle.

2. INTRODUCTION

- 2.1 Experience has shown that members have become caught in wind-driven fires often with minimal or no warning. Members must remain alert and knowledgeable of the conditions which may cause a wind-driven fire, some examples include: a wind condition blowing toward a fire apartment window, an open window, an open fire apartment door with a high heat and smoke condition on the fire floor. If the equipment and resources are available and wind conditions exist, the high-rise nozzle should be placed in position as a precaution even if the need is not immediately evident. Depending upon the fire conditions encountered, if the decision is made to place the High Rise Nozzle in position, additional resources may need to be called to the incident.
- 2.2 Dispatch policy dictates that every 10-77 will have at least one HRN equipped engine company assigned. It is the responsibility of the 5th due engine to bring the HRN to the Incident Command Post. If the 5th engine is not equipped with a HRN, they will obtain it from another unit on the scene. If necessary, the officer should contact the dispatcher for the identity of the assigned engine company equipped with a HRN. Upon arrival the officer will have the unit bring the HRN, roll-ups and a standpipe kit to the ICP.

3. HIGH RISE NOZZLE USE

- 3.1 The HRN may be used as an alternate attack strategy at high rise multiple dwelling fires in the following situations:
- 3.3.1 IC has determined that a direct interior attack with a handline is not possible, such as conditions caused by wind-impacted fires.
 - 3.3.2 The fire apartment is inaccessible to traditional exterior streams (TL, handlines, etc..)
 - 3.3.3 Any situation where the IC determines the HRN will be beneficial.

4. DESCRIPTION

- 4.1 The High Rise Nozzle is an eight-foot long aluminum pipe with a 68 degree two-foot bend to provide the proper angle for the water stream. It is attached to a standard 2 1/2" FDNY shut-off that is permanently attached to the nozzle. There is a T-shaped handle that allows members operating the nozzle to control the direction of the stream and maintain control of the nozzle. (Figure 1)



Figure 1

- 4.2 A 1 1/8" MST is attached to the outlet of the HRN. The tip is removable and should be checked weekly during MUD and before use. (Figure 2)



Figure 2

- 4.3 The HRN may be supplied by a 2" or 2 1/2" hoseline. The HRN requires a pressure of 50 psi at the tip with water flowing to produce a flow rate of 225 GPM. A stretch of longer than 3 lengths should be anticipated and thus the floor outlet pressure will need to be adjusted accordingly. A properly positioned high rise nozzle in operation is shown in Figure 3.



Figure 3

5. PROCEDURE

- 5.1 The High Rise Nozzle (HRN) will only be placed into operation at the direction of the IC, who must be a Chief Officer.
- 5.2 The IC must consider the following when placing the HRN into operation:
 - 5.2.1 Life hazard.
 - 5.2.2 Is the fire inaccessible to outside streams?
 - 5.2.3 Intensity and stage of the fire: Wind driven fire creating supercharged fire conditions in the fire apartment and/or the public hallway.
 - 5.2.4 Potential for fire spread via auto exposure.
 - 5.2.5 Availability of a Wind Control Device.
 - 5.2.6 Sufficient units on scene to deploy the High Rise Nozzle.

- 5.3 The IC shall announce over all radio frequencies that the HRN will be placed into operation, and ensure members are safely positioned before the stream is operated. By design, the high rise nozzle provides effective water application based on the principles of exterior water application (discussed further in Chapter 4). Namely the acronym S.S.S.S. of solid bore stream, steep angle, steady stream without circular motion and a steep angle providing a sprinkler effect.
- 5.4 The IC should ensure a spotter, equipped with a handie-talkie and a pair of binoculars, is in place to clearly observe the operation from the exterior. This member must monitor the conditions in the fire apartment before, during and after HRN deployment. The spotter will provide direction and progress reports to the IC and members operating.
- 5.5 The officer supervising HRN use will initiate and maintain HT contact with the spotter to ensure the nozzle is being operated effectively and the stream is knocking down the fire.
- 5.6 The IC should be aware that putting the HRN into operation will generally require additional units to assist the 5th Engine. These units should bring roll-ups, standpipe kits, and / or forcible entry tools to assist with deployment of the nozzle and forcible entry.
- 5.7 Units will need to gain access to the apartment below the fire apartment and determine which window the HRN will be operated from. Depending on the situation, the hose line supplying the HRN may have to be stretched from an outlet two or three floors below the fire floor. Officers must size up the number of roll-ups required to reach the area of deployment, if assistance is needed with forcible entry and inform the IC of the conditions, the actions being taken and any needs that they have.
- 5.8 Once the proper window is chosen and opened, impediments such as window bars, child gates, will have to be removed. In most cases it is **not necessary** to remove the window to operate the nozzle. Some windows are easily removed via clips on the top of the sash.
- 5.9 The supply line must be attached to the HRN before the nozzle is slid out on the window sill for use. Firefighters operating the HRN will use the T-handle to properly position the nozzle for optimum stream placement. The T-handle will allow the firefighters to move the nozzle along the window sill and maintain control.
- 5.11 The key to the rapid extinguishment of a wind-driven fire is putting water directly on the seat of the fire. If multiple rooms are involved, it will be necessary to reposition the nozzle to ensure complete knockdown of the fire. If this is the situation, start with the window that the wind is blowing into and extinguish the fire in this room first. Then move to the other windows downwind of the original fire room and complete knockdown of the fire.
- 5.12 If a wind-driven fire has control of several rooms, it will be necessary to move the HRN from a window in one room to another window in a separate room to achieve knock down of the fire. If this is the situation, company officers must anticipate and make sure the next window(s) that will be used for operation of the nozzle is cleared of window gates, bars etc., this will speed up the repositioning.

- 5.13 A shut-off shall be placed in line one length back from the nozzle. When repositioning of the HRN is required, the supply line should be shut down at the shut-off located one length back and the nozzle opened to bleed the line. This will make it easier to move the nozzle and supply line while repositioning. Once in position, the officer supervising nozzle operations will order water started. This officer will then notify the IC that the nozzle is in position and ready to operate. The nozzle will not be operated until the IC has given approval.

6. REPAIRS AND REPLACEMENT

- 6.1 If repairs to the High Rise Nozzle are required, the company officer shall contact the Technical Services Division via phone and request a replacement. The out of service HRN shall be tagged with an RT-2 documenting the nature of the defect.

THIS PAGE WAS INTENTIONALLY LEFT BLANK



AIR PRESSURIZED STANDPIPE

1. PURPOSE

- 1.1 An air pressurized manual dry standpipe system is required at buildings under construction upon reaching a height greater than 75 feet or buildings undergoing demolition with an existing standpipe (2014 NYC Building Code and Local Law 64 of 2009). The entire standpipe system including the riser, cross connections, and Fire Department Connections (FDC) are pressurized by a dedicated air compressor. This air pressurized standpipe system is designed to alert workers on site when the standpipe has been compromised.
- 1.2 When the air pressure drops below a predetermined (supervisory) pressure due to an open valve or broken pipe in the system or pressure rises above 25 psi an audible alarm will sound only at the site. The supervisory pressure will vary for each site but will always be below a maximum of 25 psi. The alarm will continue until the opening in the system is closed allowing the compressor to slowly bring air pressure back into the supervisory range or excessive pressure is reduced below 25 psi.
- 1.3 When an alarm sounds, work at the site must cease, and construction personnel are to notify the FDNY. Concrete pouring operations in progress shall be permitted until an orderly termination of such operation can take place. No construction or demolition work shall resume except repairs needed to restore air pressure to the standpipe.

Note: Any portion of the standpipe compromised above a closed section valve will not cause activation of the alarm due to air pressure being maintained constant in the lower portions of the standpipe.

2. OPERATION

- 2.1 To use an air pressurized standpipe system at a fire operation the air pressure must be released from the system prior to uncapping the FDC and supplying it with water. Attempting to remove the FDC caps prior to expelling the air from the system may cause the cap to become a projectile causing serious injury. After the air pressure is discharged, units can supply the system with water as they would at a standard dry standpipe operation.
- 2.2 A 2 ½" manual air release / drain valve (usually a standard standpipe outlet) is required to be installed immediately adjacent to the FDC. (See Figures 1) Remove the manual air release valve cap and open the valve fully. Air will be heard escaping from the manual air release valve. The ECC shall not remove the FDC cap(s) until air pressure has been expelled from the system. Air will be heard escaping from the open manual air release. The number of air release valves is required to be such that air pressure shall be released in no more than 3 minutes. When encountering systems with more than one manual air release valve, all manual air release valves should be opened. (See Figure 3)



Figure 1

- 2.3 Once air pressure is expelled, FDC cap(s) may now safely be removed. Connect the supply line, close the manual air release valve, and supply the standpipe with water.
- 2.4 It is not necessary to deactivate the air compressor as it will shut off when the standpipe is supplied with water.
- 2.5 The location of the FDC is required to be marked by a sign and lit by a red light at night. Signs are also required indicating that the standpipe is pressurized with air as well as the location of the manual air release valve. (See Figures 1, 2 & 3)
- 2.6 If air is noticed escaping under pressure from a FDC cap while being loosened, and no sign is present, member should stop cap removal immediately and notify the IC that the standpipe is pressurized with air. Steps shall be taken to bleed the air from a manual air release valve and/or standpipe outlet inside the building prior to removing the FDC cap(s).



Figure 2

- 2.7 Screw in type FDC caps are required in order to provide the air tight seal necessary for an air pressurized standpipe system. Breakaway caps or other non-screw in type caps on the FDC are indicative of a standpipe that is not pressurized with air.



Figure 3

- 2.8 The control firefighter, after reaching the floor outlet where the hoseline connection will be made, should remove the cap, open the standpipe outlet control valve, and wait for water to reach this point. This will expedite air removal from the system. Once water is present at the outlet, close it, and make necessary connections. The standpipe system will now function as a standard manual wet standpipe.
- 2.9 An occupied building with a wet standpipe system will have a check valve installed inside the exterior building wall providing freeze protection for the piping and FDC connection. During the construction or demolition phase with the standpipe pressurized with air, this check valve will be bypassed allowing air pressure to reach the FDC connection. At a fire operation, once the system has been drained of air and charged with water, water will flow past the bypassed check valve(s) out to all FDC connections. If FDC clapper valves are defective or tampered with in the second FDC, its caps may be under pressure.
- 2.10 The manual air release valve does not need to be opened when augmenting the standpipe with a second pumper. However, when loosening the FDC cap(s) at this second FDC, if water begins spraying out under pressure consider the clapper valves inside this FDC defective. Immediately stop cap removal, and use another option for augmenting the system e.g. supply the drain valve next to the FDC, use another FDC, or supply the first floor or another floor outlet. The manual air release valve can be supplied in the same manner as you would supply the first floor standpipe outlet.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

ADDENDUM 4

Hoseline Placement Guide

<u>Title</u>	<u>Page</u>
OLD LAW TENEMENT	131
CLASS "A" NON-FIREPROOF MULTIPLE DWELLING BUILT AFTER 4/12/01 to PRESENT	132
CLASS "A" HIGH RISE FIREPROOF MULTIPLE DWELLING (75 or more in height)	133
BROWNSTONES	135
ROW FRAMES	136
VACANT BUILDINGS	138
TAXPAYERS	139
HIGH RISE OFFICE BUILDINGS	141
PRIVATE DWELLINGS	142

OLD LAW TENEMENTS

In most cases, the first line is stretched via the interior stairs to the location of the fire. The purpose of this line is to protect the primary means of egress for occupants evacuating the building and to confine and extinguish the fire.

Cellar Fires

First Line - The first line should be stretched to the cellar entrance door which is located inside the building, under the interior stairway on the first floor. This line should remain at this position to provide protection for people coming down the stairway, and to extinguish fire which may be extending upwards from the cellar via partitions, dumbwaiter shafts and other voids. This line should not be advanced down the cellar stairs if there is an outside entrance to the cellar at the front or rear of the building, unless of course, the fire is minor.

Second Line - The second hose line stretched should be advanced into the cellar by way of the front or rear entrance to the cellar.

Store Fires

First Line - The first line should be stretched to the store. Store fires in OLTs may involve a large amount of combustible material. A 2 ½" line should be stretched for large volume fires.

Second Line - The second line is stretched to the entrance hallway. When assured that the second line is not needed on the first floor it may be advanced to the floor above the fire.

Stairway Fires

First Line - The first hose line should be stretched up the stairway, operated to extinguish fire, shut down and advanced further up the stairway. When possible, the line should be operated up the well hole to cool off the hall and stairs above. This procedure should be repeated until line is advanced to the top floor.

Second Line - A second line should follow to finish up extinguishing operations and to serve as protection for members advancing the first line. Apartments must be checked for possible extension of fire in them.

Air and Light and Dumbwaiter Shaft Fires

First Line - The first hose line should be stretched to the nearest point from which water can be directed onto fire in the shaft. Sufficient hose must be stretched to reach the upper floors of the building.

Second Line - A second hose line may be necessary if it appears that fire might have extended into the adjoining building.

For fires in rooms in the vicinity of a shaft, after the fire in the room has been controlled, the line should be operated up the shaft to extinguish fire and cool the shaft.

CLASS "A" NON-FIREPROOF MULTIPLE DWELLINGS BUILT AFTER 4/12/01 TO PRESENT

This section includes all Class "A" non-fireproof multiple dwellings built after 1901. Emphasis will be on the larger buildings, historically referred to as "H type" since they are our greatest problem. Although there are variations in the shapes of these buildings, such as "U", "O", "V", Double "E" and the newer, larger rectangular buildings, the problems and solutions are similar. A "worker" in an apartment of an "H type" building is of much greater potential than a similar fire in an apartment of a smaller building. An apartment in an "H type" building is usually larger, irregularly shaped and has long private halls.

It is of vital importance that, before a line is committed in an "H" type building, the exact location of the fire be determined. Care must be taken to avoid using a wrong stairway. Many times just stretching a line to a fire apartment will prove difficult. It may require many lengths (five or more) just to reach the building entrance. There may be large courtyards, often with obstacles such as trees, benches, fences, shrubbery, etc. Every effort must be made to get the first line in operation before additional lines are stretched. All available engine companies should be used to stretch the first line.

Store Fires

First Line - The first line is stretched to the store and extinguishes fire.

Second Line- The second line should be used to back up the first line. When it is obvious that the first line can control the store fire, the second line should be advanced to the floor above the fire. If two lines are needed in the store, the third line shall be stretched to the floor above.

Cellar Fires

First Line - The first line is stretched by way of the usually numerous exterior approaches to seat of fire and extinguish.

Second Line - The second line backs up the first line

CLASS "A" HIGH RISE FIREPROOF MULTIPLE DWELLING FIRES (75' or more in height).

Fires in these buildings can be extensive, extremely hot, and depending on wind conditions and building air flow patterns, very difficult to extinguish. These fires require a coordinated effort from the designated attack stairway with 2½" hose. All extinguishment efforts shall proceed initially from the one attack stairway. If a second stairwell is required for attack and extinguishment, it should not be the stairwell designated as the evacuation stair.

When the fire apartment door is left open; it will allow smoke and/or fire to vent out into the public hallway. If a window in the fire apartment fails, and wind is blowing into the fire apartment, an extreme condition may be created on that floor. This may negate the standard attack strategy; which is a direct frontal attack with a hose line from a stairwell, down the public hall and through the apartment door. Prior to advancing to the reported fire floor, members must gather information from the floor below, or two floors below if scissor stairs are present. Determine the location, letter designation and number of stairways serving the fire floor.

Prior to the designation of the attack stairway, all members must access the fire floor from the same stairway. If the door to the fire apartment has been left open and size-up indicates that wind may impact fire conditions, the air flow paths must be controlled on the fire floor. Uncoordinated opening of apartment and stairway doors may cause fire conditions to dramatically increase with little or no warning.

The 1st and 2nd engines to arrive **shall** team up to place the 1st 2½" hose line into operation on the fire floor. Initial hose lines stretched from a standpipe shall be from an outlet on a floor below the fire. Communicate with the ladder company officer to select the attack stairway. The attack stairway need not be the stairway with a standpipe outlet. The hoseline can be connected and stretched on the floor below and then up another stairway that is closer to the fire apartment to facilitate advance.

Charging the 2½" hoseline:

If the ladder company has control of the fire apartment entrance door;

- The hose line can be advanced to that location and charged.
- The engine officer will assist with keeping the fire apartment door closed until there is water at the nozzle and the hose line is ready to advance into the apartment.
- In most cases, the hose line shall not enter the apartment until the ladder company locates the fire and provides direction for the advancing engine company.

If the apartment door has been left open, the public hallway is now considered an extension of the fire area, (fire apartment and public hallway);

- The hose line should be charged before exiting the attack stairway.
- In most cases, the hose line shall not enter the public hallway until the ladder company locates the fire apartment and provides direction for the advancing engine company.
- Engine companies shall not enter the IDLH without a charged hose line.

The 3rd engine company to arrive is responsible to start the stretch of a 2nd hose line when required. They will be assisted by the 4th engine company. If a 2nd hose line is not required, the IC shall be notified. The second hose line is usually stretched from two floors below the fire. The second line will be stretched via the attack stairway and this will be the factor in determining which standpipe outlet to use. Additional lengths of hose will probably be needed from the 2nd or 4th engine companies. The additional lengths should be added between the last length of the 2nd hose line and the standpipe outlet. The third engine officer will determine when this hoseline shall be charged. This line should be charged at the stairway door to the fire floor depending on hallway conditions and size of the fire area. When the 2nd line is charged the pressure on the first line may drop; therefore, the control firefighter and officer of the first line should be notified.

BROWNSTONES

Fires discussed are to be considered of such magnitude as to require the use of one or two hand lines for extinguishment. All interior hand lines stretched will be considered 1 ¾". Reason for use: Speed, mobility, and close quarters

CELLAR FIRES

First Line - First hose line stretched through the front door on the first floor, then down to the cellar via the interior cellar stairs to extinguish the fire.

Second Line - Second hose line stretched through the front door on the first floor to back up the first hose line. If the first line was used to secure first floor, second line will be stretched to cellar via interior cellar stair to extinguish the fire..

First Floor Fires

First Line - First hose line stretched through the front door on the first floor to extinguish the fire.

Second Line - if not needed to back up the first hose line, shall be stretched through the front door on the second (parlor) floor to maintain the integrity of the interior stairs.

FIRE ON THE UPPER FLOOR

First Line - The first hose line is taken through the front door on the second (parlor) floor to the fire floor to extinguish the fire.

Second Line - Second hose line stretched through the front door on the second (parlor) floor to back up the first hose line.

BUILDING FULLY INVOLVED

When a building is fully involved, the first arriving engine company should drop two hand lines in front of the fire building and position the apparatus for the possible use of the multiversal nozzle or to supply a TL.

First Line - Advanced into the fire building through the front door.

Second Line - Advanced into the building as a back-up line.

Third Line – Will be stretched as ordered by the Incident Commander and may be:

1. Advanced into the fire building.
2. If fire is reported in an exposure, stretch to that exposure.
3. If there is no fire in that exposure, stretch through an exposure to the rear yard of the fire building.

ROW FRAMES

These buildings, as the name implies, are built in rows containing as many as twenty or more buildings. The room arrangement will vary with design of building. One type is similar to the Brownstone layout of rooms. They generally have three front windows per floor with one apartment going front to rear and no rear fire escape. Another type is the railroad flat with two apartments per floor. They generally have four windows across the front, with a rear fire escape.

CELLAR FIRE

First line - First line through the front door via the interior stairs to extinguish the fire. When this line cannot be advanced down to the cellar due to the intensity of the fire, it shall be used to protect the public hall, interior stairs, and the first floor, allowing the occupants to leave the building, and the ladder company to perform VEIS. The first line can be advanced to the top floor to cover any extension to that area or the cockloft after the cellar fire has been controlled by the second line. Intervening floors shall be checked for fire on the way to the top floor. A member must be stationed on the landing to warn of any fire that may break out below them.

Second line - Second hose line shall back up the first hose line. If the first hose line has advanced into the cellar, and a backup line is not needed, the second hose line shall extinguish any fire on the first floor then proceed to the top floor as above. If the first hose line is used to cover the first floor public hall, and a backup line is not needed, the second hose line will be stretched into the cellar via the outside cellar entrance to extinguish the fire.

First Floor Fires

First Line - The first hose line should be stretched to the location of the fire.

Second Line - The second hose line, if not needed to back up the first hose line, should be stretched to the floor above the fire.

FIRE ON UPPER FLOOR

First line - The first line should be stretched to the location of the fire via the interior stairs. This line will need to have sufficient length to cover the entire building.

Second line - The line should be stretched to the top floor or to the floor above. When a fire is reported in the exposure, the second line may be more effective being stretched to the exposure, with the third or fourth line stretched to back up line #1. This line will need to have sufficient length to cover the entire building.

ROW FRAMES

BUILDING FULLY INVOLVED AND FIRE IN THE EXPOSURES.– HOLDING OPERATION

First line - The first line is stretched into the fire building through the front door. When a building is fully involved with fire showing in exposure(s) the first arriving engine company should stretch one 3 ½" supply line for a tower ladder, and a hand line for entering the building. Prior to the use of the TL stream, multi-versal nozzle on the pumper, or heavy caliber stream, consideration must be given to the life hazard and the need for advancement of an interior line.

Second line - The second line, if not needed to back up the first line, is stretched to the top floor of the most severe exposure. This line will be needed to protect the cockloft, and interior shafts. While proceeding to top floor check intermediate floors for fire.

VACANT ROW FRAMES

These buildings are generally vacant due to previous fires. It can be anticipated that they have sustained heavy structural damage.

A. Vacant Buildings in a Row of Occupied Frames

First line - The first to arrive engine company should drop two hose lines: one a 3 ½" line to supply a TL, and a hose line to enter the most severe exposure.

Second line - If not needed to back up the first hose line, shall be stretched to the fire building or to the opposite exposure

B. Vacant Building(s) in a Row

First line - The first to arrive engine company stretches a 3 ½" hose line to supply a tower ladder, and stretches a hose line for use on the exterior of the building. If necessary, the first engine company can position the apparatus to use the multiversal nozzle. In line pumping should be given consideration in this type of situation. Initially operate from the exterior until the tower ladder, multiversal, or a heavy caliber stream can be placed into operation. The hoseline is then stretched into the most severe exposure

Second line - If not needed to back up the first hoseline, stretched to the opposite exposure or through an exposure to the rear yard.

NOTE: Whenever possible, a separate engine shall be dedicated to the sole task of supplying water to a Tower Ladder in order to ensure proper water delivery.

VACANT BUILDINGS

Since the strategy of vacant building firefighting is based on timely and safe control of the situation, the initial tactics of implementation are chiefly engine company operations. In this regard, supply to, and placement of, apparatus is of critical importance. Because of the conditions in a vacant building conducive to rapid fire build-up, quick water on the fire is a prime requisite to affect reasonable control. For attainment of this objective, deployment of the first engine company to arrive is most important.

Protection of life is the most important consideration in size-up. This means placing the first stream between the fire and persons endangered.

A. When a vacant building is heavily involved on arrival, place hose streams between the involved building and the most severe LIFE EXPOSURE.

Assume an unoccupied factory severely exposed by a fully involved vacant building, and the same fire communicating to an occupied dwelling. The first stream would be placed in position to protect the people in the multiple dwelling, even though the factory is the most severely exposed of the two. The factory is the **Most Severely Exposed Building**, but, because of life hazard, the multiple dwelling is the **Most Severe Life Exposure** and the exposure which must be protected first.

B. When no life is endangered in the exposures, position the first stream to protect the greatest amount of property. Assume a fire exposing a stack of waste lumber, and communicating at the same time but not quite as severely to an oil storage yard. In this case, the stream should protect the oil storage yard. Even though it is not the most severely exposed to fire, it is the **Exposure to be Given Greatest Consideration**.

C. When possible, take a position which not only protects the exposure, but also enables the stream to be used on the main body of fire. In cases where it is impossible to so confine the fire, alternate the stream from fire to exposure. This procedure controls the effects and reduces the cause of spread of fire. When using an exterior hoseline from a purely defensive position, (i.e., when a unit does not expect to advance a hoseline within the structure), members should stretch a 2 1/2" hoseline.

D. A fire may involve two or more floors in a certain portion of a building, such as the rear or a wing of an "H" "U" or "E" type building.

1. An interior attack may be feasible (within safety limitations) to extinguish or hold the fire in that area while exterior streams are set up. Hose lines can be stretched via fire escapes, portable ladders, through adjoining buildings, tower ladder bucket, etc. Positions above a fire that have not been controlled are very hazardous, particularly in vacant building fires where the spread of fire can be unusually rapid.

2. Units operating above any fire must be continuously aware of conditions below them. Units on floors below must inform those working above of any developing conditions that will affect their positions.

TAXPAYERS

A fire in a taxpayer is usually a fast-spreading and difficult fire to control and extinguish. It calls for many hand lines stretched quickly to the proper locations to prevent a large loss. When heavy or medium fire conditions are encountered the initial lines should be 2-1/2 inch. These lines can later be used to supply distributors, cellar pipes and heavy stream appliances. If the striking power and the water capability of 2-1/2 inch hose lines are not required, after the initial attack, they can be reduced to 1-3/4 inch lines for subsequent operations.

CELLAR FIRES

First Engine Company

Stretch the first line into the occupancy above the fire to prevent vertical extension. In a building protected by a sprinkler system, if staffing and conditions permit, a second line shall be stretched to feed this system.

Second Engine Company -

Assist first engine with initial line. In a building protected by a sprinkler system, when first engine has not supplied it and staffing and conditions permit, a second line shall be stretched to feed this system. After supplying the sprinkler system, when staffing and conditions permit, stretch a line to backup first engine company's line which may be used for any of the following:

1. To control the first floor if the first engine company has advanced into the cellar via the interior cellar entrance.
2. Serve as a backup or protection line for the first engine company.
3. Stretch into the cellar via the interior stairs or the outside entrance if the first unit's line has to control the first floor.
4. To employ the use of cellar pipes or distributors over the fire.

STORE AND COCKLOFT FIRES

Store Fires

First Engine Company - Stretch the first line into the involved store to protect life and extinguish the fire. In a building protected by a sprinkler system, when staffing and conditions permit, a second line shall be stretched to feed this system.

Second Engine Company: - Assist first engine with initial line. In a building protected by a sprinkler system, when first engine has not supplied it and staffing and conditions permit, a second line shall be stretched to feed this system. After supplying the sprinkler system, when Staffing and conditions permit, stretch a line to backup first engine.

**TAXPAYERS
STORE AND COCKLOFT FIRES**

Cockloft Fires

First Engine Company - When fire has control of the cockloft and the need for exposure protection is critical, position the engine to utilize the deckpipe. In-line pumping will give good positioning and allow room for placement of a tower ladder. Stretch a hand line into the most seriously exposed occupancy/building, depending on life hazard and the location and severity of the fire

Second Engine Company -When fire has control of the cockloft, and the need for exposure protection is critical, assist first engine with initial line. When staffing and conditions permit, stretch a line into another seriously exposed building/occupancy and operate into the cockloft to confine and extinguish the fire. It may be advisable to skip stores in order to confine a cockloft fire.

HIGH-RISE OFFICE BUILDINGS

The many variables and complexities built into high-rise office buildings may be compounded by both the fire location and the fire load within the tenant space on the floor. The many variables and complexities built into high-rise office buildings may be compounded by both the fire location and the fire load within the tenant space on the floor.

FIRST ARRIVING ENGINE COMPANY

Remain at the ICP until the first ladder company has verified the fire location. Proceed to the upper floor via the elevator staffed by the member of the first ladder company. With the assistance of the second arriving engine company, stretch a hose line from the standpipe outlet on the floor below the fire in the designated stairway.

SECOND ARRIVING ENGINE COMPANY

Provide the communications link between the lobby and the fire area pending the establishment of a Fire Sector/Branch. This is accomplished by taking the Post Radio and report with his/her company to their normal location in the vicinity of the standpipe outlet from which the first hand line is being stretched. Assist the first arriving engine company in stretching sufficient hose to reach the fire. Leave the fire area when the hose line has been stretched and is operating so as not to deplete their air supply.

THIRD AND FOURTH ARRIVING ENGINE COMPANIES

Operate in a manner similar to the first and second engine companies to stretch the second hose line. Stretch and operate the second hoseline as directed by the Fire Sector Supervisor or Fire Branch Director or the IC if the Fire Sector/Branch has not been established. This hose line may be used to:

1. Reinforce the position of the first line.
2. Protect the position of the first line.
3. Protect the search and evacuation of the fire floor.
4. Contain and confine fire spread and/or prevent fire wrapping around the core and endangering operation of the first line.

PRIVATE DWELLINGS

Private dwelling fires challenge the expertise of firefighting forces and require a coordinated team operation. Seventy percent of all fire deaths occur in private dwellings. Due to the size of these structures, crowding of stairs may become a major problem. Stairs must be kept clear. The number firefighters inside the fire building should be kept to a minimum to safely carry out operations.

Fires discussed will be based on the need for one or two hand lines. Due to the combustible nature of both interior and exterior building materials, fire can spread rapidly. The unprotected, open interior stairwell to the upper floors acts as a natural flue for fire spread. Small rooms and narrow stairs are commonly found in these dwellings. Due to the need for speed and mobility, a 1¾" hoseline is recommended.

CELLAR FIRES

First Hose line - Proper placement of the first hoseline requires a coordinated size-up and communication by the first Engine and Ladder Officer. After size-up, the first hoseline should be stretched to the entrance door that provides the quickest access to the cellar in order to extinguish the fire. In detached and semi-attached PD's, the secondary entrance found on the side or rear of the dwelling is usually the option that provides the quickest access to the cellar. Some PD's have secondary entrances to the cellar in the front of the dwelling which lead directly into the cellar and provide quick access. When using a secondary entrance, members should size-up the layout of the entrance, the stairs and the cellar, and then flake the hoseline out for the most efficient advance of the line. This is particularly important when stretching hose via a narrow alley, driveway or rear yard. In some situations, various factors including the following would preclude the descent of the first hoseline down the interior cellar stairs:

- High heat conditions at the top of the stairs
- Questionable stability of the stairway
- Initial size-up indicating a serious fire condition

In the cases above, hoseline advancement via a secondary entrance or water applied through a cellar window will be available options.

In situations where the first line is advanced through the main entrance and the first hoseline does not advance into the cellar, then the first hoseline will maintain its position on the first floor (if safety allows) to:

- ◆ Protect the interior stairs leading to the floors above
- ◆ Protect members conducting searches on the first floor and the floors above
- ◆ Extinguish any fire that is extending from the cellar

Control of the interior cellar door is critical in all situations. This door should be maintained closed when an exterior cellar entrance or other cellar access point is used for attack. The first hoseline will remain on the first floor (if safety allows) until the cellar fire is controlled. Officers shall communicate any adverse changes to the IC.

PRIVATE DWELLINGS CELLAR FIRES

Second Hose Line - Initially positioned and charged outside the fire building as a back-up for the first hose line. When not needed to back-up the first hose line, it can be used to extinguish any fire that may extend to the floors above or positioned as per the Incident Commander. Enough hose line shall be considered in the stretch for possible advancement into the cellar through an exterior entrance. Depending on where the first hoseline was stretched and the progress of this hoseline, the IC should consider the following options for placement of the second hoseline:

- Backing up the first hoseline.
- Used for exposure protection.
- Stretched into an exposure.
- Used to extinguish auto-exposure on the structure.
- Stretched to the first floor through the main entrance door to extinguish fire and/or protect members operating on the upper floors.
- Enter the cellar via a secondary entrance if present.
- Apply water into a cellar window (or Bilco door) for a quick knockdown if there is a heavy fire condition or entry is delayed.

FIRST FLOOR FIRES

First Hose line- After size up, the first hose line should be stretched through the main entrance door to the first floor in order to extinguish the fire. During the initial size-up at apparent first floor fires, members should ensure they check to determine that the fire did not start in the cellar, before committing the first hose line.

Second Hose Line - Initially positioned and charged outside the fire building as a back-up for the first hose line. If not needed to back-up the first hose line, it can be used to extinguish any fire that may extend to the other floors or to exposures.

UPPER FLOOR FIRES

First Hose Line - Through the main entrance and up the interior stairs to the fire floor to extinguish the fire. When there is no access to the upper floors by way of the main entrance, locate and stretch via the stairway that provides access to the fire area.

Second Hose Line - Initially positioned and charged outside the fire building as a back-up for the first hose line. When not needed to back up the first hose line, it can be used to extinguish any fire discovered in the cellar, on other floors, or in exposures.

**PRIVATE DWELLINGS
BUILDING FULLY INVOLVED**

- Whenever the first arriving engine company backstretches to the hydrant, they should consider dropping two hose lines in front of the building.
- Units shall maintain the front of fire building accessible for tower ladder placement.
- Consider stretching a 2½ inch hose line for a faster knock down, greater reach of stream, increased volume of water and increased exposure protection.
- A 2½ inch hose line shall also be considered when encountering a wind impacted fire.
- Operate the hose line on the exterior to protect exposures before entering the building.
- Buildings fully involved have an increased collapse potential and require a complete evaluation by the IC before entering. Wood frame buildings that initially appear fully involved may only have their exterior siding burning.

EXPOSURE PROTECTION

- Fire "lapping" out of a window, or burning on the exterior of a building, presents a serious exposure problem.
- Openings in the underside of eaves (i.e. vent openings) or deteriorated siding may allow for fire extension to the attic of an exposure or the original fire building.
- Units operating a hose line to extinguish fire on the exterior of a building should sweep the stream across the face of the building, starting at the top, so the water cascades down the exterior.
- Consider stretching a 2½" hose line if increased volume or reach of the stream is a consideration.

PART TWO

ENGINE EVOLUTIONS

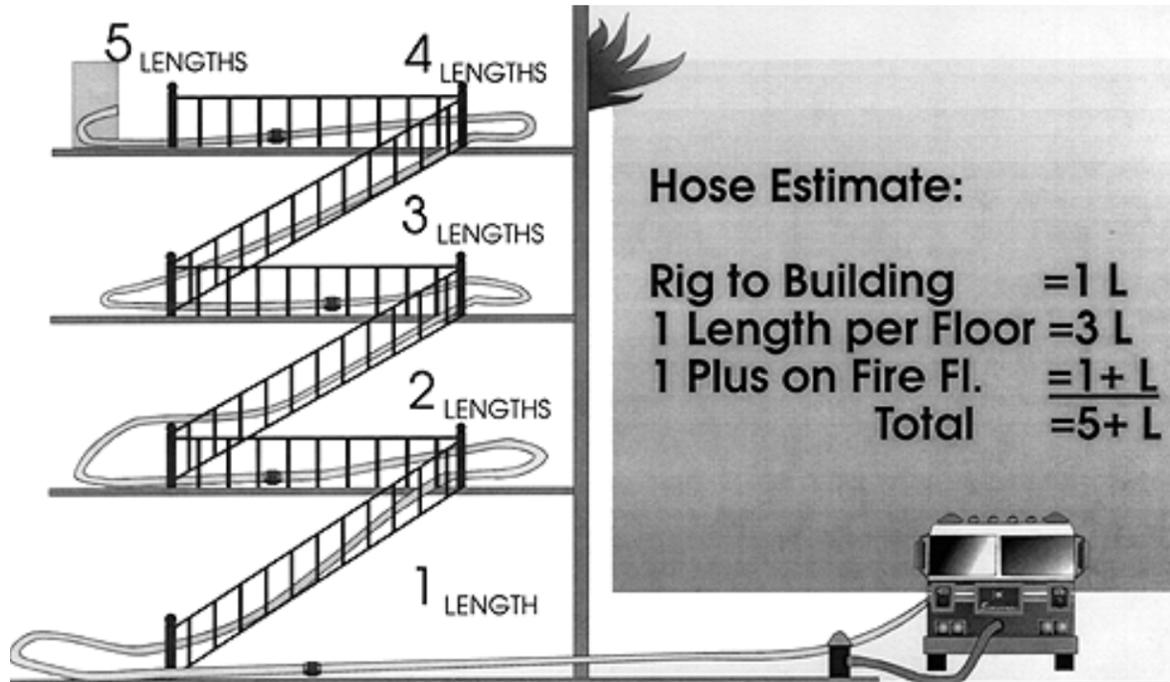
<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
1	ESTIMATING A HOSE STRETCH.....	147
2	WELL HOLE STRETCH.....	148
3	FIRE ESCAPE STRETCH.....	150
4	UTILITY ROPE STRETCH.....	152
5	BACKSTRETCH.....	154
6	INLINE PUMPING.....	155
7	RELAYING WATER.....	159
8	SUPPLY AND OPERATE FROM A STANDPIPE.....	161
9	2 ½" HOSE UP THE AERIAL.....	165

1. ESTIMATING A HOSE STRETCH

- 1.1 When the orders are given to stretch a handline, a rapid estimation of the number of lengths required to reach the seat of the fire is in order. The general rule for estimating the number of lengths in the fire building is:

1 length per floor + 1 length for the fire floor.

Ex. 5 story NLT, fire on the 4th floor would require 5 lengths (4+1=5).



- 1.2 This rule assumes that the engine has stopped at the fire building and the required lengths are removed prior to repositioning the apparatus at a hydrant.
- 1.3 For large multiple dwellings (H-types and their variations), hose estimations must consider the distance from the backstep of the engine to the entrance door. In some cases several lengths of hose might be required to reach the entrance door. The distance from the entrance door to the base of the stairway must also be considered. This is in addition to the required one length per floor plus one for the fire floor. Some buildings may require two lengths for the fire floor.
- 1.4 If the engine apparatus is positioned at a hydrant before reaching the fire building or has to pass the fire building, the additional distance must be taken into account in estimating the number of lengths required to reach the seat of the fire. The building frontage can be used to estimate the required number of additional lengths. Ex: row of OLT's, engine is two buildings past fire building, OLT 20-25' wide, at least 2 lengths will be needed to reach the entrance to the fire building.
- 1.5 Use the apparatus for as much of the stretching as possible. Hose stretched at fires should be laid as close to the side of the street as possible and on the same side as the hydrant or pumper. If it is necessary for hoselines to cross the street, the lines should cross in front of the fire building. This allows as much room as possible for the maneuvering of apparatus.

2. WELL-HOLE STRETCH

- 2.1 The use of a well-hole for stretching the hoseline allows for more rapid positioning of the line and reduces the number of lengths required. The rule of thumb is that a 5 story stretch up a well-hole requires about one length of hose (see Fig. 2-1A & 2-1B).
- 2.2 The engine officer should communicate to the members stretching, the presence of a well-hole, as soon as possible. The officer should look up the well to see if it goes up the entire stairway. In certain stair configurations, a well exists between the 1st and 2nd floor, but the rest of the stairway does not have sufficient space to accept a charged hoseline.
- 2.3 The stretch is accomplished as follows:
- A. The nozzle firefighter has two options depending on the size and configuration of the well-hole.
 - *Narrow well-hole* - nozzle firefighter drops his/her folds at the base of stairway, securely grasps the nozzle and proceeds up stairway pulling hose up through well-hole.
 - *Wide well-hole* - nozzle firefighter carries nozzle and lead length in well.
 - B. If conditions on the fire floor are favorable, and the door to the fire area is controlled, sufficient hose must be pulled up and flaked out on the fire floor.
 - C. If the fire has extended into public hallway, sufficient line must be pulled up and flaked out on the floor below.
 - D. When sufficient line has been pulled up the well-hole, the line must be secured with a hose strap.
 - E. The backup firefighter initially feeds line to the nozzle firefighter from the base of the stairway, then proceeds up the stairway pulling line up the well-hole.

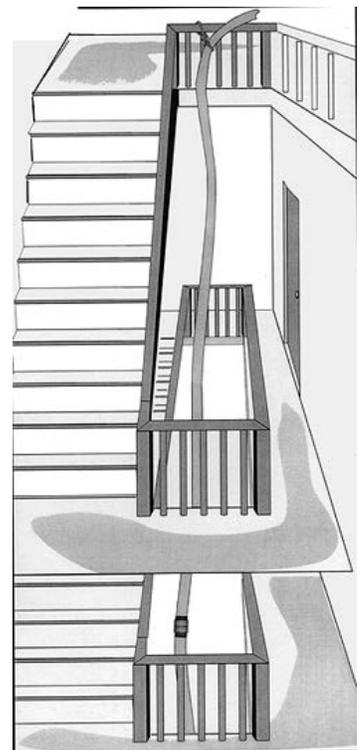
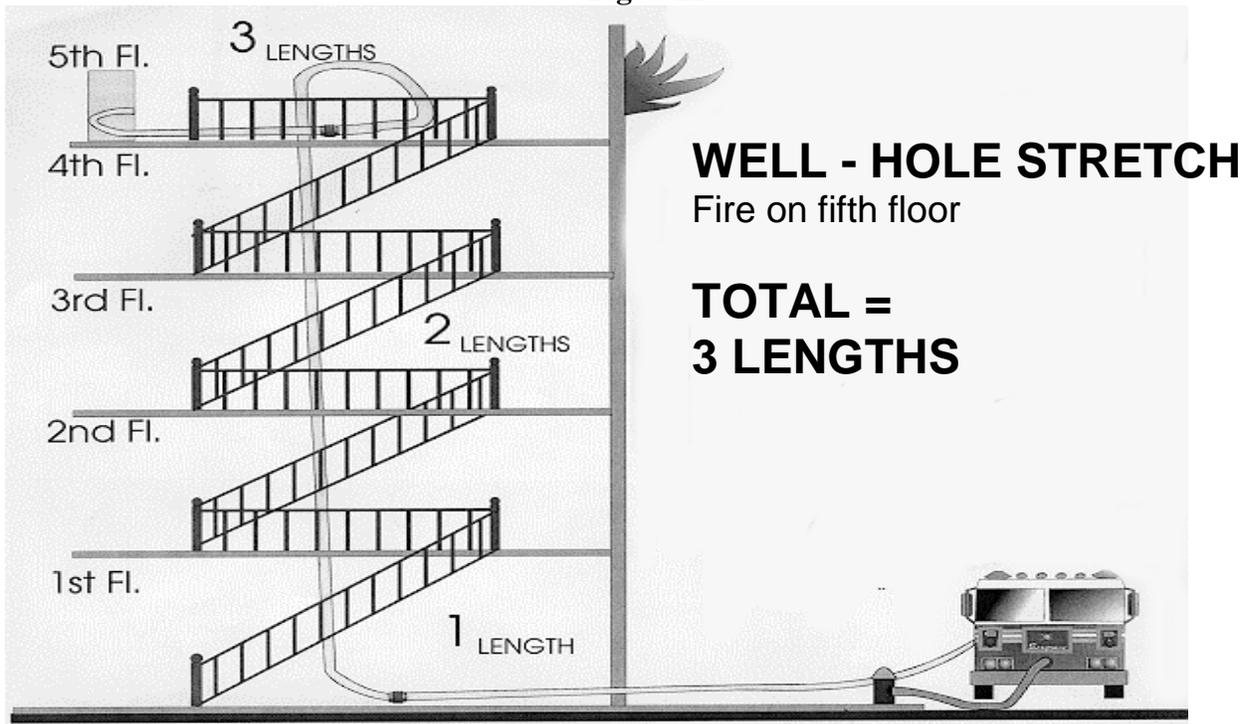


Fig. 2-1A

- F. The door firefighter lightens up on the line and proceeds up the stairway pulling line up the well-hole.
 - G. The control firefighter will remain at the base of the stairway until notified by the officer that sufficient hose has been stretched. Any remaining hose on the first floor should be flaked out and checked for kinks, once the line is charged.
- 2.4 When a second hoseline is stretched up a well-hole, caution must be exercised to ensure the first and second lines do not become entangled. To prevent entanglement, the nozzle firefighter should carry *only* the nozzle and change hands at each newel post (turn) as the line is stretched up the well-hole. A utility rope can also be used if the well-hole is large enough to accommodate its use.

Fig. 2-1B



3. FIRE ESCAPE STRETCH

The fire escape stretch can be utilized to stretch a hoseline (or an additional line) via the outside of the building. The line can be stretched to the balcony of the floor below the fire and in through a window and up to the fire floor via the interior stairs. Another option, when there is no access via the interior (i.e. a vacant with damaged interior stairs) is to stretch up to the balcony of the floor below the fire and then gain access to the fire area via the balcony through a window on the fire floor.

NOTE: The following is the procedure to follow when utilizing the fire escape to access the fire floor from the fire escape.

3.1 Sufficient hose should be stretched and arranged below the fire escape balcony.

3.2 The hose can be hoisted with a utility rope or a 6 foot hook.

- ◆ If the rope is used:

- the nozzle firefighter should proceed directly to the balcony of the floor below the fire and pull up the nozzle once the Control firefighter secures it to the rope.

- ◆ If a 6 foot hook is used:

- members ascend the fire escape and position themselves on successive balconies, with the nozzle firefighter proceeding to the upper balcony. At ground level, the control firefighter inverts the hook and places the handle of the controlling nozzle onto the hook. The handle is passed from the member below to the member on the balcony above. The member on the lowest balcony (door Firefighter) remains at this position to lighten up on the hose until sufficient hose is hoisted. Nozzle and back-up firefighters continually pass the hook up and move up until the nozzle reaches the balcony of the floor below the fire.

- In both cases the control firefighter will remain at ground level and assist in hoisting and securing the line. Once sufficient line has been hoisted and the line has been charged, the control firefighter can ascend the fire escape and join the nozzle team (**see Fig. 3-1**).

3.3 Once the nozzle reaches the balcony of the floor below the fire, the nozzleman must secure the nozzle and notify other members to move up one landing (exception: Control firefighter remains at ground level). At this point the nozzleman pulls up sufficient hose to make entry on the fire floor above. This additional hose can be flaked over the fire escape railing. Once this hose is in place the nozzleman can position himself roughly half way up the steps to the fire floor landing to await water.

3.4 The back-up man, upon reaching the balcony below the fire will pull additional hose to operate through the fire area above. When sufficient hose is pulled onto this balcony the back-up man will secure the line with a hose strap and then join the nozzleman.

- 3.5 The doorman, will initially lighten up on the hoseline as it's being hoisted. Once the backup man is done hoisting hose the doorman (if necessary) will secure the hose to the fire escape railing and then proceed up to flake out hose from the fire escape into a window on the floor below the fire.
- 3.6 The line must be secured with hose straps on alternate floors, beginning with the floor below the fire.



Fig. 3.1

- 3.7 NOTES:
- ◆ The line is secured with hose straps beginning with the floor below the fire and continuing with alternate floors down.
 - ◆ Hose straps are used as follows: hook end of strap is passed around hose and through loop of rope. It's then pulled taught, brought over and under fire escape railing, and then hooked on strap.
 - ◆ Prior to charging the line members must position themselves between the dry line and the building- not the dry line and the fire escape railing.
 - ◆ Fire below the 4th floor, the line is stretched up the well of the fire escape.

4. UTILITY ROPE STRETCH

4.1 Engine companies should carry 75 feet of 3/8 inch nylon rope to be used for a quick, efficient stretch to upper floors or roofs (see Fig. 4-1). This rope can be used to haul the line:

- To roofs of low buildings, i.e., taxpayers, three story frames, brownstones.
- In vacant buildings when interior stairs are missing or damaged and would present a hazard in supporting an interior stretch.
- In buildings with the staircase winding around an elevator shaft.
- At fires requiring three lines, when the interior stairs already have two lines on them.
- When CIDS or previous knowledge indicates its use.
- In non-standpipe project buildings.

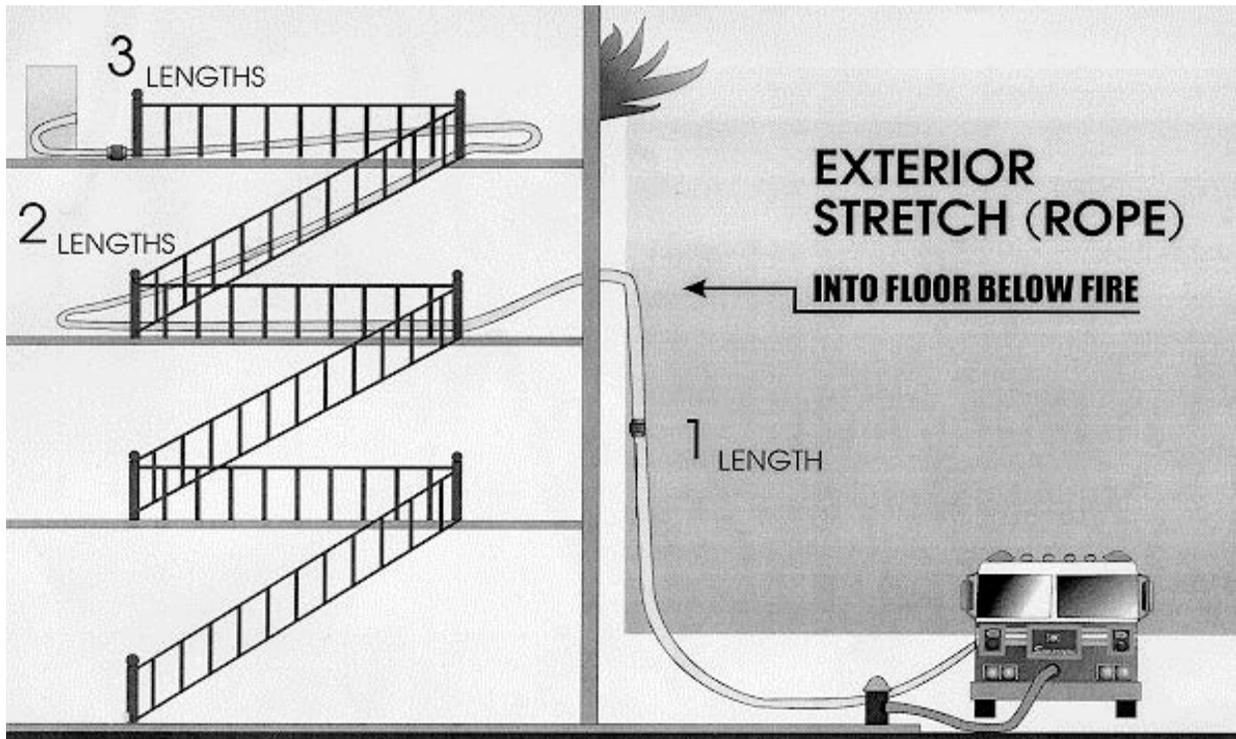


Fig. 4-1

4.2 Example: Utility Rope Stretch Via Stair Shaft Window In Buildings With Stairs That Wrap Around An Elevator.

- ◆ In order to reduce the number of lengths required and speed up the stretch, the line can be hoisted via stair shaft window with the utility rope. If the fire is below the third floor, the line is stretched up the stairs.

- ◆ The officer's initial size-up will determine if this type of stretch would be beneficial in reducing the number of lengths required. Knowledge of the building, the location of the fire, and availability of stair shaft windows will assist in making this determination.
- ◆ The line is stretched as follows:
 - The officer proceeds to the floor below the fire with the rope, selects the window to be used, and communicates this information to the control firefighter. The rope is deployed from this window.
 - Sufficient lengths must be brought into the lobby and the folds arranged near the window selected by the officer. The nozzle firefighter attaches the rope to the nozzle, places the nozzle outside the window, then proceeds to the floor below the fire.
 - The backup firefighter will join the nozzle firefighter when relieved by the control firefighter. The control firefighter must remain at the window until enough line is hoisted to ensure that the line does not get hung up. Once the line is charged, the control firefighter will check for kinks and join the nozzle team.

4.3 OPERATIONAL CONSIDERATIONS USING UTILITY ROPE

- ◆ Before the utility rope is deployed, look out the window and check for obstacles or obstructions such as air conditioners, clotheslines, overhangs or setbacks which might interfere with the rope.
- ◆ Remove the child guard if present, raise the lower sash and ensure that it stays open.
- ◆ At the lower floor window, lower the top sash, grab rope and tie to nozzle.
- ◆ Members must be aware that tools will be required to remove child guards. Some windows will be secured closed and others may have stops which limit the raising of the sash only a few inches.
- ◆ Hinged windows which open outward can prove difficult and similar windows on intermediate floors may have to be closed to prevent the line from getting hung up.
- ◆ If difficulty is encountered in raising a window, remove glass from sash.

5. BACK STRETCH:

A backstretch is a stretch of an attack line in which the pumper reaches the fire before the hydrant. The necessary amount of hose to reach the fire is removed and the pumper can be used to fill out the stretch. As the pumper proceeds to a hydrant the additional necessary hose peels off the rear of the hosebed.

5.1. Steps:

- ◆ Pumper stops in vicinity of fire building so as *not to impede the positioning of a truck company*. (In most cases the engine will stop the proper distance beyond the building entrance, taking into account the type of ladder apparatus responding in, directly from behind). Firefighters remove enough hose to reach fire. (See Fig 5-1). Use side of hoseload that ends with male coupling. Attach nozzle to line and advance to point of operation.
- ◆ Pumper proceeds to hydrant playing out hose on way. One member (control firefighter) rides rear step, standing clear of moving hose. Upon reaching hydrant, connect pumper; break hose line and attach to pumper. Officer gives command, "Start Water." Control firefighter after controlling stretch, proceeds to fire, moving hose close to curb, removing kinks etc.(See Fig 5-2)

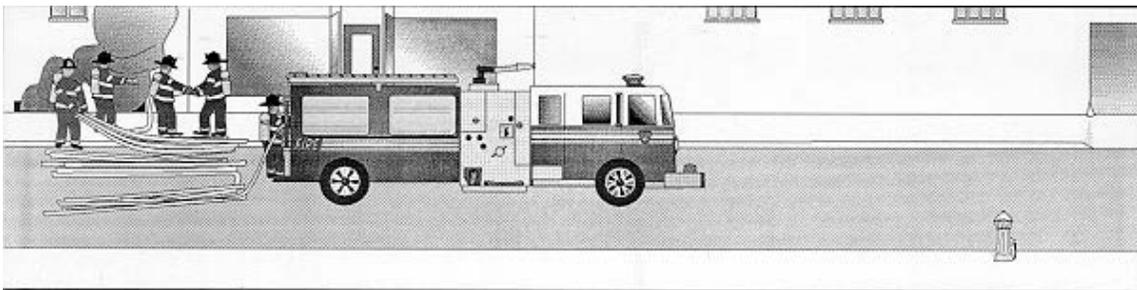


Fig 5-1

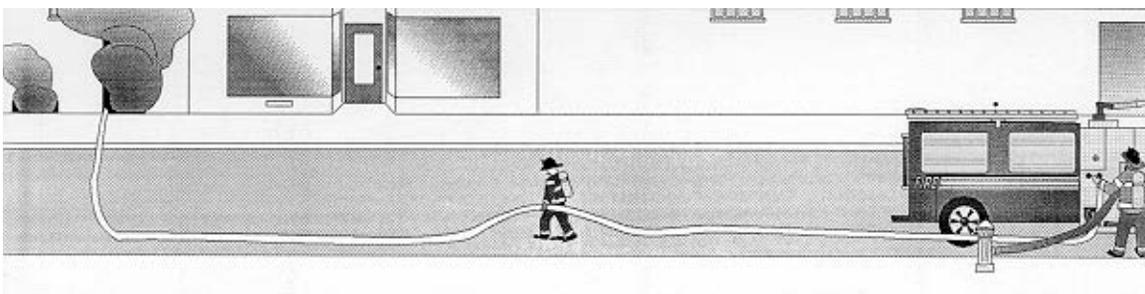


Fig 5-2

5.2 Removing Hose From Apparatus

- ◆ To Remove hose from apparatus one member mounts rear step of apparatus, places arm through first 3 folds of hose, gives a strong pull, steps down and walks backward, dragging hose. Firefighter lays hose on ground about 15 feet from apparatus and slightly to side in direction of stretch. A second firefighter lays the next three folds directly to rear of apparatus. A third member lays the next three folds slightly to side away from direction of stretch. There are now three full lengths laid out neatly in street. Additional hose may be removed similarly.
- ◆ Advancing line to fire -- (Three members used). Attach nozzle to line. Each firefighter carries three folds of hose. They walk toward point of operation with loop of hose between each member. As they advance, hose is played out in a continuous line beginning with last firefighter.
- ◆ When fire and hydrant are adjacent, apparatus need not be used in stretching lines.
- ◆ If, on rolling in to fire, the officer anticipates use of multiple lines, two lines shall be laid simultaneously by apparatus performing stretch.

6. INLINE PUMPING:

Inline pumping is a stretch of the supply line in which the hydrant is located before the fire (in relation to the direction of the pumper's response). In this evolution the supply line can be stretched from the hydrant to the pumper's operating point (in this situation the hose would peel off the hosebed as the pumper proceeded to the operating point). Another option would be to hand stretch the supply line from the operating point back to the hydrant.

Note: 4 FF Engine Co.

Hydrant FF = Control FF

Hose FF = Back-up FF

Note: 5 FF Engine Co.

Hydrant FF = Control FF

Hose FF = Door FF

6.1 Steps:

- ◆ Pumper stops so that the rear step is opposite the hydrant. The Hydrant FF equipped with a hydrant wrench and a 2½" gate, tests the hydrant. A bolt cutter should be taken if necessary.
- ◆ After the hydrant is deemed serviceable, the Hose FF keys the hydrant by pulling sufficient 3½" hose from the hose bed prepared for In-Line Pumping (ILP) and takes a turn around the hydrant. (See Figure 1) The Hose FF then mounts the pumper's backstep, and prepares to use the signal buzzer. (See Note 10)

- ◆ The Hydrant FF should:
 1. Maintain the key as the pumper proceeds. (See Figure 2)
 2. Connect the 3½” hose to the 4½” outlet of the hydrant. (See Figure 3)
 3. If time permits, connect a 2½” gate to the hydrants 2½” outlet. (See Figure 3)
 4. Waits for notification from the ECC before opening the hydrant. (See Figure 4)

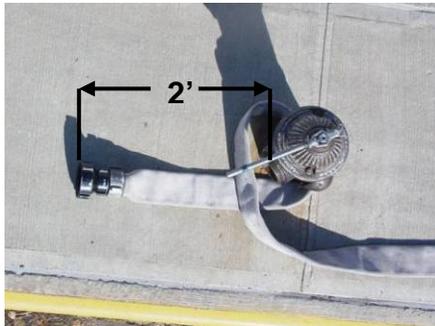


Figure 1
Hydrant Keyed With 3½ " Hose



Figure 2
Hydrant FF Maintaining Keyed Hose



- Figure 3**
- Hydrant FF connecting 3½” hose to 4½” outlet of hydrant
 - 2½” gate connected to 2½” outlet of hydrant



Figure 4
Hydrant FF waiting for notification to start hydrant water.

- 6.2 At a slow rate of speed, playing out 3½” hose, the pumper proceeds to the vicinity of the fire building, so as *not to impede the positioning of a ladder company*. The Hose FF rides the rear step and monitors the playing out of the supply hose.
- 6.3 Pumper stops at the operating position where the members remove enough hose to reach the fire. The ECC:
 - 1) “Drops” booster tank water into pumps
 - 2) Engages the pump

- 3) Breaks the 3½” inch supply line and connects it to the 3” gated inlet on the pump panel side.
- 4) Notifies the Hydrant FF to start water.

Note: The ECC should leave the gated inlet closed while opening the drain to the gated inlet, thus allowing air in the 3½” supply line to exhaust. When good water flow is observed flowing through the drain, the ECC should close the drain. The ECC should then slowly open the 3” inlet gate fully, then prime the pumps and begin fire line operations as per standard operating procedures.

Supplying booster water upon Officer's orders shall be given priority over hooking up the in-line supply line.

6.4 After receiving notification from the ECC to start water, the Hydrant FF opens the hydrant fully and then proceeds to the pumper for the purpose of controlling the stretch. The Hydrant FF, after controlling the stretch, ensures tools are placed on the apparatus and then proceeds to the fire, moving hose close to the curb, removing kinks, etc.

Note: Depending on staffing, the initial handline stretch will be controlled by either the Door FF (5 FF Engine) or the ECC (4 FF Engine), until relieved by the Control FF (Hydrant Firefighter).

6.5 When the Engine Officer calls for water, the ECC supplies available water, notifying the officer as to type. If booster water is used, the ECC must notify the Engine Officer when hydrant water is started.

6.6 ECC notifies the Incident Commander and incoming Engine Companies when the necessity exists for the ILP pumper to be augmented. (See Note 5)

NOTES:

1. Hydrant shall be tested and flushed before the supply line is committed.
2. Hydrant selected for ILP must be on a 6” or larger main. During Water Alert, ILP shall not be used unless absolutely necessary.
3. Pumper shall use 3½” inch hose as the initial supply line from the hydrant to the pumper.
4. Not more than 6 lengths of hose shall be used in the initial supply line.
5. When intake pressure drops below 15 psi, the pump operator shall have his intake supply augmented.
6. Necessary fittings to connect to a hydrant shall be preconnected to the 3½” supply hose on the pumper.
7. In order to prevent injuries or damage to hose or equipment, the supply line shall not be preconnected to an inlet of the pumper.

8. Consideration should be given to the pumper mounted deck pipe nozzle in ILP positioning when the need for exposure protection or quick knock down is evident.
9. Pumpers should not be positioned where they will prevent effective utilization of aerial and tower ladders.
10. Pumper may proceed to the operating position, stopping only to drop the Hydrant FF off for testing the hydrant. Generally, a maximum of 3 lengths of 3½” supply line may be hand stretched back to this hydrant if necessary.
11. Time permitting, a 2½” gate should be attached to the hydrants 2½” outlet for possible augmentation if necessary. This is particularly effective when the hydrant being used for ILP is nearby (3 lengths or less).
12. The ECC of the ILP should have water supply augmented when the intake pressure drops below 15 psi. The method selected requires judgment based on fire conditions, location and location of apparatus.
13. The following signals shall be sent from back step buzzer:
One buzzer tone -----Emergency stop.
Two buzzer tones-----Hose FF is in position, pumper to proceed.
Three buzzer tones -----Area to rear of pumper is clear for backing up operations and under proper supervision.
14. ILP is another option in stretching firefighting lines. It may be used in lieu of the back stretch when conditions indicate that ILP may be advantageous.
ILP may be utilized as a supply option when signal 10 – 70 is transmitted.
15. The capacity of a hydrant is a major factor in “In-line pumping” operations. The capacity of a hydrant is based on many variables (size of main, location within the system etc.). It is important for units to know the capabilities and limitations of hydrants in their response area.

7. RELAYING WATER

A relay operation is one in which one pumper supplies water to another. Relay operations can complicate pumping operations because they require coordination between two or more pumpers (potentially accruing higher pressures) and two or more pump operators (necessitating more communication). In addition there is an increased possibility of introducing air into an operating pumper and losing prime. However, if a water relay is warranted, the following procedure shall be implemented.



Figure 1
Supply Pumper



Figure 2
Operating Pumper

7.1. Steps:

- ◆ The Officer or ECC of the operating pumper (normally 1st due pumper), upon finding no viable water source transmits signal 10-70 via Department radio and HT and decides on optimum position of the pumper, factoring such things as easiest hose stretch, ladder company accessibility, fire conditions, collapse potential, etc.
- ◆ The next arriving pumper, designated as the Water Resource Unit, upon hearing signal 10-70 must find a viable water source.
- ◆ The supply pumper connects to a hydrant utilizing either the 10' or 35' hydrant connection. The necessary lengths of 3½" hose are stretched from a 3" outlet of the Supply Pumper to the Operating Pumper's 3" gated inlet on the pump panel side of the pumper.



Figure 3
3½" Hose From Supply
Pumper's 3" Outlet



Figure 4
3½" hose Into Operating
Pumper's 3" Gated Inlet
(Pump Panel Side)

Both the Supply Pumper and the Operating Pumper must remain in the **Volume Position**. An exception to this is standpipe operations, where head pressure needs to be overcome. In this case, the operating pumper will operate with its pump in the **Pressure** configuration. (Supply pumper will still be in volume).



Figure 5
Transfer Valve in the Volume

- ◆ When ready to send water, the Supply Pumper ECC communicates this to the Operating Pumper ECC. Upon confirmation that the Operating Pumper is ready the Supply Pumper ECC should fully open the 3" discharge valve to supply idle pressure. Idle pressure is hydrant pressure plus pressure imparted by the pump at idle (typically 100-125 psi).
- ◆ This relay procedure should accommodate two-2½" handlines without intake pressure gauge dropping below 15 psi on the operating pumper. If the Intake pressure gauge reading does drop below 15 psi on the Operating Pumper, then the ECC of the Operating pumper should request the Supply Pumper to increase throttle (tap-up pro-pressure governor) in 10 psi increments as needed.
- ◆ If the Supply Pumper's Intake pressure gauge drops below 15 psi, the Supply Pumper ECC should contact the Operating Pumper ECC and the Incident Commander to inform them that the hydrants supply limit has been reached.

NOTES

- 1) Time permitting, a 2½" gate should be attached to the 2 ½" hydrant outlet for possible augmentation if necessary.
- 2) For operations where head pressures must be overcome (e.g., standpipe operations) requiring higher pump pressures, the Supply Pumper should be in the **volume** position and the Operating Pumper must be in the **pressure** position.
- 3) In most circumstances, in the volume position the reading on the pump pressure gauge of the Supply Pumper should be around 100-125 psi. (Hydrant pressure 50-75 psi plus pressure of pump in volume - around 55 psi)

- 4) On some hydrants with high pressures (e.g., parts of Staten Island) the Intake pressure reading on the Operating Pumper may reach or exceed 150 psi, even if the Supply Pumper is in the Volume position. If the Operating Pumper ECC notes the intake pressure is greater than 150 psi or the automatic intake relief valve discharges (this should happen when the inlet pressure reaches 150-175 psi), he/she should communicate with the Supply Pumper ECC to insure he/she is in the Volume position.
- 5) If possible, it is better to set up a relay operation before supplying handlines.
- 6) Officers ordering ECCs to “drop” booster tank water should be aware that in addition to the possibility of running out of water, it also increases the possibility that the pump may lose prime, necessitating the ECC to shut down lines and re-prime the pumps.
- 7) The capacity of a hydrant is a major factor in Relay Operations. The capacity of a hydrant is based on many variables - size of main, location within the system etc. It is important for units to know the capabilities and limitations of hydrants in their response area.

8. SUPPLYING A STANDPIPE AND OPERATING FROM A FLOOR OUTLET

A standpipe system is an auxiliary fire protection system installed in certain buildings/facilities. The requirement of standpipe systems is based on any of the following factors: building height, floor area, and/or fire department vehicle access.

While the use of a standpipe system can make for a much more effective operation, it's imperative that all units follow the following procedure in utilizing this system.

- 8.1 ECC- Connect pumper to hydrant and charge pump. Stretch 3½" hose line from pumper and connect to Siamese to supply standpipe siamese. Start water. Augment supply to siamese with second hose line from pumper.
- 8.2 Control firefighter will proceed to the floor below the fire with a folded length of 2½" hose and the standpipe kit. The Nozzle, Back-up and Door Firefighters (if a five (5) fighter company) will proceed as follows:
 - ◆ Place folded lengths on floor landing below standpipe outlet, or in hallway adjacent to stairway door containing standpipe, with straps facing up and male and female hose butts adjacent to each other. Length with nozzle is placed most distant from standpipe with nozzle facing in direction of stretch. If available and needed, place additional length(s) in the sequence before nozzle.

- ◆ Leave straps connected on folded lengths and proceed as follows: (Photo 8-1)
 - Remove protective covering from male butts.
 - Nozzle firefighter connects hose butts between lead length and second length.
 - Backup firefighter connects hose butts between second and third lengths.
 - Door firefighter (if present):
 - a) Connects hose butts between 3rd and 4th lengths (if needed).
 - b) Assists Control firefighter in hooking up to standpipe.
 - c) Assists Nozzle and Backup firefighters.

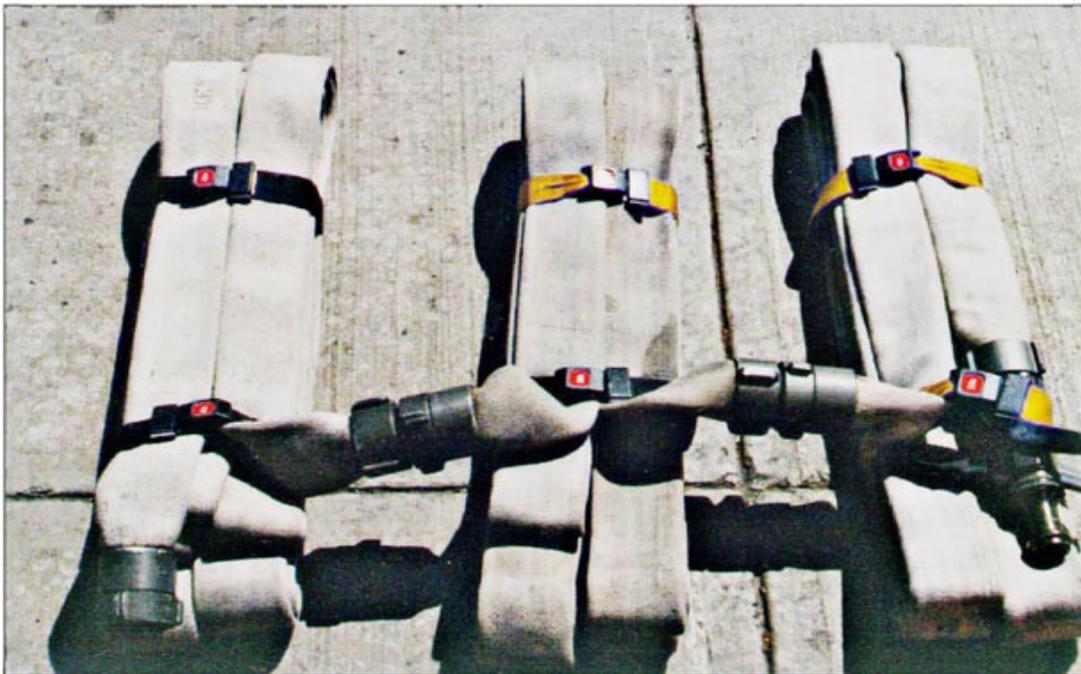


Photo 1

- ◆ Disengage straps from the folded lengths. The Nozzle firefighter may opt to take his length up to the fire floor before removing the strap.
- ◆ Nozzle and Backup firefighters advance the hoseline up the stairway to the fire floor. Hose plays out in the same manner as if it was stretched from the bed of the apparatus. Door firefighter (if present) monitors hose as it plays out to prevent kinks and snags. Control firefighter operates standpipe.
- ◆ The control firefighter of the 1st to arrive engine company will complete the connection to the standpipe outlet, charge the line when ordered, provide proper water pressure, and remain at the standpipe outlet throughout the operation to provide orderly and accurate communications and continuity.

NOTES:

- a. All hoselines stretched from standpipe shall be 2½" hose with controlling nozzle and 1½" Main Stream Tip. All hoselines stretched from standpipes shall be connected to outlets on floors below the fire floor. Variations from stretching initial hoselines from standpipe outlets on a floor below the fire due to building configurations shall be approved by division commanders and placed in the CIDS program.
- b. If a pressure reducing/restricting device (PRD) is found on the standpipe outlet, it **should** be removed. If the PRD cannot be removed, and there is no other outlet available without a PRD, than it is permissible to use an outlet with a PRD.
- c. Always connect in-line pressure gauge to standpipe outlet to ensure correct nozzle pressure. Pressure gauge can be carried attached to the Control firefighter's length in the same manner as is the nozzle.
- d. Controlling nozzle must always be carried attached to the folded lead length.
- e. Observe the color of siamese or outlet caps and indicating signs or plates before connecting hose lines. Color markings for the systems are:
 - ◆ Standpipe.....Red
 - ◆ Automatic Sprinkler.....Green
 - ◆ Non-Automatic Sprinkler.....Aluminum
 - ◆ Combination Standpipe/Sprinkler.....Yellow

To supply the standpipe if the Siamese is inoperable (but the system is otherwise serviceable) or if the Siamese is supplied but further augmentation is required, this can be done by connecting and supplying water to the first floor outlet. To make this connection a 3"x 2 ½" reducer and a 2 ½" double female is required. Another option to make this connection would be to use a 3" double female and a 2 ½"x3" increaser.

- f. Before water is started, member controlling supply must personally check connection of hose to proper siamese.
- g. If building is equipped with both standpipe and sprinkler systems and standpipe is to be used, the engine company first to arrive must connect first line to standpipe siamese and second line to sprinkler siamese.
- h. Another pumper must augment the supply to combination standpipe and sprinkler systems.
- i. Certain pumpers in the FDNY are capable of delivering water at high-pressure, this may be needed in high-rise buildings. During high-pressure pumping, members must not utilize stairways as staging or rest areas. Utilize minimum amount of personnel in stairways served by standpipes, during high-pressure operations.
- j. Exposed male hose butts on folded lengths must always be protected.
- k. **Photo 2** demonstrates how to carry folded lengths so as to protect the firefighter and others from the exposed hose butts. Note that the folded length is placed with the butts toward the body, minimizing the chance of the butts flopping around (especially in tight quarters like elevators).



Photo 2

1. The folded lengths shall be placed on the floor with the butts facing up. For narrow landings, folded lengths can be stacked on stairs, adjacent to each other. (**Photo 3**)



Photo 3

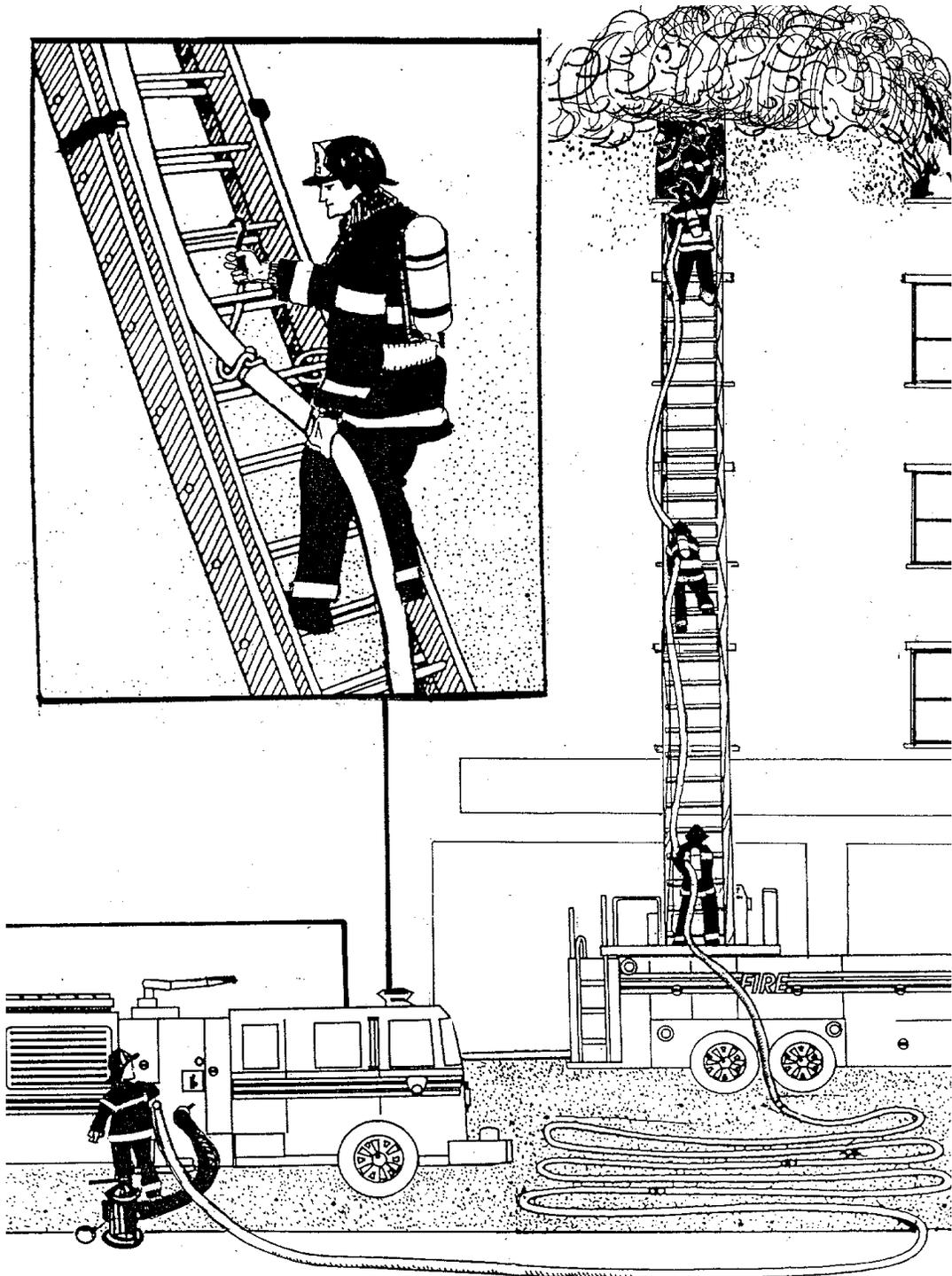
9. STRETCHING 2 ½” HOSE UP AN AERIAL

Stretching a line up an aerial is another option available to place a hoseline from the exterior when the situation calls for such. The procedure is as follows:

- 9.1 Connect pumper to hydrant and charge pump.
- 9.2 Place turntable of aerial ladder directly below objective. Raise ladder and place it in position with tip of ladder level with sill..
- 9.3 Stretch hose from pumper and use controlling nozzle. Arrange hose in folds below turntable.
- 9.4 Officer climbs ladder, enters window, surveys conditions, and orders line advanced. Nozzle, backup, and doorman use life belts. The nozzleman climbs to turntable; nozzle is passed up to him. Placing hose under left arm and nozzle over right shoulder, nozzleman climbs the aerial. Backup and doorman follow nozzleman, lightening up on line. Nozzleman snaps life belt on top rung of aerial and passes nozzle and hose in over sill to officer who holds the line. Nozzleman then climbs in the window. Backup continues up, positions at top of the aerial, and snaps life belt on top rung. Doorman positions at middle of the aerial and snaps life belt hook on rung. The Control firefighter positions on turntable to feed hose up ladder.
- 9.5 When the backup and doorman are locked in to aerial, the nozzleman, assisted by those locked in to aerial pulls sufficient hose in for operations.
- 9.6 When sufficient hose is raised both the backup and doorman secure the hose with hose strap to the aerial, unsnap their life belt, and move up to join nozzleman for operations.
- 9.7 When hose is flaked out and everyone is in position the officer gives the command to start water.

NOTES:

- 1) Hose is placed on left side of ladder as men climb.
- 2) All members operating on ladders shall wear personal harness or life belts.





ENGINE COMPANY EMERGENCIES

OBJECTIVE:	<ul style="list-style-type: none">To introduce members to the various emergencies that may be encountered.
CONTENTS:	
SOURCE:	<ul style="list-style-type: none">FDNY Firefighting Procedures, Engine Co. Ops. Chapter 10
FDNY REFERENCE:	<ul style="list-style-type: none">FDNY Firefighting Procedures, Engine Co. Ops. Ch 10

ENGINE COMPANY

EMERGENCIES

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	OVERVIEW.....	1
2	INABILITY TO SECURE A WATER SOURCE.....	1
3	LOSS OF WATER IN AN OPERATING HOSELINE.....	7
4	INABILITY OF HOSELINE TO REACH FIRE AREA.....	11



ENGINE COMPANY EMERGENCIES

1. OVERVIEW

- 1.1 Engine companies can encounter a number of unique emergency situations on the fireground. Each presents a serious safety hazard and need to be decisively addressed to avoid catastrophic consequences.
- 1.2 Engine emergencies can be classified into three broad categories, based on the underlying threat presented by each specific situation:
 - 1.2.1 Inability to secure a water source
 - 1.2.2 Loss of water in an operating hoseline
 - 1.2.3 Inability of hoseline to reach the seat of the fire
- 1.3 The following sections will describe a number of emergency situations that engine companies may encounter at a fire operation. These sections will also discuss the proper reaction by engine company personnel, as well as potential solutions to the problems faced.

2. INABILITY TO SECURE A WATER SOURCE

- 2.1 The inability of the 1st due engine company to secure a positive water source is a serious situation that affects everyone on the fireground.
- 2.2 Anytime an engine company is unable to secure a positive water source, a signal 10-70 should be transmitted. This should be given by an URGENT handie-talkie transmission in accordance with *Communications Manual: Company Unit Communications*. The signal 10-70 should also be transmitted over the department radio, which will alert incoming units of the situation. The 2nd due engine officer will be designated the “Water Resource Officer” and will be responsible for ensuring a water source is secured.
- 2.3 Inoperative hydrant
 - 2.3.1 If the 1st due engine finds their hydrant to be inoperative (or frozen), the ECC should immediately notify their officer that their primary hydrant is inoperative and attempt to find a nearby operable hydrant that can supply water. If there are no nearby hydrants, and the second due engine is not on scene, the 1st ECC should transmit a 10-70, as described above.
 - 2.3.2 If there is another hydrant in the immediate area, the ECC should test it for operability. If the second nearby hydrant is inoperative or frozen, and the second due engine is not on scene, the 1st ECC should transmit a 10-70, as described above.

- 2.3.3 If there is no alternative hydrant in the immediate area and the 2nd due engine is on scene, the 1st ECC should contact the 2nd ECC to see if they have a working hydrant.
 - 2.3.4 If the 2nd due company has a working hydrant, the 1st ECC must determine if they can hook up to that hydrant directly, either by repositioning their rig, or by stretching 3 ½” hose. If either option is available, the 10-70 signal is not required.
 - 2.3.5 If the 1st ECC determines that they cannot directly hook up to the working hydrant, they will need to be supplied via a relay operation. If this is required, the 1st ECC should transmit a 10-70, as described above.
 - 2.3.6 If the 2nd due engine does not have a working hydrant, both ECC’s must continue searching for a working hydrant until a water source is obtained. In this situation, a 10-70 should be transmitted as described above.
- 2.4 Inoperative standpipe system
- 2.4.1 If the standpipe system fails to provide a water source on the upper floors of a high-rise building, engine company members will not be able to stretch and operate a hoseline from the standpipe outlet, creating an emergency situation for operating units.
 - 2.4.2 This will likely be discovered by the control firefighter at the standpipe outlet. If they are unable to use the standpipe system to supply the hoseline, they should transmit a signal 10-70 via an URGENT handie talkie transmission as described above and inform the Incident Commander and engine officer of the situation.

- 2.4.3 Before initiating an emergency solution, it should be determined whether the standpipe system is completely inoperative. It may be possible to rectify the issue of inadequate water at the outlet by correcting a minor problem in the system, effectively making the system fully operational. As a first step, members should troubleshoot possible problems in the standpipe system by considering the following:
- A. Confer with the supplying ECC to determine if they are flowing water as indicated on their flowmeter.
 - B. If they are flowing water, this indicates an opening (open floor outlet, ruptured piping, etc...) in the standpipe system.
 - C. In this case, members should attempt to find and close the opening.
 - D. Depending on the height of the building and the fire floor, the Incident Commander may have to assign several units to assist in this search.
 - E. The search for the opening should begin in the basement of the building and work towards the fire floor.
 - F. However, units already in place on upper floors may be assigned by the Incident Commander to assist in the search by working downwards from the upper floors.
 - G. If the ECC is not flowing any water as indicated on the flowmeter, this may indicate a blockage in the system.
 - H. This may be a closed riser or section valve or other obstruction. In this case, members should attempt to find the closed valve.
 - I. The search for the closed valve should begin in the basement of the building and work towards the fire floor.
 - J. In either case, the system should be augmented by a 2nd apparatus. This may be via a 2nd FDC or the 1st floor outlet.
- 2.4.4 If the standpipe system proves to be fully inoperative, engine companies must seek out an alternative method of supplying water to the fire floor. By the time the failure of the standpipe system is discovered, the 1st arriving engine will likely be positioned at the floor outlet on the floor below the fire, equipped with their standard complement of equipment, which includes 3 lengths of hose and a standpipe kit. Using this equipment, this emergency can be solved by performing either a “reverse stairway stretch” or an “exterior hose drop”.
- 2.4.5 A “reverse stairway stretch” involves members carrying 2 ½” roll-ups into the building and stretching down the stairway to the apparatus. Rather than beginning the stretch on the street level, the stretch begins on the floor below the fire and additional lengths are added as it continues down the designated stairway. This method will use gravity to facilitate a long and difficult stretch.

- 2.4.6 An “exterior hose drop” is similar to a rope stretch, but instead of using a rope to hoist hose up to a window, members will lower connected lengths of hose down from a window to the street below. While completing a rope stretch from a window on an upper floor might be possible, the extreme weight of the hose will make hoisting the required number of lengths prohibitively difficult.
 - 2.4.7 In both scenarios, the key point is that 2 ½” roll-ups are carried to the fire area and stretched down to the apparatus.
- 2.5 Reverse Stairway Stretch
- 2.5.1 The execution of a reverse stairway stretch must be approved by the IC and communicated to all units.
 - 2.5.2 The engine officer will communicate with the Incident Commander and the ECC to identify the stairway to be used for the stretch. On the ground, the ECC (assisted by additional engine companies) will begin stretching 2 ½” hose up the designated stairway.
 - 2.5.3 Beginning on the floor below the fire, members will connect their lengths of 2 ½” hose (roll-ups) and begin stretching down the designated stairway. As additional engine companies arrive, they will add their roll-ups to the stretch as it descends the stairway. Members should ensure the female end of the hose is being stretched downwards towards the street.
 - 2.5.4 Depending on the length of the stretch, additional engine companies may be directed to report to a lower floor (equipped with their roll-ups) to meet the stretch as it descends the stairway. This operation will require significant coordination and clear communication to ensure sufficient hose is brought to the correct locations.
 - 2.5.5 The stretch will continue down the designated stairway until it meets the hoseline being stretched up the stairway. At this point, the hoselines will be coupled and the stretch will be complete.
 - 2.5.6 Once the stretch is complete, the engine officer in command of the nozzle team must be notified. Only the officer in command of the nozzle team can call for the hoseline to be charged.
 - 2.5.7 The ECC should supply the line with pressures consistent with the street hydraulics calculations for a 2 ½” hoseline. The ECC must remain aware of any indication of insufficient pressure in the hoseline and be prepared to supply additional pressure if necessary.

2.6 Exterior Hose Drop (Figure 1)



Figure 1

- 2.6.1 The execution of an exterior hose drop must be approved by the IC and communicated to all units.
- 2.6.2 The engine officer will communicate with the Incident Commander and the ECC to coordinate the location from which the hoseline will be lowered. On the ground, the ECC will stretch a 2 ½" line to the point at which the lowered line will reach the ground.
- 2.6.3 hose and begin to lower it out the window. If there is a rope available, it can be tied as a safety precaution to the lead coupling being lowered, so as to allow the members waiting on the ground below to guide the hose as it's being lowered. Once the lead coupling reaches the ground, the ECC will couple it to the supply line stretched to that location.
- 2.6.4 After the hose has been lowered, members of the first due engine company must properly secure the hose. This is the most critical point of the evolution. If the hose is not properly secured, the weight of the charged hoseline will cause such severe kinking in the line such that sufficient water will not reach the fire floor. Once charged, the line will be too heavy to move and adjustments to eliminate the kinks will not be possible.

- 2.6.5 To properly secure the hoseline with the equipment available, a rolling hitch must be tied and secured directly below the first hose coupling that will be located outside the window (Figure 2). The knot must be tied and secured before the line is charged. If a different knot, such as a standard clove hitch, is used, the line will likely kink around the rope and severely limit water flow. The wide surface area of the rolling hitch (4 turns around the rope) will minimize this kinking effect. If the knot is tied away from the coupling, it will likely also kink severely; it requires the stability of the coupling to prevent kinking.
- 2.6.6 Once the rolling hitch is tied at the coupling, the knot must be lowered outside the window so the hose is oriented vertically (Figure 3). If the knot is kept inside the window when it is secured, the weight of the water will severely kink the line as it comes over the window sill. *(photos show hose lowered from a roof, but the evolution is the same from a window)*



Figure 2

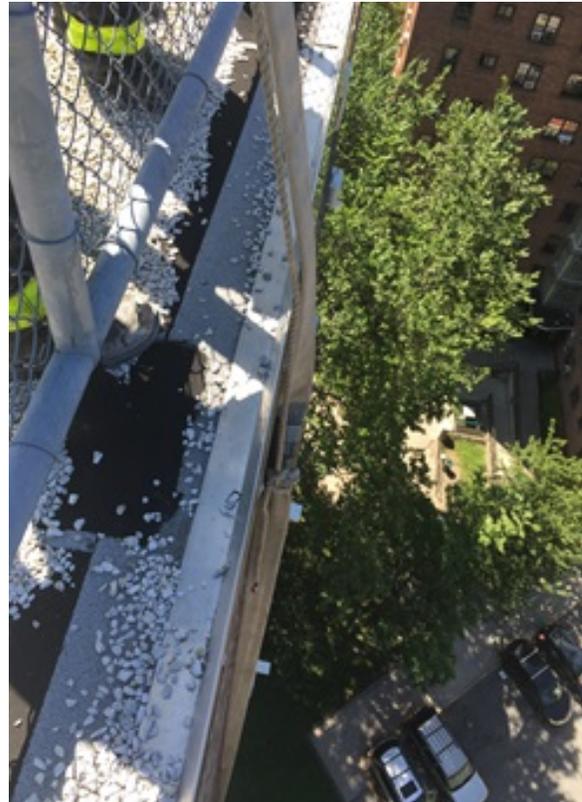


Figure 3

- 2.6.7 After the knot is lowered into place, the rope must be secured inside the window using a substantial object knot. The location of the substantial object knot will depend on the length of the rope being used. Any available rope may be used for this purpose.

- 2.6.8 When the rolling hitch is in position, the substantial object knot has been secured, and the nozzle is attached, the line is ready to be charged (Figure 4). When the officer calls for water, the ECC should charge the line slowly to minimize movement in the hose as the water fills the line.
- 2.6.9 Once the line is charged, there will likely be a significant kink at the window sill. This can be eliminated by lifting the line to create a bow, effectively “loading” the line onto the rolling hitch (Figure 5), which is supporting the hose at the first coupling located outside the window.

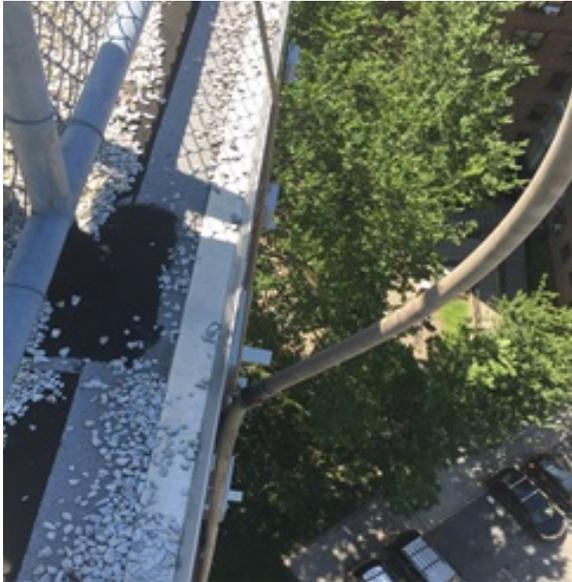


Figure 4



Figure 5

- 2.6.10 The ECC should supply the line with pressures consistent with the street hydraulics calculations for a standard 2 ½” line stretched. This calculation should include the lengths to be stretched inside the building from the floor below the fire to reach the fire area.

3. LOSS OF WATER IN AN OPERATING HOSELINE

- 3.1 When an engine company loses water in their hoseline while operating, the Engine Officer should transmit an URGENT message via handie-talkie, as outlined in Communications Chapter 9. This will alert the entire fireground of the emergency. In addition to this transmission, the Engine Officer must initiate action to remedy the situation.
- 3.2 It is important for the engine officer to coordinate with the ECC to identify the problem and correct it as soon as possible. Once the problem is accurately identified, there may be corrective action that can be taken that would not require the water supply to the hoseline to be shut down. Shutting the water supply to the hoseline should be avoided, if possible.

3.3 Burst length

- 3.3.1 When a burst length is severe enough to critically reduce the extinguishment capabilities of the hoseline, it should be treated as a loss of water in the hoseline and it must be addressed. An URGENT handie talkie transmission must be made and the hoseline should be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.
- 3.3.2 It is important to note that a leak in the hoseline does not necessarily constitute a burst length. If adequate water flow is still present at the nozzle, it is not a “water loss” emergency, even if water is leaking from the hoseline. If a significant leak is found in the hoseline, the engine officer should be notified, but the determination of a water loss should be made by the engine officer in charge of the hoseline.
- 3.3.3 The indications of a burst length include water loss at the nozzle, pressure loss in the lead length, an elevated water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter) and the apparatus pump RPM increasing automatically. This indicates that water is leaving the pumper, but not reaching the nozzle. This diagnosis from the pump panel must be followed up with the confirmation of the location of the burst length itself.
- 3.3.4 This problem can be solved by locating and replacing the burst length. To do this, water to the hoseline will need to be shut down at the pumper (or standpipe outlet) and a replacement length of the same size hose will be brought to the location of the burst length. Once water is shut, the burst length is disconnected and replaced with the new length. Only the engine officer can order the hoseline shut down.
- 3.3.5 In certain situations, if enough hose is available and it is determined that the hoseline can safely operate with one less length, the burst length can simply be removed and the couplings reattached from existing hose lengths.
- 3.3.6 Once the replacement length of hose is connected, the engine officer in command of the hoseline must be notified. The engine officer will then call for the line to be recharged.

3.4 Clogged nozzle

- 3.4.1 If there is a water loss at the nozzle, but no pressure loss in the lead length of hose, there may be an obstruction at the nozzle itself. In this case, the pump panel will indicate normal pressure, but no water flow.
- 3.4.2 To check for an obstruction at the nozzle, the shut-off handle to the nozzle should be closed and the MST is removed, allowing any obstruction to be removed. Water may not need to be shut down at the pumper.

- 3.4.3 Once the obstruction is removed, reattach the MST and open the nozzle to continue operations.
 - 3.4.4 If the clog is suspected to be related to ice or slush in the hoseline, a possible solution may be to rapidly open and close the nozzle repeatedly. This may help break up the ice or slush in the line.
- 3.5 Kinks
- 3.5.1 Kinks are a common problem on the fireground, but they can escalate to an emergency situation if the kinking is severe enough to critically reduce the extinguishment capabilities of the hoseline. This would be the case if water flow is reduced at the nozzle to the degree that the engine officer determines that the hoseline cannot continue to advance.
 - 3.5.2 If kinks are severe enough to critically reduce the extinguishment capabilities of the hoseline, they should be treated as a loss of water in the hoseline and they must be addressed. An URGENT handie talkie transmission must be made. When deemed necessary, the hoseline may be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.
 - 3.5.3 In the case of kinking, the pump panel would indicate normal pressure, but there will be a reduced water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter). There will also be a decrease in the engine RPM.
 - 3.5.4 The problem can be solved by dispatching members to survey the path of the hoseline and manually remove any kinks in the line. Kinking should not be corrected by increasing the pressure in the hoseline.
 - 3.5.5 Once the kinks are removed, full water flow should return to the nozzle. The engine officer should communicate the return of water to the line.
- 3.6 Hoseline charged under a door
- 3.6.1 If a hoseline becomes charged while it is under a door (or similar narrow opening), water flow and pressure at the nozzle may be completely lost. Additionally, the hoseline may not be able to advance as it is physically stuck in place under the door. This is a more serious situation than kinking and is not as easily resolved.
 - 3.6.2 In this situation, the pressure reading at the pump panel will be normal, but there will be a reduced water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter).

- 3.6.3 Upon the discovery of the charged hose under a door, the engine officer must be notified and steps must be taken to remove the hose from the pinch point. The engine officer should transmit an URGENT handie-talkie message and withdraw the nozzle team to an area of safety.
 - 3.6.4 If a charged hoseline is found under a door and critically reducing the extinguishment capabilities of the hoseline, this situation should be treated as a loss of water in the hoseline and must be addressed. An URGENT handie talkie transmission must be made and the nozzle team should be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.
 - 3.6.5 The member that discovered the pinch point must work to remove the hose from the obstruction. This will likely require a halligan, hydra ram, or other hand tools. In the case of a hose stuck under a door, the quickest solution may be to remove the door from the hinge (if the door removal will not adversely impact fire conditions).
 - 3.6.6 If the charged hose cannot be removed from the obstruction, it may become necessary to momentarily shut the water supply to the hoseline to allow members to free the hose. Once the water supply is shut, the ECC will need to relieve the pressure in the line by opening the appropriate drain valve on the apparatus. This order must be given by the engine officer and would have to be closely coordinated between the engine officer, ECC, and member removing the hose from the pinch point. Once removed, the engine officer will order the line recharged as soon as possible.
 - 3.6.7 If this scenario occurs when a line is stretched from a standpipe outlet, there will not be an option to relieve the pressure in the hoseline by opening a drain valve on the apparatus. This is a more serious situation, as there will be no way to relieve the pressure in the line once it is charged from the standpipe outlet. The obstruction will need to be removed.
- 3.7 Failure of Apparatus pump
- 3.7.1 A serious emergency situation would be the failure of the apparatus pump while supplying a hoseline. This could cause the immediate loss of water in all hoselines supplied by that apparatus.
 - 3.7.2 If the issue is first noticed at the nozzle, the engine officer would experience a loss of water and pressure in the line. An URGENT handie-talkie message should be given indicating the problem.

- 3.7.3 If the problem is first noticed by the ECC, they should transmit an URGENT handie-talkie message for a water loss. Since the problem is with the apparatus and not the water source, a signal 10-70 should not be transmitted. When a 10-70 is transmitted, resources are focused on securing a water source for the 1st due apparatus. In this case, the apparatus itself is not operational, so an URGENT transmission for water loss is more effective.
 - 3.7.4 Following this transmission, the engine officer should withdraw the nozzle team to an area of safety and members in the street should provide whatever assistance necessary to solve the problem. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.
 - 3.7.5 If the problem with the apparatus cannot be quickly solved, water supply can be restored to the hoseline by stretching 2 ½” hose from a nearby apparatus (that is connected to a hydrant) to the 1st due pumper. The hoseline is then disconnected from the 1st due apparatus outlet and connected to the new 2 ½” line. The hoseline can now be supplied by the new pumper.
 - 3.7.6 An alternative solution may be to supply water from a 2nd apparatus to the apparatus with the failed pump. The pumping operation can then be controlled from the 2nd pumper, with the original apparatus essentially functioning as a large manifold. In this scenario, the pressure supply to the original apparatus will be limited to 150 psi, as the relief valve will dispel any additional pressure.
- 3.8 Failure of Pro Pressure Governor
- 3.8.1 If the PPG of the apparatus fails to operate properly, the ECC may not be able to supply sufficient pressure to operating hoselines.
 - 3.8.2 As a solution, the ECC may be able to boost available pressure by switching the apparatus to Pressure Mode by using the apparatus transfer valve. An additional solution may be to receive a relay from another pumper.

4. INABILITY OF HOSELINE TO REACH FIRE AREA

- 4.1 At a fire operation, there are a number of reasons that a hoseline would not be able to access the fire area. While such a situation may not require an URGENT transmission, it should be treated as an emergency and all available resources should be used to facilitate the advance of the hoseline to the fire area.
- 4.2 If the hoseline is unable to reach the fire area, the engine officer must clearly communicate the situation to the IC and ensure all members operating in exposed positions (such as the floor above) are aware that extinguishment will be delayed. Depending on the situation, corrective action may be taken.

4.3 Short stretch

- 4.3.1 If there is not enough hose in the hoseline to reach the fire area, it is called a “short stretch”. This problem can be prevented by ensuring an accurate estimation of the amount of hose needed in the stretch to reach the fire area.
- 4.3.2 The problem of a short stretch can be fixed by adding a length of hose to the stretch. A length of 1 ¾” hose should be maintained in readiness on all engine apparatus for this purpose. If 2 ½” hose is needed, a length maintained as a roll-up can be used.
- 4.3.3 If the short stretch is recognized after the line is operating inside the fire area, the line will need to be withdrawn to a safe area in order to add the additional hose. This may occur when the hoseline cannot reach the fire room itself. In this case, the IC must be informed when the line is repositioned to a safe area.
- 4.3.4 The engine officer must decide where to add the additional length to the stretch. There are two options: the length can either be added to the front of the stretch at the nozzle, or it can be inserted at any point in the stretch itself.
- 4.3.5 When adding an extra length in the stretch behind the nozzle, the water supply to the hoseline will need to be shut. To minimize the amount of time without water, the extra length should be flaked and ready to be coupled at the desired location before the engine officer orders the water supply shut to the line. Once the new length is connected, the officer will order the line recharged.
- 4.3.6 To avoid shutting the water supply to the hoseline, the length can be added to the front of the stretch at the nozzle. To do this, the added length (with an additional nozzle attached) will be brought to the nozzle. With the hoseline remaining charged, the nozzle is closed and the MST is removed. The added hose is coupled directly to the shut-off of the nozzle. If the added length is 1 ¾” hose, no additional fittings are required and it is connected directly to the existing shut-off. If the added length is 2 ½” hose, an increaser will be needed to make this connection. The added length will now become the new lead length.
- 4.3.7 Once the new lead length is flaked out, the original shut-off will be opened and the lead length will be charged. The shut off must be maintained in an open position, which can be achieved by securing it with a hose strap. The hose strap is looped around the hose several feet behind the original shut-off and the clip of the hose strap is attached to the handle of the shut-off to maintain it in an open position. A member must also be positioned at the shut-off to ensure the shut-off remains open and the water supply is not interrupted.
- 4.3.8 If conditions prevent the new length from being added to the front of the stretch, it should be added as close to the front of the stretch as possible. This will minimize the hose that will need to be advanced after the addition of the extra length.

- 4.3.9 If six lengths of 1 ¾” hose have already been stretched, it is permissible to add one extra length of 1 ¾” hose to the stretch in the emergency situation of a short stretch.
- 4.3.10 If the hoseline is stretched from a standpipe, it may have a lead length of 2” hose. In this case, the procedure is the same and the 1” MST can be removed to allow the connection of an additional length. The additional length can be either 2” hose or 2 ½” hose, so an increaser will be needed to make the connection. In this emergency situation, it is permissible to add a 2nd length of 2” hose (with 1” tip) to remedy a short stretch. It is also permissible to add a length of 2 ½” hose (with 1 1/8” tip) to a lead length of 2” hose.
- 4.4 Hose strap failure
- 4.4.1 When a hose strap is used in a well hole stretch, rope stretch, or fire escape stretch, it is supporting the weight of the charged hose that is hanging vertically. If the hose strap fails (either the strap breaks or the securing knot is ineffective), this hanging hose will begin to fall away from the fire floor.
- 4.4.2 Such a failure will have the effect of halting the forward progress of the hoseline and may even pull the operating hoseline out of the fire area. If this happens, the engine officer must be made aware of the situation and coordinate the restoration of the hoseline to the proper position.
- 4.4.3 The problem can be solved through a coordinated effort of members lifting the hose back to the fire area and properly securing it with another hose strap.
- 4.5 Blocked access to fire area
- 4.5.1 In a situation in which the 1st hoseline cannot gain access to the fire area, the engine officer must clearly communicate the problem and work to find a solution.
- 4.5.2 A common obstruction to a fire area can be the door to the fire area itself. If the door opens inward into the fire area, it can often block access for the hoseline when the door is chocked in the open position (Figure 6). This is especially difficult if the open door blocks the entire hallway behind it, as is common in a variety of multiple dwellings. In these situations, the presence of a hallway behind the door can be difficult to detect and units may have difficulty finding the fire.



Figure 6

- 4.5.3 To resolve this, the engine needs to advance a sufficient amount of the charged lead length into the apartment and stage it in an area opposite the door. Once in position, the door needs to be closed (at least partially) to allow the engine to advance the hoseline and access the fire. Once water is on the fire, consideration can be given to removing the door from its hinges, if it will not negatively impact fire conditions. This will allow for unimpeded egress from the fire area.
- 4.5.4 In the case of a more significant obstruction that cannot be removed and hoseline access will be impossible or severely delayed, the engine officer must notify the IC and consideration should be given to finding alternative access with a 2nd hoseline. The 1st hoseline should remain in position to protect operating members and the building egress, but the operation of the two hoselines must be closely coordinated.



LADDER COMPANY TOOLS

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with the various tools generally carried by ladder companies
CONTENTS:	<ul style="list-style-type: none">• A brief description of ladder company tools with an explanation of the proper use of the more commonly used tools.
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Training Bulletins, Tools 2,3, 9,10,20,21,24,26& 27• FDNY Training Bulletins, Forcible Entry 1 & 2• FDNY Firefighting Procedures, Ladder Company Operations, Book 3

<u>TOOL</u>	<u>PAGE</u>
HOOKS	1
AXES.....	5
HALLIGAN	7
RABBIT TOOL & HYDRA RAM.....	8
MISCELLANEOUS HAND TOOL.....	9
POWER SAW.....	11
MAXI-FORCE AIR BAGS.....	22
CHAIN SAW.....	31
HURST TOOL.....	43
KO CURTAIN & WINDOW BLANKET.....	48
THERMAL IMAGING CAMERA.....	55
GASALERT EXTREME (CO) MONITOR.....	63
RADALERT 50 RADIOLOGICAL MONITOR.....	67

The duties of a Ladder Company include, but are not limited to, forcible entry, search & rescue, ventilation, overhauling and laddering. The following is a list of tools carried by ladder companies to accomplish these duties:

HOOKS

- ◆ Come in various sizes: 6, 10, 12, 15 or 20 feet. The six foot hook is the most commonly used. Hooks are used mostly for pulling ceilings and opening walls. They are also used to pull up sections of roof after an opening has been cut.

- ◆ There are two different types of hooks:

1. Wooden with a pike end



2. Halligan hook with the shaft made of metal or fiberglass



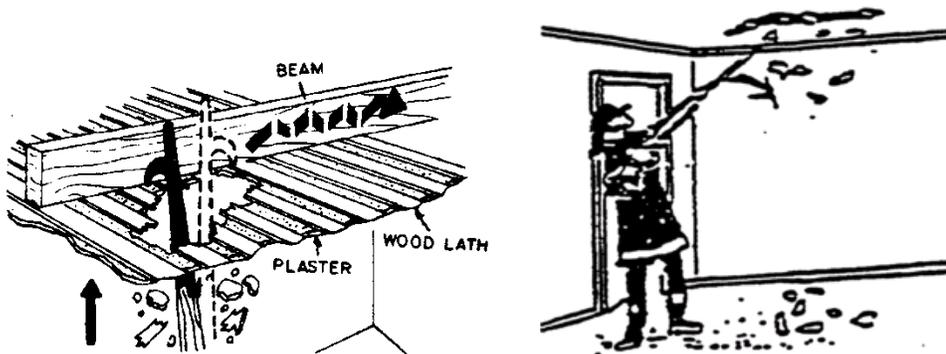
- ◆ When carrying hooks, care must be taken to avoid injuring people in front or behind. Hook should be carried with the hook end straight up, to the rear and close to the body.

◆ **USES:**

○ Opening Up Concealed Spaces:

• *Pulling ceilings:*

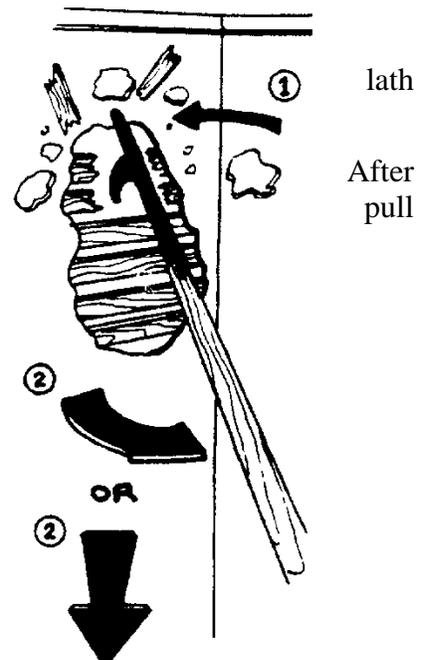
- The ceiling is penetrated with one firm stroke with the hook end parallel to the lath. This breaks only one lath on the upstroke instead of two or three. The hook is then turned to form a right angle to the lath and the ceiling is pulled with short, sharp strokes close to the beam. This method is fast and conserves energy. The firefighter should not stand directly below the ceiling being pulled. They should keep the work in front of them. In close quarters firefighters shall keep their heads down to prevent injury. Eye shields shall be used.

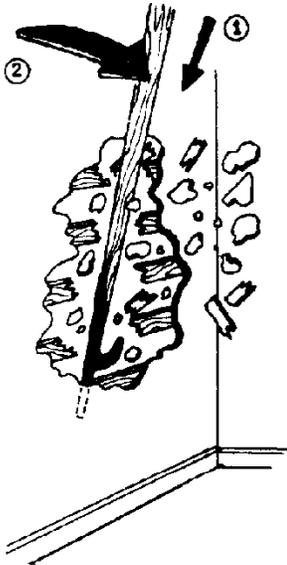


NOTE: WHEN PULLING SHEET ROCK CEILINGS, BE AWARE THEY MAY FALL IN LARGE HEAVY SECTIONS.

• *Opening Walls:*

- To make a hole high in a sidewall or partition of and plaster:
 - This requires a sharp blow with the hook. penetration with the hook, the tool is used to pry down or pry out if leverage is possible.





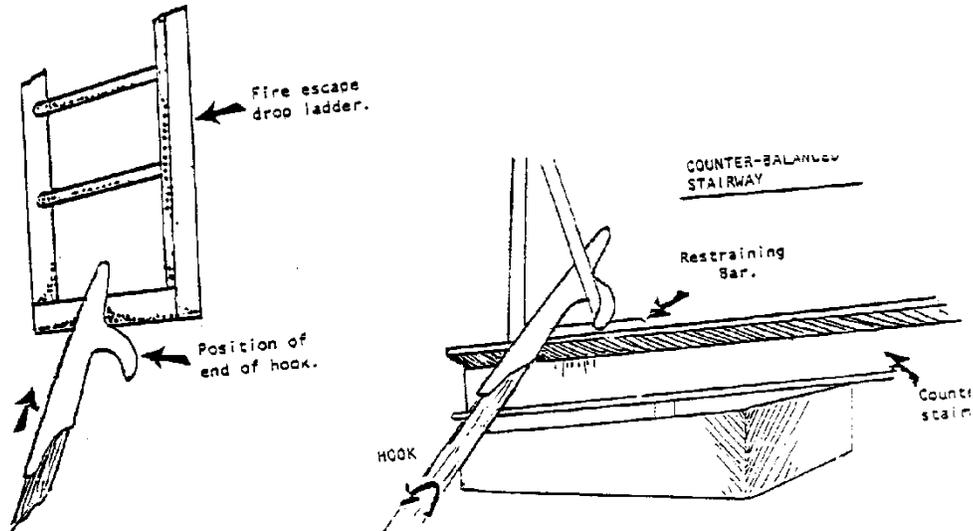
➤ To make a hole low in a side wall or partition:

- The hook is held like a javelin before penetrating the wall. After an opening has been made, the hook is then pushed down behind the lath and the lath is removed by pulling the handle. This should open the wall to the floor or baseboard. When prying with the hook, excessive strain which may break the wooden handle must be avoided.

- Use the handle of the hook, or the point to make small probing holes to check for extension or to allow water to flow out as opposed to pulling.



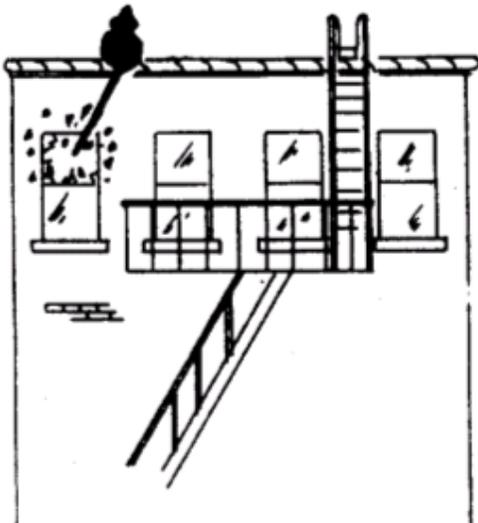
- Releasing Drop Ladders or Counter-Balanced Stairways:
 - Drop ladder should be raised by pushing it with the hook end of the tool. Member should maintain control of the ladder by keeping pressure on the bottom rung as the ladder is lowered.



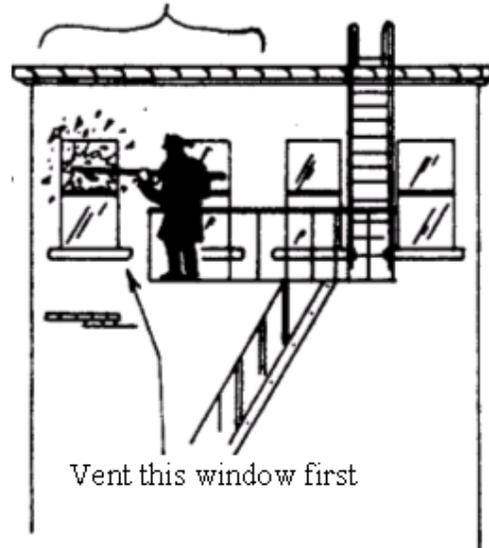
NOTE: Member lowering a drop ladder should, when possible, stand under the fire escape. This way if the guide rails are missing or defective, the ladder will fall away from the member.

- Venting Windows:

Avoid standing directly above window



Apartment to be Vented



AXES

- ◆ The FDNY uses two types of axes, a flat head and a pike head:

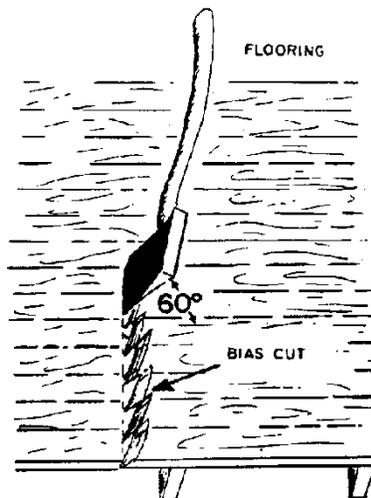


Flat Head Axe

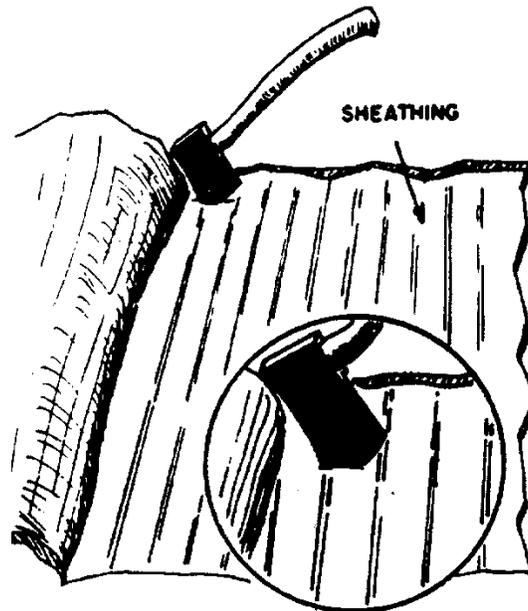


Pike Head Axe

- ◆ The flat head axe is usually carried by the Forcible Entry Firefighter, married together with the halligan tool.
- ◆ The pike head axe might be used the Ladder Company Chauffeur (LCC).
- ◆ Besides using as a striking tool against the halligan, axes can be used to cut floors or roofs.
 - *Cutting a floor:*
 - Cut floor at a 60 degree angle and on a bias as shown.
 - This is easier than cutting across the grain.

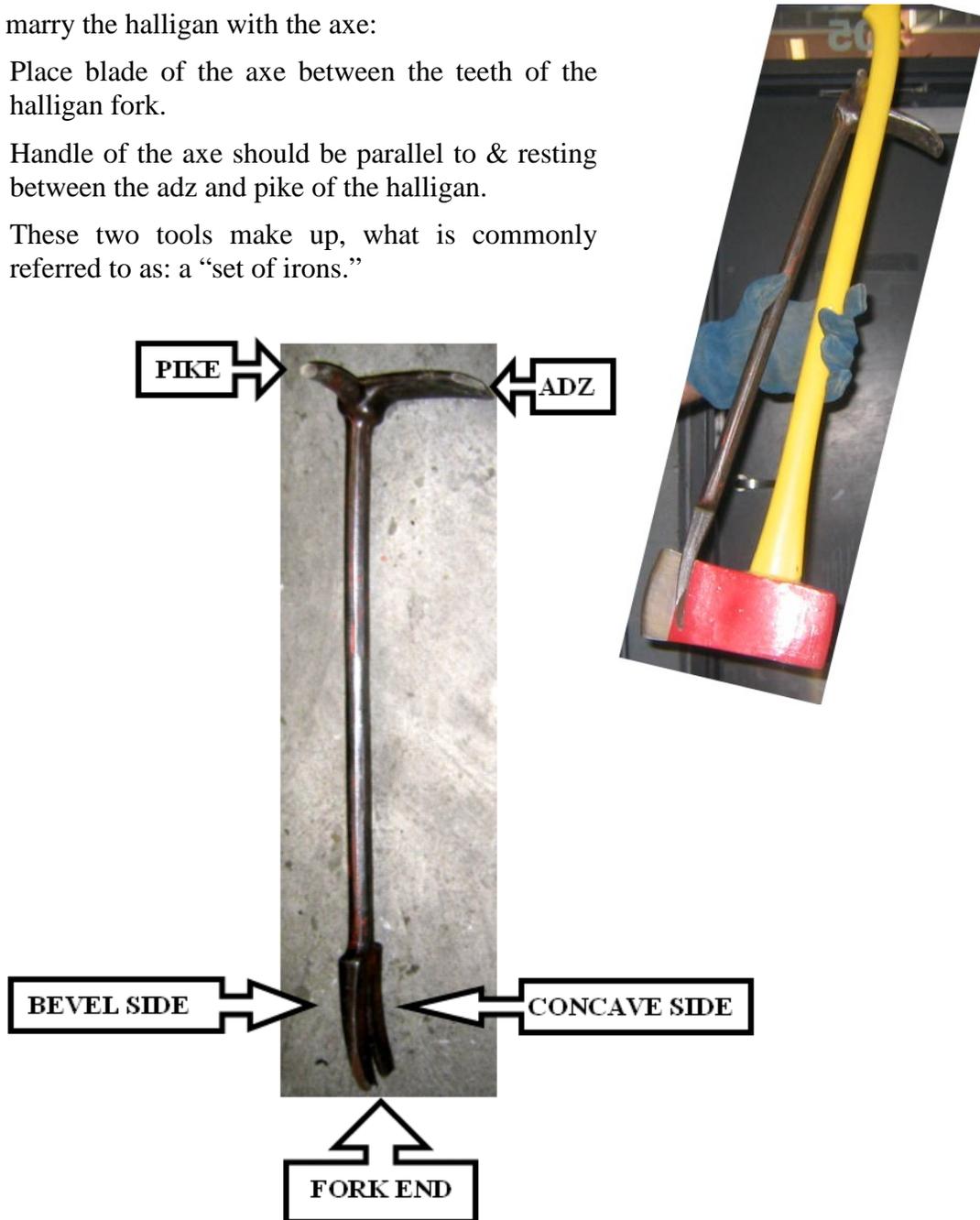


- *Cutting a Roof with an Axe:*
 - The instructions contained herein are still valid in that total reliance cannot be placed on power equipment and the principles that apply to the use of axes still apply to the use of power saws.
 - A. Determine the location of the hole. Cut through the roof covering and remove it, exposing the sheathing. The roof sheathing is placed at right angles to the beams and generally run front to rear. Cut through the sheathing at opposite sides of the proposed opening close to the beam to lessen the bounce of the axe and the resultant binding action when the axe goes through a springy portion of the sheathing. Remove the cut sheathing from the opening with a member on each end of the cut section working in unison to remove tar, tin and nails. Push down the ceiling of the top floor with a 6` hook.
 - B. The approximate location of the beam may be determined by "sounding" with the back of the axe.
 - C. When there is a tin covering between the asphalt covering and the roof boards, it will require an accurate cut to separate the tin from the roof boards. This frequently requires two cutting operations. The first cut is the tar and the tin which is removed prior to cutting the roof boards. It is obvious that this will cause a slight delay in obtaining a roof opening.



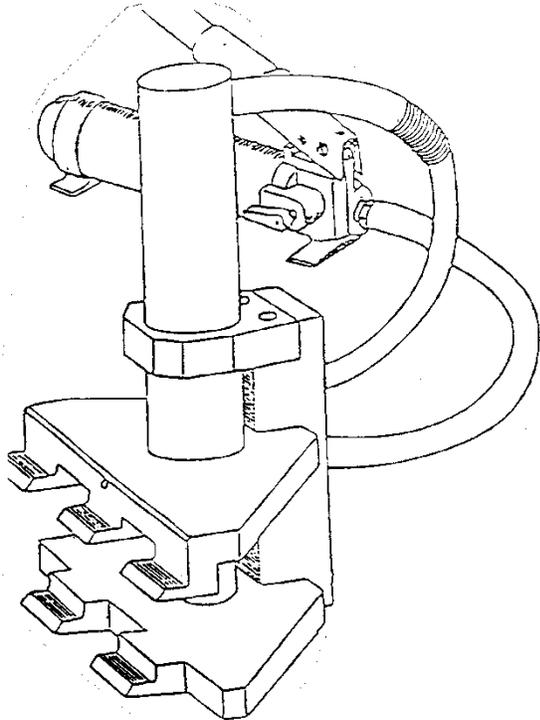
HALLIGAN TOOL

- ◆ One of the most versatile tools of the FDNY arsenal.
- ◆ Usually carried by the Forcible Entry Firefighter, married together with a flat head axe, or the Roof & Outside Vent Firefighters.
- ◆ To marry the halligan with the axe:
 - Place blade of the axe between the teeth of the halligan fork.
 - Handle of the axe should be parallel to & resting between the adz and pike of the halligan.
 - These two tools make up, what is commonly referred to as: a “set of irons.”



RABBIT TOOL

- ◆ A hydraulically operated forcible entry consisting of a hand pump, high pressure hose & jaws.
- ◆ Designed for doors that open inward.
- ◆ Exerts over 4 tons of force
- ◆ Weighs 25 lbs.
- ◆ Has also been successful on sliding elevator doors.
- ◆ Not to be use as an auto extrication tool.
- ◆ The hand pump is designed to be operated horizontally, but may be used vertically if hose is facing down.



tool

the

HYDRA RAM

- ◆ Another hydraulically operated forcible entry tool, but without any hoses and less limitations as the Rabbit Tool.
- ◆ Can be used for inward & outward opening doors. Can also be used to provide an opening from the side of vehicle hood or trunk for stream placement.
- ◆ Can be used under water.
- ◆ Jaws open from $\frac{3}{4}$ " to a max. of 4"
- ◆ Exerts a maximum of 10,000 lbs. of force.
- ◆ Weighs 12 lbs. & is 13 inches long
- ◆ **Never** strike the Hydra Ram with another tool to gain a purchase.



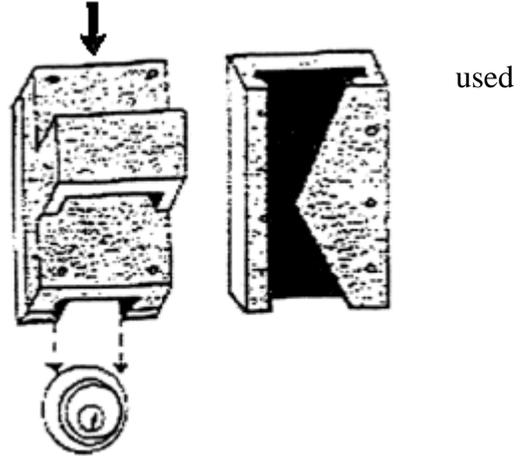
a

NOTE: WHENEVER USING HYDRAULICALLY OPERATED TOOLS, PUT YOUR EYE SHIELDS DOWN OR WEAR SAFETY GOGGLES.

MISCELLANEOUS HAND TOOLS

K-TOOL

- ◆ Used to pull out a lock cylinder on door. It is used with an axe and halligan. The K-tool is forced behind the ring & face of the cylinder until the wedging blades take bite into the cylinder. Light blows with an axe help this forcing. When the cylinder is removed, use a key tool in the hole to move the locking bolt to the open position.



BOLT CUTTERS

- ◆ Used for cutting bolts, locks, metal cables, etc.
- ◆ Should **not** be used on case hardened locks.

PORTABLE LIGHTS

- ◆ Used to provide illumination to facilitate operations.
- ◆ There are various types of lights that can be operated from fixed locations, i.e. on top of apparatuses & tower ladder buckets and/or by portable lights where needed.



SHOVELS

Used for overhauling, clearing floors of plaster, sheetrock, etc.



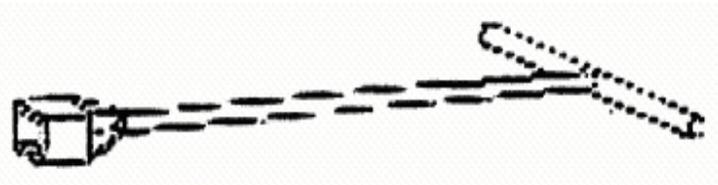
WIRE CUTTER

A tool with insulated handles and used for cutting electrical wires. Rubber insulated gloves must be worn when using wire cutters.



HYDRANT MAIN SHUT OFF KEY

Used to close the valve of the main, supplying water to a hydrant



MAUL

The maul (sledge hammer) has many different uses, e.g. with a halligan for force entry, breaking concrete covers over gas curb valves, breaching cinder block walls, etc.



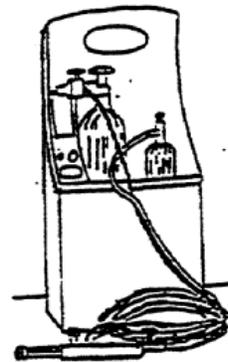
DUCK BILL

Its long, sharp pointed pick may be used for forcing padlocks.



TORCH

An oxygen and MAPP gas cutting torch.
Used to cut steel & iron



PORTABLE POWER SAWS

- ◆ Improves efficiency by facilitating cutting operations
- ◆ Can be extremely dangerous if misused or if safety precautions are disregarded.



Carrying Handle

Control Handle

◆ DESCRIPTION:

- High speed, two cycle engine
- Gasoline/oil mixture: 2.6 fluid ounces of oil to one gallon of gasoline
- 20 to 30 minutes operating time
- Special suction wick; allow saw to operate regardless of position, such as upside down, sideways, etc.
- Three different types of blades:

1. CARBIDE TIP:

Will cut through gravel & tar covered roofs, wood flooring, light sheet metal and similar material (pictured above). The Carbide blade shall not be used on metal security doors, auto bodies, metal window bars & case hardened locks, etc.

- Dislodged carbide tips can become airborne & cause injuries
- Blades are placed out of service when
 - a. Eight (8) or more tips are broken or missing from the **24-tooth blade**.
 - b. Three (3) or more tips are broken or missing from the **12-tooth blade**.
 - c. Blade is cracked
 - d. Center hole wears out of round

2. ALUMINUM OXIDE (Abrasive Disc):

Will cut various types of steel, including auto bodies, metal security doors, metal window bars, etc.

3. SILICON CARBIDE (Abrasive Disc):

Will cut through concrete & other masonry materials. Silicon Carbide Blades as painted yellow, on both sides, to differentiate from the aluminum oxide blade (**Figure 1**)

- Abrasive Blades are placed out of service when:
 - a. Cracked or badly nicked
 - b. Center hole wears out of round
 - c. Disc is worn to an 8" diameter or less

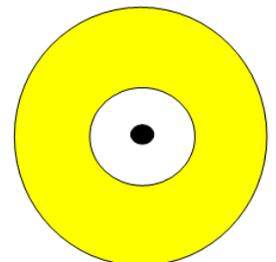


Figure 1

4. COMBINATION METAL/CONCRETE BLADE

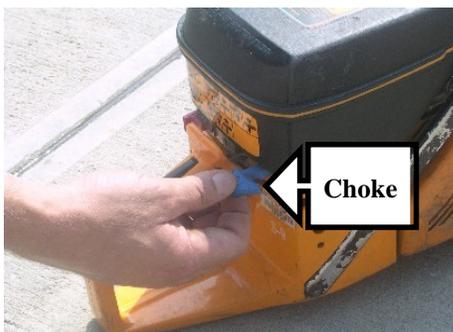
The 12" blade is a diamond brazed saw blade for use on the forcible entry saw. This blade replaces both types of abrasive disks mentioned above. The blade can cut wood, however it's not recommended. If the blade is glazed over and cuts ineffectively, run the blade through an abrasive material such as concrete. This removes build up and exposes more diamonds on the blade's edge. (**Figure 2**)



Figure 2

◆ Testing & Starting the Saw:

- Move to a safe area – Do not start in explosive atmosphere.
- Check all nuts, bolts, and screws for tightness.
- Check fuel level.
- Shake saw vigorously to insure gasoline and oil is mixed.
- Place the saw on a flat surface holding it firmly in a level position.
- Place the red (Stop) lever in the run position
- Engage the choke (blue lever), by either pushing to down position or pulling it out.
- Engage the trigger (throttle) lock.
- Press the decompression button

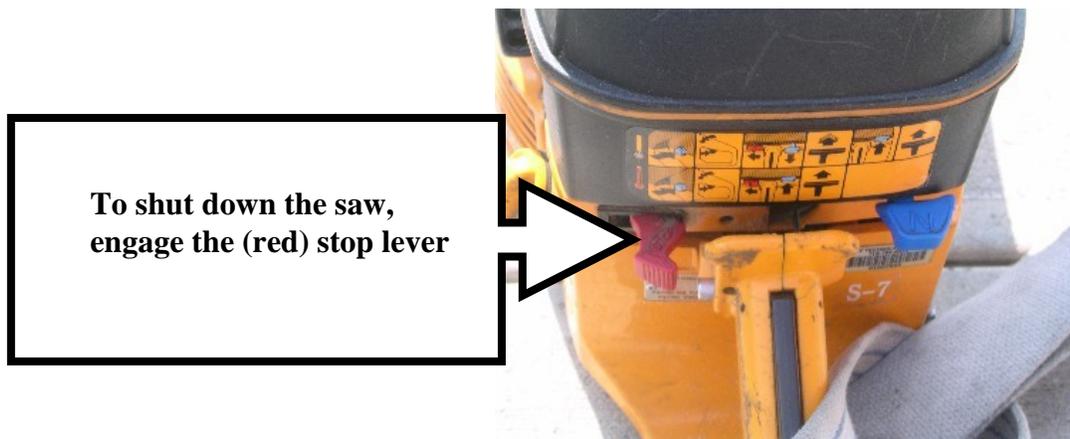


Place the left foot in the control guard & the right foot back for balance.

- Lift the starter cord a couple of inches. (This is to prevent damage to the recoil mechanism).



- Pull the starter cord, until you here the motor kick.
 - Disengage the choke and pull the starter cord again.
 - Once the saw starts disengage the trigger lock, by squeezing & releasing the throttle trigger.



NOTE: With the problem of large boots not fitting into the handle, members have the option of placing their right foot onto the lip of the right side of the handle. If this method is employed the carrying handle should be held down with the right hand. An additional option is to insert a tool or a substantial object such as a thick piece of wood or steel through the handle and step on the same prior to starting the saw. Regardless of which method is used, the saw handle must be held by hand prior to starting the saw.

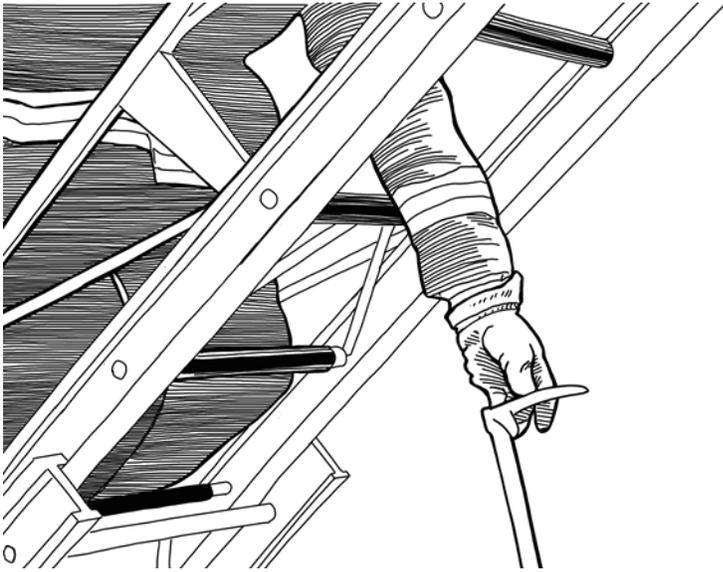
Aerial Ladder Climb with Roof Saw Removal and Dismount

Inspection of the sling for serviceability must be a normal part of saw maintenance. Check the sling for any damage (ex. tears, rips, fraying, fuel saturation, etc.). When a sling is deemed unserviceable it is to be placed “Out of Service” and a replacement obtained (by requisition) from the Fire Tools and Equipment Unit

- Each Roof saw is equipped with a carrying sling.
- When the saw is stored on apparatus, attach sling so that it is ready to be carried.
- Each member should adjust the saw to their own height, taking into account for the gear to be worn during practical applications. This sizing should be done when the member receives their positional assignment for the tour.



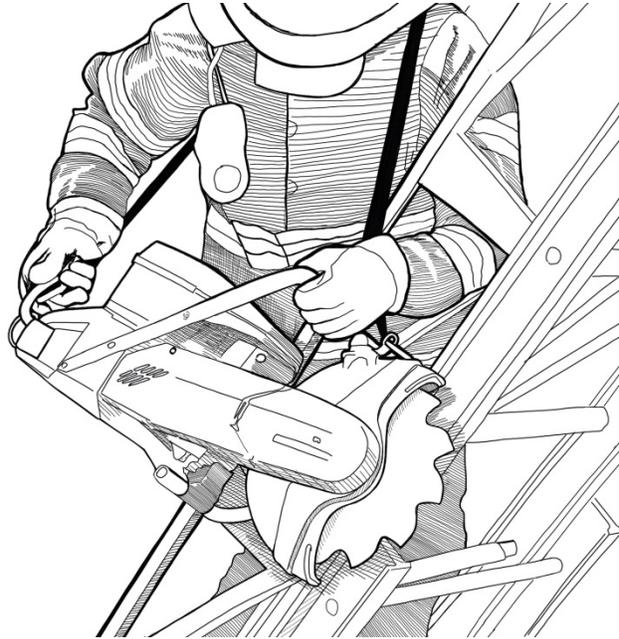
Dismounting Aerial ladder with Power Saw:



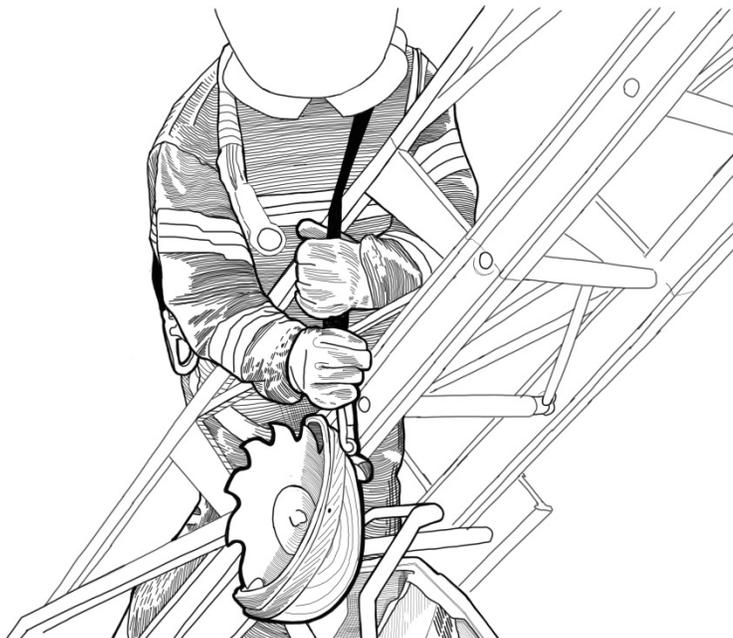
- After dropping hand tools on roof the Firefighter shifts body to the right side of the aerial ladder and lets the saw hang over the outside of the right rail
- The firefighter maintains grip of aerial ladder with the right hand and places the left arm through the right rail of the aerial ladder and grasps the portable power saw handle in an “arm lock”.



- Once the left “arm Lock” has secured the firefighter and the saw the firefighter uses their hand to release the double action carabineer from the rear of the throttle grip handle of the saw.



- The firefighter returns their right hand to the portable power saw handle and grasps the saw sling with the left hand where it is attached to the saw on the blade guard and slowly lowers the saw to the roof by slowly passing the saw harness through both hands.



- Firefighter properly dismounts aerial ladder.



- While using this procedure the firefighter safely maintains contact with the aerial ladder at all times.





Note: The Sling Must Be Removed From The Saw Before Starting The Saw.

◆ **SAFETY PRECAUTIONS & PROCEDURES:**

- All members operating and/or in the immediate area of cutting operations shall wear full protective clothing. Goggles must be worn or eye shields must be in the down position.
- Only members who have demonstrated an aptitude and who have been thoroughly trained in its operation should operate the saw during fire operations.
- Have a plan of action BEFORE STARTING SAW; plan should include:
 - Location & sequence of cuts and openings
 - A safe means of egress
 - Wind direction – consider its effect on exposures & other members
- SAW OPERATING TEAM
 - The firefighter who operates the saw (Operator) will be assisted and/or guided by another member.
 - A physical communication system between the Guide Man and the Operator will be as follows:
 - A. One slap on the back of OperatorStop Cut.
 - B. Two slaps on the back of OperatorCut.
 - C. Three slaps on the back of OperatorShut Down Saw.
- CIRCLE OF DANGER
 - During cutting operations, everyone in the vicinity of a saw in operation shall observe, "as near as possible and practical, a 20 foot radius Circle of Danger."
 - This circle shall be measured in all directions FROM THE POINT WHERE THE BLADE OF THE SAW IS IN OPERATION.
 - Only the Officer, the Operator and the member designated as the guide may enter this circle. All persons directly to the rear of the operating saw blade must be warned away, as the saw may throw debris 20' feet or more.
 - The Operator shall not bring a "live saw" (i.e. a saw with engine running) into a position that puts other members within the Circle of Danger.

○ MOVING WITH THE SAW

- Before moving from one position to another, **DISENGAGE THE CLUTCH, RELEASE TRIGGER, AND PLACE BLADE ON FLAT SURFACE TO STOP THE BLADE FROM SPINNING.** Keep the blade on the surface and roll the saw to the next assignment.
- The member assigned as a guide holds onto the Operator. They then proceed in unison. This is an awkward position and debris, hose lines or obstructions may be in the way. The Operator, after maneuvering over these obstacles, must always return the saw blade to surface as soon as possible.
 - This method has been chosen to prevent the operator from carrying a "live saw" (and possibly accidentally running into someone). If saw rolls into a hole while traveling in this position, the blade will go over the edge and the operator will immediately know he must stop. This situation can then be investigated before advancing.
- The saw shall be shut down when moved to distant areas of operation, (e.g., level to level).

○ OTHER SAFETY CONCERNS

- If conditions permit, scrape gravel and debris from the path to be cut, in order to reduce the danger of injury from flying chips and loose materials.
- To prevent accidents caused by moving belts, gears, blades, etc., it is imperative that Operator and Guide have their clothing completely buttoned up and close fitting.
- "GUNNING" the saw while the Operator is either "standing by" or moving to a new point of operation **SHALL NOT BE PERMITTED.** Gunning engages the centrifugal clutch and causes the blade to spin, thus increasing the possibility of injury.
- The saw cut should be only as deep as necessary. Deep cuts may weaken supporting beams and lead to collapse. The experienced Operator will know when a beam is being cut by the sound and feel of the saw.
- Side pressure or twisting of the blade when operating should be avoided. The saw should never be forced. If too much pressure is applied to the blade, the hazard of blade breakage (carbide tipped) or blade shattering (aluminum oxide or silicon carbide discs) is increased.
- Always place saw down when changing operators
- Avoid using saws from portable ladders
- Hold with two hands
- The saw shall always be shut down when unattended

◆ CUTTING OPERATIONS

○ CARBIDE TIP BLADES:

- Lean forward, squeeze the throttle and bring the blade up to full RPMs before contacting the surface with the blade. Let the blade lower itself into the material. Then move backwards, guided by your guide man. Maintain the saw at full RPMs while cutting.
 - Do not over-extend yourself.
 - Do not reach forward past the point of good balance.
 - A slight back and forth motion of the saw will widen the cut & help prevent the blade from binding.

○ ABRASIVE DISCS (aluminum oxide & silicon carbide):

- When the disc is brought into contact with the material, run the engine at low speed and gradually increase it as the disc cuts into the material; this provides guidance. Once a groove is formed, work at full throttle and regulate engine speed by varying pressure on the material.
- When a cut has been completed, stop the blade by lifting the spinning blade from the cut, releasing the trigger and placing the blade on the surface being cut.

◆ MAINTENANCE PROCEDURES

- Saw should be checked at the beginning of each tour.
- Weekly, and after every cutting operation, the belt should be adjusted.
- Other maintenance, as needed, include:
 - Changing the spark plugs
 - Change the blade
 - Refueling the tank
 - Change & adjust the belt
 - Cleaning the exterior of the saw
 - Changing the air filter

MAXI-FORCE AIR BAGS

USES:

- ◆ Designed to lift and move heavy loads
- ◆ Excellent on cylindrical and odd shaped objects.
- ◆ Works well with other extrication tools, such as, the Hurst tool, power saw, cutting torch, air chisel, etc.

COMPONENTS:

- ◆ AIR CYLINDER
 - Steel SCBA cylinder, painted green as not to be confused with breathing air cylinders

- ◆ AIR SUPPLY HOSES

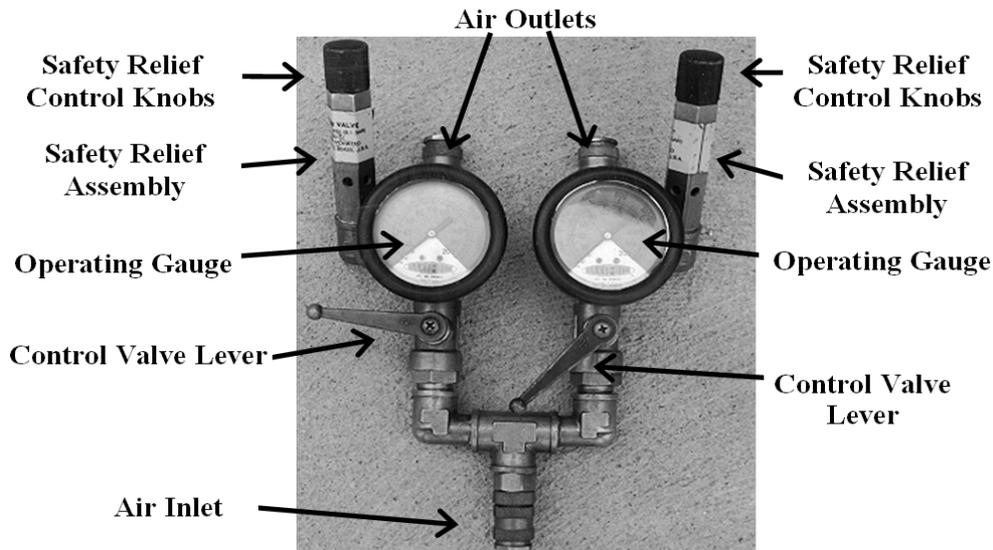
- Three 16 feet long, one (1) yellow and two (2) red.
- Heavy duty connectors of a special size to prevent improper connection
- Dual locking mechanism located on the female connections



- ◆ BAGS

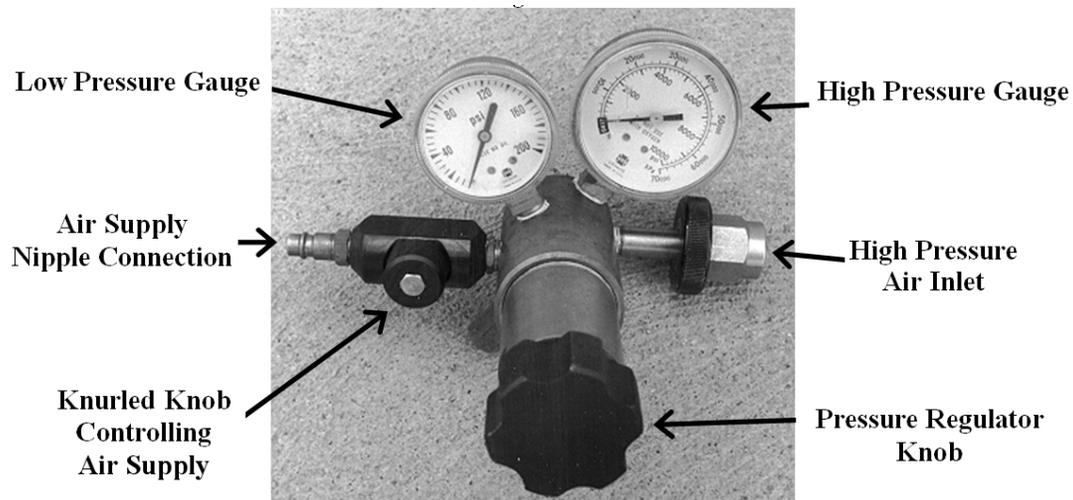
- Neoprene rubber, reinforced with steel, with a non-slip type surface
- Requires only an inch of space for insertion.
- 7 bags in system:
 - 12-ton/8.2 inches to 74-ton/20 inches
- Rated tonnage is based on the bags ability to lift that weight one inch
- Rated height is based on the bag's ability to lift ½ the maximum tonnage to a certain height, i.e. a 12-ton/8.2" bag can only lift 12 tons one inch and six tons 8.2 inches.





◆ DUAL COMBINATION CONTROL VALVE & SAFETY RELIEF (CVSR)

- Single input / dual output
- Air received from regulator
- Control Valve Levers, supplies air to bags (inflate & deflate slowly)
- Operating Gauges (one for each bag)
- Safety Relief Assemblies prevent over inflating bag; will expel air pressure in excess of 118psi.



◆ PRESSURE REGULATOR

- Piston-type high pressure
- Connected to air cylinder, by the High Pressure Air Inlet
- Two gauges: High (cylinder) & Low (working) pressures
- Low pressure gauge – set to 135psi
- Pressure Regulator Knob (sets low pressure)
- Knurled Knob Controlling Air Supply (clockwise to close)
- Air Supply Nipple Connection (used to supply air to the CVSR and to bleed off air from the regulator)

◆ SHUT-OFF CONTROL DEVICES

- When bag is lifted to desired height these devices off the bag and the hose can be disconnected & to another bag.
- Clockwise to close
- Equipped with automatic safety relief valve



can seal
attached

ASSEMBLY

◆ SET THE PRESSURE REGULATOR:

- Close regulator air supply by turning the small knurled black knob clockwise



- Connect regulator to high pressure source



- Open air source slowly and watch the gauge. The high pressure gauge should reflect the air source pressure.



- Set the low pressure gauge to 135psi by turning the pressure regulator knob clockwise.

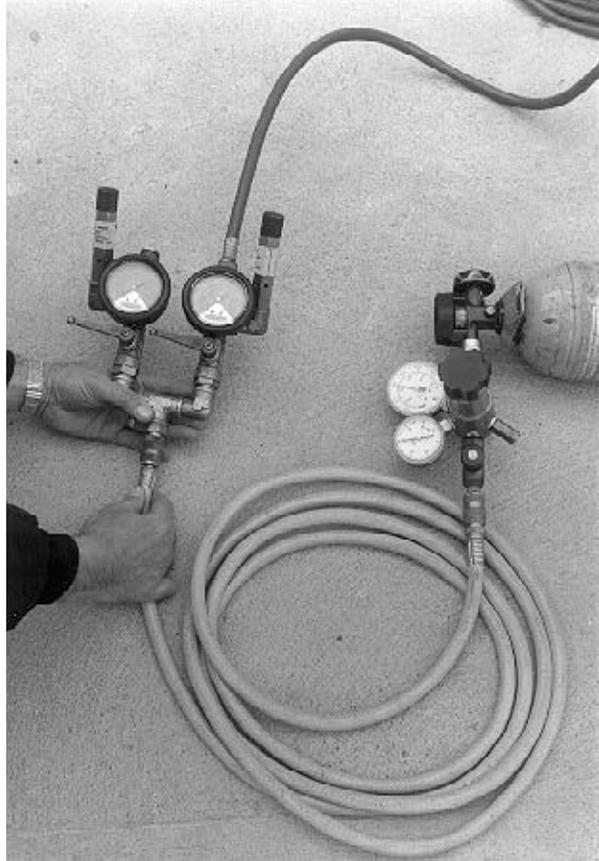


NOTE: When the high pressure gauge falls below 200psi, change the air cylinder.

NOTE: Always open the high pressure air source slowly. Failure to do so may damage the regulator diaphragm. Make sure all valves are in the closed position before you turn on your air source. This will reduce the risk of any uncontrolled lift.

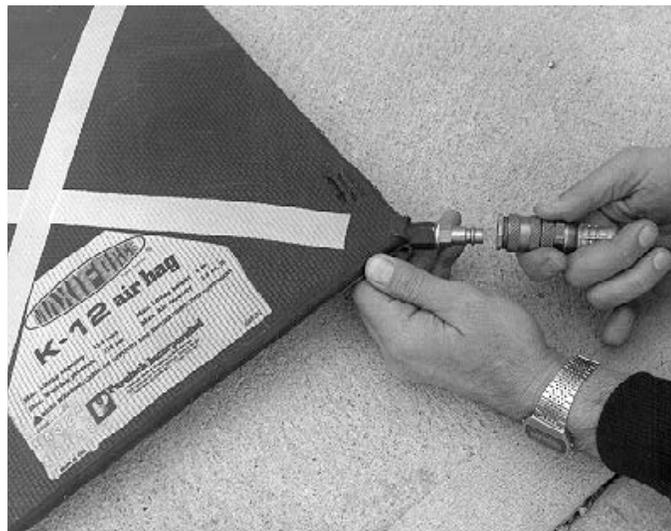
◆ DUAL COMBINATION CONTROL VALVE AND SAFETY RELIEF (CVSR)

- The control valves are quarter turn ball valves which work independently.
- Check both control levers to make sure they are in the closed position (perpendicular to air supply line.)
- Connect one of the red air supply hoses to the pressure regulator and to the control valve and safety relief inlet.
- The other red air supply hose is connected to one of the air outlets.
- Return to the regulator and fully open the knurled knob air outlet valve, counterclockwise. This will bring the air up to the control valve safety relief.

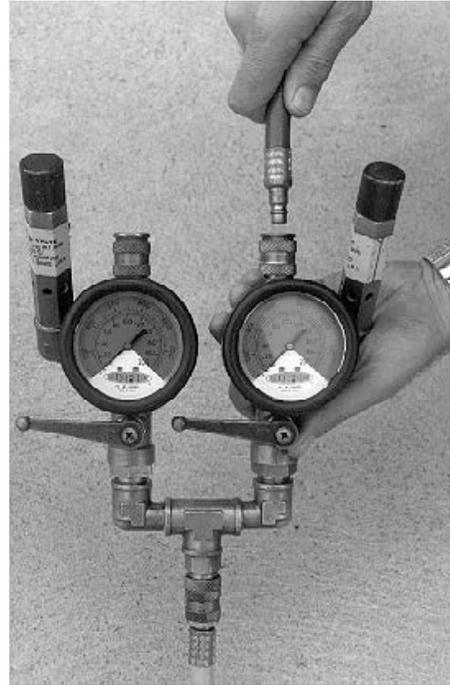


◆ CONNECTING A BAG

- Select a bag size capable of lifting the load and connect an air supply hose to the inlet nipple protruding from the corner of the bag.



- Connect the air supply hose to the outlet connection on the dual CVSR. Both safety relief valves must be closed.
- Be sure to engage the dual locking mechanism located on the female connections and CVSR.
 - Simply insert the male into the female and then rotate the serrated knob at the base of the female connection (clockwise) until it is snug. Give both hoses a "tug", to make sure they are securely joined.



- Place the bag under the load with the air inlet nipple pointing out. Place the bag as close to the load as possible to maximize the contact area between the bag and the load.

NOTE: Always have the bag connected prior to placing it under or between a load to minimize the operator's exposure to the load area and to eliminate the possibility of the operator placing the bag with the air inlet under the load.

◆ INFLATION AND DEFLATION OF THE BAGS

- Open the control valve lever by slowly moving it parallel to the air line. The bag will gradually inflate. The speed of inflation is controlled by this lever.

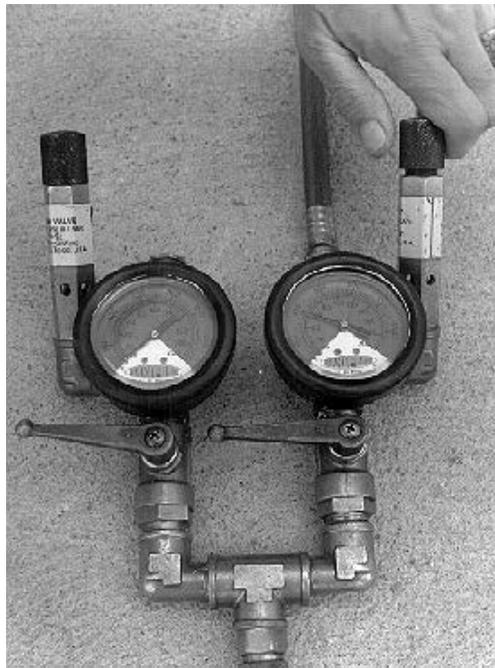
NOTE: Inflate the bags slowly to minimize the chance of the load shifting.

- As the bag is being inflated, note the gauge reading on the control valve safety relief. The gauges read the internal air pressure of the connected bag.
 - Maximum internal air pressure for the bag when used for lifting purposes is 118psi. The safety relief valve will prevent over-inflation.
 - Air pressure in excess of the 118psi limit will be expelled from the opening at the base of the control valve safety relief.
 - Normally, inflation should be just enough to lift the load as far as needed.

- When the gauge reading reaches the vicinity of the red mark, the safety relief will open (at 118psi) and start venting.
- At this time, close the control lever to conserve the air supply.
- If the desired lift is reached before the bags reaches maximum pressure, simply close the control lever.

NOTE: Stabilize and shore a load before placing bags into position. Build shoring in stages as load is being lifted. Always exercise care to avoid injury in the event of a drop or load shift

- To deflate the bag with the control valve safety relief, close the control levers. Then, slowly turn the knurled knob on the top of the safety relief counter-clockwise. The lowering speed must be adjusted by the operator.



NOTE: The bags are designed to inflate and deflate slowly to prevent the load from being thrown off-center.

◆ CHANGING AIR CYLINDERS

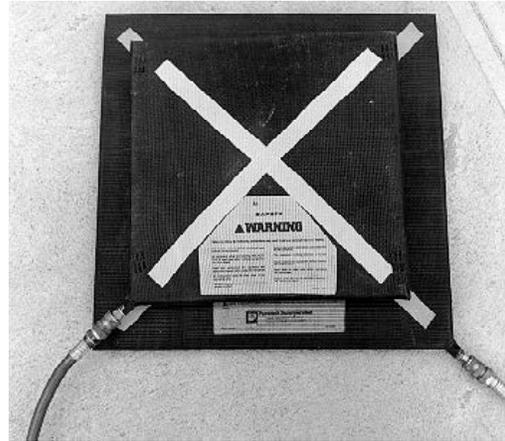
- Can be changed during operation or when pressure falls below 200psi.
- To change cylinder:
 - Stop operation.
 - Block or shore the lift.
 - Make sure all air inlet and outlet valves on cylinder, pressure regulator, and control valve and safety relief are in the fully closed position.
 - This will isolate the bag from the air supply and will prevent bags from deflating.
 - Disconnect the air outlet hose from the pressure regulator.
 - Bleed the regulator using the knurled knob.
 - Disconnect the regulator from the air cylinder.
 - Connect the pressure regulator to a new cylinder.
 - Re-connect the air outlet hose to the pressure regulator.
 - Resume operations.

◆ OPERATIONAL GUIDELINES

- Personnel should wear protective clothing.
- Only trained members should be allowed to operate the system.
- Before raising an object, determine the desired height or load movement and obtain blocks or shoring before the bags are inflated.
- When using an air bag, inflate at a slow rate and maximize the surface contact area of the bag. This may require either blocking up the bag before inflating or using two bags, one on top of the other.
 - If necessary to block up a bag, 3/4" plywood, 3 layers thick, glued and nailed or screwed together is recommended. Plywood will not split or crack under loads as it has elasticity.
- The bags should only be inflated half to three quarters of their rated height capacity. The "pillowing effect" should be avoided. This can cause the load to shift with possible dangerous results.
- During inflation, stand to one side and clear all personnel from the vicinity. Do not stand in front of the opening where the bag has been placed, there is a possibility of the bag being pushed out by the load shifting.
- Never work under a load unless it is blocked or shored. As the load is being moved or lifted, always block or shore the load. Remember that although a bag does not need a smooth surface, blocks and shoring do.

- Avoid inflating bags against sharp objects or on a surface heated to over 220 F. If necessary, insert a flexible insulated pad (heavy canvas, leather, rubber) or 3/4" plywood between the hot or sharp surface and the bag, in order to protect the bag.
- Two bags may be used safely from one control valve safety relief device.

- This allows for a greater lift height.
- It allows lifting the same load at two separate points to maximize surface contact.
- Never stack more than two bags on top of each other and always place the smaller bag on top of the larger one.
- When stacking bags, generally inflate the bottom bag first.



- Remember that, when stacking, you cannot add together the tonnage of the two bags to get the total lifting weight. The tonnage of the smaller bag is the maximum that can be lifted.
- The lifting capability is reduced by 50% to obtain maximum lifting height. Example: a 30 ton bag with a maximum lifting height of 10 inches will lift 30 tons 1 inch, but will lift 15 tons to a height of 10 inches.
- Do not operate bags, hoses, valves or regulators that are damaged or improperly assembled.
- It is recommended that the bags be stored in a horizontal position to reduce stress.
- It is important to center the bags on top of each other when stacking them. Blocking or shoring should be centered as much as possible. Do not place wood between the bags.
- To insure proper inflation of the correct bag (when two bags are stacked) always refer to the bag by the color of the supply hose; e.g. when you want the bottom bag inflated, say "raise the yellow bag" when the yellow supply hose is connected to the bottom bag. This is extremely important when the operator of the control valve and safety relief cannot see the bags or cannot distinguish which line is connected to what bag.
- Have one firefighter on the far side of the lift to observe any shift or reaction. The firefighter should be equipped with a handie-talkie.

CHAIN SAW

1. INTRODUCTION

- 1.1 Chain saws can save time and energy. They are also extremely dangerous. The safety and operational procedures of this training bulletin are to be enforced.

2. POLICY

- 2.1 Except for pier fire operations, the chain saw is not to be used for the ventilation or overhauling of structural fires.
- 2.2 The chain saw may be utilized at emergencies or non-structural fires only if the safety and operational procedures outlined in this bulletin are followed.
- 2.3 Members are to adhere to AUC 301 "Tree Emergency Operations" while operating at such incidents.
- 2.4 While operating the chain saw, the operator and control person shall wear the following NFPA compliant and FDNY approved protective equipment: Long sleeve work duty shirt or bunker coat, helmet, eye protection, ear protection, saw protected gloves, bunker boots, and saw protected chaps.



Figure 1

3. GENERAL RULES

Refer to manufacturer's manual for starting and stopping instructions specific to the model saw.

3.1 Starting stance (Figure 2)

3.1.1 Hold saw down on a clear level surface with the bar and chain clear of any obstructions.

3.1.2 Keep body to the left of the chain. Never straddle the saw or lean across chain.

3.1.3 Hold the front handlebar on top behind the hand guard with left hand.

3.1.4 Pull starter grip straight up with right hand.



Figure 2

3.2 Always hold the saw firmly with both hands while the engine is running. Keep your left hand on the front handlebar and your right hand on the rear handle so that your entire body is to the left of the cutting line. (Figure 2) Never use a cross-handed grip or any stance which would place your body and arm across the chain line.

3.3 Proper grip is to be used at all times, fingers encircling the handle with the thumb wrapped around the opposite side from the fingers. (Figure 3)

3.4 Warm up the chain saw prior to any cutting.



Figure 3

3.5 Operating stance (Figure 4A & 4B)

- 3.5.1 Weight balanced on both feet - both feet on solid ground.
- 3.5.2 Left arm is to be kept in the "straight arm" position with elbow straight to withstand any kickback force.
- 3.5.3 Body always to the left of the chain line.
- 3.5.4 Proper grip maintained as outline in sections 3.2 and 3.3
- 3.5.5 Do not overextend or cut while off balance.
- 3.5.6 Do not attempt cutting above chest height.

Figure 4A



Figure 4B



- 3.6 Properly position yourself for cutting. Hold saw near log and throttle up to full speed just before allowing chain to touch wood.
- 3.7 Maintain steady footing while gripping the saw firmly with both hands. When operating on slopes, the chain saw operator must always stand on the uphill side of the tree/log when cutting.
- 3.8 Start cuts with "bumper spike" against the wood and keep it there. Let the chain saw do the cutting. While firmly holding the saw, use the bumper spike for leverage as you slowly rock the saw in upward motions. (Figure 1)
- 3.9 Do not force the chain saw. If you have to force the saw, stop until you find out what is prohibiting you from cutting. Exert moderate feed pressure to help the chain cut the wood.
- 3.10 While cutting downward you will experience a pulling reaction. When the saw breaks through the wood the pull will cease. Operator must be ready to stop pushing down on the saw and hold the saw nose up. (Figure 4C)

3.10.1 Pull-in:

- A. Pull-in occurs when the chain on the bottom of the bar is suddenly stopped. The chain on the bottom of the bar stops when it is pinched, caught or encounters a foreign object in the wood. The reaction of the chain pulls the saw forward and may cause the operator to lose control.
- B. Pull-in frequently occurs when the bumper spike of the saw is not held securely against the tree or limb and when the chain is not rotating at full speed before it contacts the wood.

Warning: Use extreme caution when cutting small size brush and saplings which may easily catch the chain and pull you off balance.

- C. To avoid pull-in:
 1. Always start a cut with the chain rotating at full speed and the bumper spike in contact with the wood.
 2. Pull-in may also be prevented by using wedges to open the kerf.

Note: The kerf refers to the space left behind the cutting blade as it cuts.

Figure 4C

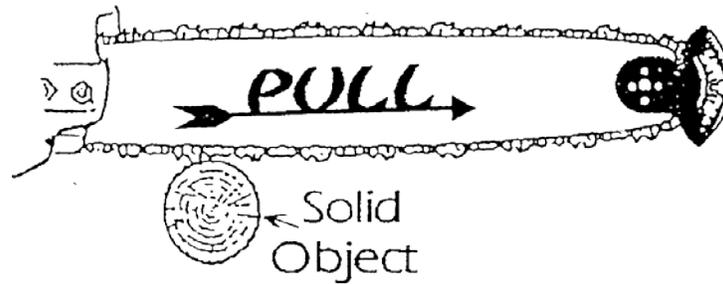
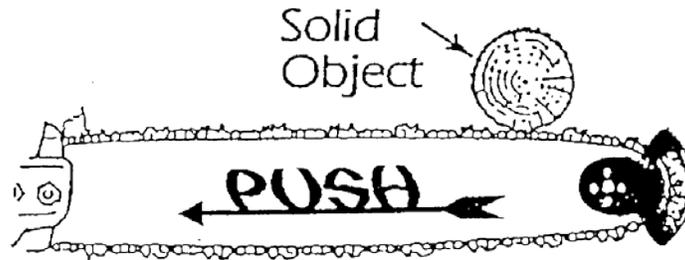


Figure 4D



While cutting downward you will experience a pulling reaction. During upward cutting a pushing reaction will be felt.

3.11 When cutting on the underside of a log or limb with the top of the saw blade, the saw will naturally be pushed out of the cut towards the operator. To compensate for this force, keep your left arm stiff and maintain constant pressure against log with the saw. (Figure 4D).

3.11.1 Pushback:

- A. Pushback occurs when the chain on the top of the bar is suddenly stopped when it is pinched, caught or encounters a foreign object in the wood. The reaction of the chain drives the saw straight back toward the operator and may cause a loss of saw control. Pushback frequently occurs when the top of the bar is used for cutting.
- B. To avoid Pushback:
 - 1. Be alert to forces or situations that may cause material to pinch the top of the chain.
 - 2. Do not cut more than one log at a time.
 - 3. Do not twist the saw when withdrawing the bar from an underbuck cut because the chain can pinch.

- 3.12 Beware of "hidden" pressure points; cut slowly to avoid binding saw in these instances. Watch the kerf space for any decrease in size; this will warn you prior to binding.
- 3.13 Do not hit the ground with the blade of the saw, even momentary touching will dull the chain to some degree.
- 3.14 When finished using the saw, slowly loosen both, the fuel cap and the oil cap to relieve the pressure. After refilling, tighten both caps.

4. SAW OPERATION

- 4.1 Size-up the job before starting and take your time, do not rush.

Sizing Up Operations Prior to Cutting:

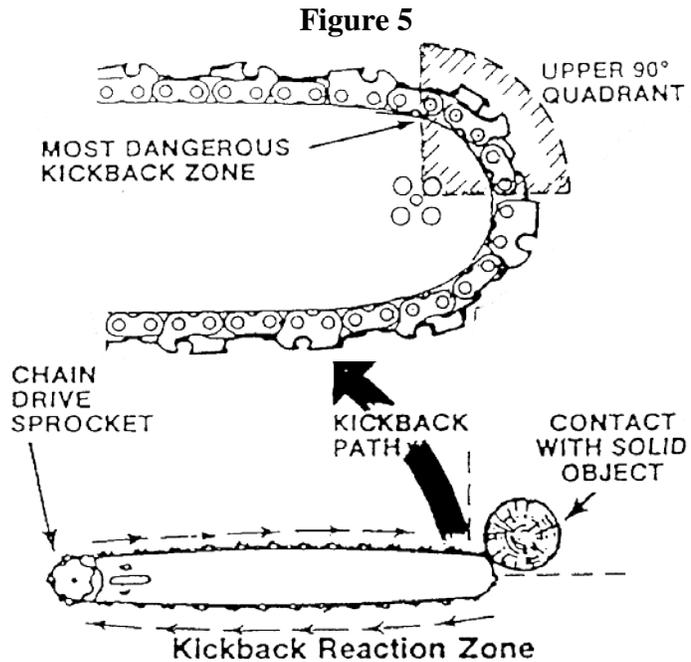
- 4.1.1 Check area for power lines, vehicles, trapped victims or possible tree shifting.
 - 4.1.2 Remove all surrounding obstacles, undergrowth, vines, shrubs, etc.
 - 4.1.3 Where is the tree/log lying? Is it on a slope? Is it hung up in other trees? Does the tree need to be secured before cutting?
 - 4.1.4 What caused the tree to fall?
 - 4.1.5 Do you have adequate tools and enough staffing to complete the job?
 - 4.1.6 Size-up should continue throughout the job as you plan out each move. Always keep evaluating the scene.
- 4.2 After receiving instructions, control person and saw operator are to don protective equipment including eye and hearing protection prior to starting the cutting operation.
- 4.3 Plan Cut:
 - 4.3.1 Operator must have a clear understanding of goals.
 - 4.3.2 Ensure safe retreat path is present.
 - 4.3.3 Clear the cutting area to provide for good footing.
 - 4.4 A circle of danger of a radius of at least 10' will be established before the commencement of cutting. The saw operator and control person will be the only personnel in this area during cutting. Officer is to monitor conditions and relay orders received from the officer in command. If possible, the officer is positioned as to permit visual contact with the control person.

- 4.5 The noise level of a chain saw, in conjunction with the hearing protection being worn, makes voice communication very difficult. Hand signals must be established between operator, control member and officer.
- 4.6 The control member should be positioned as to permit easy visual contact with the operator maintaining a safe distance from the saw. The control member must maintain a sufficient distance from the member using the saw, to prevent any possible contact with the saw. The possibility of kickback or movement of the operator must be taken into consideration. The control member must not remove cutting debris while the operator is cutting. Anytime the control member approaches the immediate cutting area, the operator must first apply the chain brake and signal the control member to approach. When possible, the control member is to maintain a visual contact with the officer.
- 4.7 Members outside the circle of danger are to be deployed as required. Duties may include: monitoring incident for changing condition, relief, assist in refueling, pedestrian and crowd control.
- 4.8 One of the primary reasons for the establishment of a circle of danger is to reduce the exposure of members to high noise levels. Long or continuous exposure to noise levels associated with chain saw operations may cause permanent hearing impairment. Hearing protection devices must be worn during operational and training sessions by members within circle of danger.
- 4.9 Debris from cutting operation should not be removed from work area until saw operator indicates it is safe to do so. Always clear immediate work area before continuing operations, eliminating tripping hazards.
- 4.10 Saw refueling area is to be located outside the circle of danger.
- 4.11 Officer is to rotate personnel to reduce individual exposure to high noise levels and prevent operator fatigue.

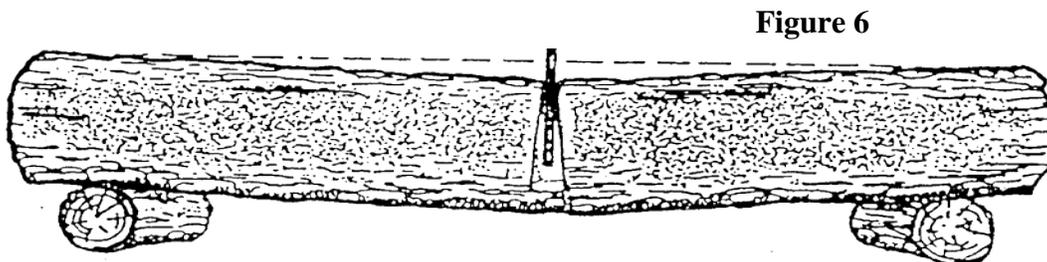
5. OPERATIONAL PRECAUTIONS

- 5.1 Prior to cutting, examine the area. Note branches or other objects which may spring back to their normal position when freed. Precautionary measures must be taken to avoid injury or damage.
- 5.2 Do not attempt cutting an object which has fallen against a structure and is now supported by it.
- 5.3 If a branch, tree section or other object is hanging, leaning or otherwise damaged, members are to prevent access to the danger area by unauthorized persons. If practical, the object should be stabilized by lashing or shoring. Cutting it down is not to be attempted.
- 5.4 Be aware of the consequences of the cut. Cut may cause shifting, rolling or dropping of object.

- 5.5 Prior to cutting operations, members are to survey area for electrical wires in contact with tree. TREES ARE GOOD CONDUCTORS OF ELECTRICITY.
- 5.6 Kickback potential of the chain saw is very dangerous. Never make plunge cuts with the tip of the blade. Never use the tip of the saw blade for cutting. This practice can cause a violent, uncontrollable kickback. (See figure 5).



- 5.7 Pinching top of guide bar in a cut could cause recoil of the saw. Saw engine could be propelled either to or away from the operator. (Figure 6)
- 5.8 Sand, dirt, cement and metal objects can be found in trees and can dull a sharp chain in seconds. Check trees for such hazards prior to cutting. A dull chain saw is an extremely dangerous tool, as it causes the operator to exert excessive force to compensate for slow cutting.
- 5.9 Never operate a chain saw while in an uncomfortable position.
- 5.10 Trees knocked over may have their trunks fractured or split. Be cautious when cutting as they can "jump" when partially cut due to undetectable tension.



6. SAFETY REQUIREMENTS

- 6.1 Saw is to be operated only by members trained in its proper use.
 - 6.2 Saw shall not be operated from a ladder.
 - 6.3 While operating the chain saw, the operator and control person shall wear the following NFPA compliant and FDNY approved protective equipment: Long sleeve work duty shirt or bunker coat, helmet, eye protection, ear protection, saw protected gloves, bunker boots, and saw protected chaps.
 - 6.3.1 Chaps must be worn over either long pants or bunker pants. Chaps **shall not** be worn over shorts.
 - 6.3.2 Bunker coat and/or long sleeve shirt shall be worn to protect against flying debris, insect bites, poison ivy, etc.
- Warning: Bunker coat, bunker pants, and firefighting gloves are NOT saw protected and will NOT prevent the chain saw blade from inflicting severe injury.**
- 6.4 The kickback potential is very real. Members are not to tamper with or remove manufacturer safety devices.
 - 6.5 Saw is not to be used in situations where the vision of the operator is limited.
 - 6.6 Never attempt cutting a tree which is in contact with live electrical wires. **TREES DO CONDUCT ELECTRICITY.**
 - 6.7 Always hold running saw with both hands. Never overreach or operate saw above your shoulders.
 - 6.8 Use a sharp chain.
 - 6.9 Rotate saw operators, never permit a fatigued member to operate the saw.
 - 6.10 When transporting, refueling or performing maintenance, the saw must be in the "OFF" position.
 - 6.11 Keep chain of saw away from all parts of body while motor is running.
 - 6.12 Avoid fuel or skin contact with the hot muffler.
 - 6.13 Never cut while wearing loose clothing such as torn or hanging bunker coat stripes.
 - 6.14 Use saw protected gloves when operating saw and handling chain.
 - 6.15 Operate only in well-ventilated areas.
 - 6.16 Always hold saw with two hands properly positioned when engine is running.

- 6.17 Be sure chain stops when throttle is released. If the chain continues to spin at idle place saw out of service.
- 6.18 Once cut is started do not slow down and then accelerate, saw may pull you off balance.
- 6.19 Do not leave saw unattended while running.
- 6.20 Maintain correct chain tension. (See operators manual).
- 6.21 Whenever opening up the fuel tank, always loosen the cap slowly and wait for the tank pressure to be equalized before removing cap. This will prevent the spurting of fuel.
- 6.22 Do not rev the saw until you are ready to make the cut.
- 6.23 Do not walk through unstable areas cluttered with brush, logs, vines or heavy underbrush with a running chain saw. Carry the saw with the guide bar to the rear when climbing uphill and to the front when going downhill. Keep the safety brake engaged when traversing uphill, downhill or on uneven surfaces.
- 6.24 When the operator is not actively cutting, the safety brake must always be applied.
- 6.25 Beware of unnatural forces and pressure being exerted on limbs and trunks, especially when operating with ice storm damage.
- 6.26 The term “Feathering” refers to increasing and decreasing pressure on the throttle trigger. This technique should be applied just prior to finishing each cut, this will help the Operator maintain control of the saw as the chain breaks clean.
- 6.27 When operating a chain saw, secure or remove your handie-talkie as to avoid the potential for the radio to swing into the cutting space or become tangled on debris.

7. MAINTENANCE

7.1 General

7.1.1 Saws are to be examined and tested weekly. Schedule is to be established by the Company Commander.

- Two persons at all times. A two member team consisting of the saw operator and control person is required whenever chain saw operations are being conducted.
- Test to be performed in a protected area. A circle of danger of a radius of at least 10' will be established before the commencement of testing.
- Operating members must wear all required NFPA protective equipment whenever testing or operating chain saw.
 - Helmet
 - Eye Protection
 - Hearing Protection
 - Bunker Boots
- Saw Protected Gloves - NFPA approved protective gloves that are specifically designed to prevent serious injury by causing the chain saw blade to bind and stop if contact is made. Members must wear saw protected gloves whenever testing or operating chain saw. Saw protective gloves are not approved for firefighting purposes.

Note: Firefighting gloves are not approved for chain saw operation.
- Saw Protective Chaps - NFPA approved leg protection specifically designed to prevent serious injury by causing the chain saw blade to bind and stop if contact is made. Members must wear Chaps whenever testing or operating chain saw. Chaps must be worn over either long pants or bunker pants. Chaps shall never be worn over shorts. Bunker gear is **not** saw protected.

How do chain saw chaps protect the user when a chain saw strikes chain saw chaps? Kevlar fibers first resist the cut, and then are pulled into the chain saws drive sprocket, slowing and quickly stopping the chain (approximately five seconds or less). If the chap surface or pad is cut, it cuts the Kevlar fibers. If another cut occurs it will only pull out the Kevlar strands that have been previously damaged, resulting in increased chance of injury.

7.2 Bar and Fuel Oil

7.2.1 Bar oil levels are to be checked prior to cutting operations and replenished as required during cutting. The chain saw should never be operated without chain and blade being oiled. It is unsafe and can cause damage to saw.

If saw is not oiling the bar, first check reservoir for oil and, if necessary, remove the bar and clean debris from oiling grooves and ports in bar.

7.2.2 Only 2 cycle engine oil, received from Technical Services Division, specifically for the chain saws is to be mixed with gasoline when making the fuel mixture. Manufacturer's directions are to be followed when making mixture.

7.2.3 Bar and fuel oil are to be requisitioned from Technical Services Division using form 23-BS-2.

7.2.4 Fuel and bar oil levels are to be examined and replenished at the weekly inspection of the saw.

7.3 Filters

7.3.1 Air filter shall be examined and cleaned after each cutting operation. If replacement is required, saw will be forwarded to the Technical Services Division.

Clean air filter after each use. Place choke to on position before cleaning. Do not remove filter until first brushing off sawdust. Remove filter and blow out carburetor housing and filter being careful not to get any sawdust into carburetor barrel. Replace filter and cover. Then tighten filter cover housing nut.

7.4 Chain

7.4.1 Chains requiring re-sharpening are to be forwarded with RT-2 to the Technical Services Division.

7.4.2 Replacement chains may be requisitioned by forwarding form 23-BS-2 to Technical Services Division, when forwarding chain for sharpening.

7.4.3 To replace the chain or bar assembly on all chain saws, the chain brake has to be in the off position before removal of side cover. Check that the chain brake is in the off position by moving the front hand guard towards the front handle. Failure to do so will prevent you from reinstalling cover and the saw will have to be sent out for repairs.

HURST TOOL SYSTEM

◆ INTRODUCTION

- The Hurst Tool System is a high powered, self-contained, hydraulic spreading and pulling device carried by all ladder companies, rescue companies and squad companies. The system consists of a power unit, cutters, spreaders, rams, a hand pump and low pressure hoses that may be used for vehicle rescue, structural collapse, urban search and rescue, and industrial rescue. Refer to the specific Operating Instruction Manual for each tool's general and technical specifications.

◆ INSPECTIONS – DAILY/AFTER EACH USE

- Check fuel level.
- Check engine oil level.
- Check hydraulic fluid level.
- Inspect carefully for hydraulic leaks.
- Inspect hoses and couplings for wear and damage (bulging and or swelling at fittings and spring reinforced areas).
- Check control valves for easy operation and for free return to the neutral (center position).
- Be certain all parts are clean.
- Check blades for damage.
- Check that all fasteners (nuts, bolts, screws, and retaining rings) are in place and securely fastened.
- Check for wear or damage of all parts.
- After a complete inspection of the Hurst Tool System, start the power unit and operate the spreaders, cutters and rams to ensure proper working order.

◆ STORAGE

- When storing the Hurst Tool System provide adequate space to prevent damage to hoses, hose connectors and all components.
- Inspect all mounting brackets and holders in apparatus compartment for damage.
- When storing the Honda Mini Mate Power Unit on the apparatus, the fuel valve lever **MUST** be in the **OFF POSITION**.

MINI MATE SIMO POWER UNIT

1. TOOL SPECIFICATIONS

1.1 Model No.	363R217
1.2 Weight.....	60.4 lbs.
1.3 Length	18.11 in.
1.4 Width.....	12.4 in.
1.5 Height.....	17.5 in.
1.6 Maximum Operating Pressure	5,000 psi
1.7 Fluid Reservoir.....	0.92 Gal.

2. FEATURES / BENEFITS

- 2.1 Powered by a 3 horsepower, 4-stroke Honda motor.
- 2.2 Two tool simultaneous use with no loss of individual tool power.
- 2.3 Separate pressure / dump valve for each tool port.
- 2.4 Reservoir sight glass for ease in monitoring Hurst fluid level.

3. OPERATION

- 3.1 To start unit, place pressure / dump valve in the dump (horizontal) position.
- 3.2 Fuel valve must be placed in the on position.
- 3.3 Place choke lever in the closed position.
- 3.4 Make certain the engine throttle is in the max position.
- 3.5 Place the on / off switch in the on position.
- 3.6 Pull the starter cord. Once the engine starts, gradually move the choke lever to the open position.
- 3.7 After connecting tools, place pressure / dump valve in the pressure (vertical) position.
- 3.8 To shut down unit, place pressure / dump valve in the dump position.
- 3.9 Disconnect tools.

- 3.10 Turn the on / off switch to the off position.
- 3.11 When storing the Honda Mini Mate Power Unit, on the apparatus the fuel valve lever **MUST** be in the OFF POSITION.



HURST MOC II CUTTER

1. TOOL SPECIFICATIONS

1.1	Model No	362R392
1.2	Weight.....	47 lbs.
1.3	Length	30.9 in.
1.4	Width.....	9.06 in.
1.5	Height.....	8.9 in.
1.6	Cutting Force	up to 152,870 lbs.
1.7	Cutter Opening.....	7 in.
1.8	Maximum Operating Pressure	5,000 psi

2. FEATURES / BENEFITS

- 2.1 Star control valve permits tool actuation from almost any gripping position.
- 2.2 Dead man design control valve reverts back to the neutral position if the user's hand is released from the control.
- 2.3 Hose exit directs the hydraulic hose out of the tool handle and away from the work area.



HURST MLT -32 SPREADER

1. TOOL SPECIFICATIONS

1.1	Model No	362R346
1.2	Weight.....	59 lbs.
1.3	Length.....	15.5 in.
1.4	Width.....	8.25 in.
1.5	Height.....	27.5 in.
1.6	Spreading Force	up to 31,500lbs.
1.7	Pulling Force.....	up to 16,500lbs.
1.8	Spreading Distance	32 in.
1.9	Maximum Operating Pressure	5,000 psi

2. FEATURES / BENEFITS

- 2.1 Can be used to crush, spread, pull, lift, pinch and pry objects.
- 2.2 Interchangeable tip system accepts a variety of spreader tip configurations.
- 2.3 Dead man control valve reverts back to the neutral position if the user's hand slips from the control.



KO CURTAIN WIND CONTROL DEVICE

◆ DESCRIPTION

- Material Hot-Stop 1500 L. The Blanket and Ropes have been tested to 2000 degrees F. The KO Curtain survived 50 mph winds and 60 minutes of fire exposure.
- Weight 26.5 Pounds
- Dimensions 8' x 6'
- Ribs Five High Tempered Aluminum Bars
- Ropes Four 3/8 inch diameter, 15 foot long fire-proof ropes. One at each corner of the curtain.
- Clips Four stainless steel clips at ends of each rope. Clips are connected to form loops at top and bottom of curtain.

◆ USE

- To cover a fire vented window(s) where the wind is blowing the fire back into the fire occupancy. With the door to the fire occupancy open, this condition makes it impossible to advance toward the fire occupancy via the public hallway.
- Once the curtain is in place, the negative effects of the wind on the fire will diminish. **Curtain shall never be deployed in the horizontal position. It is designed and shall be deployed only in the vertical position.**

◆ MAINTENANCE

- The KO Curtain shall be inspected weekly during MUD and after each use. The inspection will include removing the curtain from the carrying sleeve and unfurling it. Inspect the deployment ropes, the 5 aluminum bars embedded in the curtain and all stitching.
If there is any doubt as to the serviceability of the KO Curtain, the officer on duty will notify Research and Development and be guided by their instructions.

- If the KO Curtain has been subject to direct flame impingement, it shall be placed OOS and forwarded to Research and Development for evaluation. A letterhead report to the Chief of Operations detailing the specifics of the operation shall be included with the OOS KO Curtain.

◆ **REPACKING PROCEDURE**

1. Place the curtain on a flat surface with reflective stripes up and ropes unclipped.
2. Ropes are loosely coiled and placed as shown and clipped together. **(Figure 1)**
3. Curtain is rolled from bottom to top, bottom ropes encapsulated within the roll. **(Figure 2)**
4. Top ropes are placed 5-10” from the top edge of curtain, and roll is completed.
5. Curtain is placed into carrying case.



Figure 1



Figure 2

◆ **DEPLOYMENT**

- The KO Curtain in the fully deployed position. (Figure 3)



Figure 3

FIRE WINDOW BLANKET

◆ DESCRIPTION

- FDNY Designation Fire Window Blanket
- Material Hot-Stop 1500L (Natural color)
- Weight Approximately 40 lbs.
- Dimensions 10'W x 12'L

● USE

- To cover a window when the wind is blowing fire back into the fire occupancy. An open door with wind driven fire indications will make it impractical to advance a handline down the hallway to the fire occupancy. A 2 ½" handline will not provide sufficient cooling of the hallway to protect exposed members. Once the Fire Window Blanket is in place, the negative effects of the wind will be diminished, allowing members to advance a handline toward the fire area as directed by the Incident Commander. Testing conducted by the FDNY and NIST (National Institute of Technology) showed an immediate 50% decrease in temperatures and significant flame reduction when the Fire Window Blanket is deployed, but there will be an increase in the smoke condition produced by the fire
- The Fire Window Blanket may be used as pre-deployment option to cover a window prior to it failing in order to prevent a wind-driven fire.
- Under no circumstances is the Fire Window Blanket to be deployed for drill purposes. Each Division has been issued Training Fire Window Blankets for drill. Repeated use of the Fire Window Blanket for drill can cause unnecessary damage.

● MAINTENANCE

- Fire Window Blanket shall be inspected weekly. If the inspection reveals holes, tears or damage to the straps, the blanket shall be placed out of service. The officer on duty shall notify R&D. The R&D Unit will conduct an inspection to determine the serviceability of the Fire Window Blanket.



FIRE WINDOW BLANKET REPACKING PROCEDURE

Lay blanket on a clean flat surface. **(Photo 1)** The words “Top” and “Bottom” are stenciled on the blanket and straps for easy identification



Photo 1

Fold each strap (top and bottom) over itself approximately 18 inches in length. **(Photo 2)**



Photo 2

Place tape to secure the top strap, create a handle with tape for easy removal. Only tape top straps. **Never use tape on bottom straps.** (Photo 3)



Photo 3

- Place bottom straps along the bottom edge of blanket. Fold the blanket onto itself with the side edges placed 2" from the center line, leaving a 4" space. The bottom straps must stay inside of the folded blanket. (Photo 4A, B)



Photo 4A

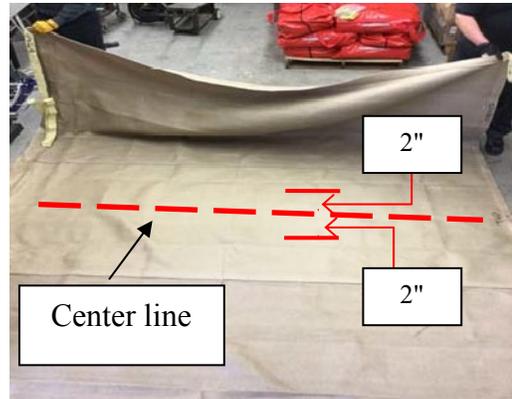


Photo 4B

Fold the side edges of the blanket onto itself, again, towards the center line. Leave approximately a 4" along the center line. (Photo 5A, B)



Photo 5A

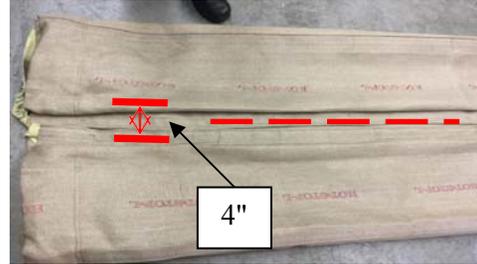


Photo 5B

Begin to roll the blanket from the bottom towards the top. Do not tuck top straps into the rolled blanket. (Photo 6)



Photo 6

When completely rolled to the top of the blanket, fold blanket in half. Place the bag over the blanket, turn bag upright pushing the blanket into the bag, then tuck top straps in the bag. Securely close the bag. (Photos 7A, B, C)



Photo 7A



Photo 7B



Photo 7C

THERMAL IMAGING CAMERA



◆ INTRODUCTION

- This bulletin is intended to explain the basic theory and application of thermal imaging cameras (TIC). Training Bulletin Tools 27, Data Sheets, will cover the features of the individual TICs in service in the FDNY.
- The thermal imaging camera is a valuable tool that can be used for many operations. TICs may be especially helpful in the low visibility environment of structural firefighting. TICs provide a pictorial representation of temperature differences that are unaffected by smoke. Basic understandings of thermal imaging, fully understanding the functions of the TIC in use, combined with disciplined tactical applications are essential in utilizing this tool to its fullest potential.
- TICs provide a new perspective of the fire ground that can be beneficial. When the images presented are properly interpreted, operators may utilize the information to assist in making decisions especially in the instances of firefighting, firefighter accountability and directing interior operations. The company officer, being empowered to direct, may be best suited to carry and operate the TIC.
- The following companies are equipped with TICs and shall carry and operate them at structural fires and applicable emergencies;
 - Battalion Vehicles
 - Ladder Companies
 - Rescue Companies
 - Squad Companies
 - Haz-Mat Company 1

- The TIC is a tool and shall be used as an adjunct to, not a replacement for the established firefighting procedures and practices already in use.

◆ **OPERATING THEORY**

- TICs detect infrared (IR) energy and electronically process it and display it into a viewable image.
- Vision in Smoke
 - Visible light is blocked by the solid carbon particles in smoke.
 - IR wave length is unaffected by smoke.

Example - During interior firefighting operations, vision may be greatly reduced, however heat penetrates through the smoke within the structure.
- A thermal image is a pictorial representation of temperature differences represented by:
 - **BLACK** indicates the presence of the least amount of heat or the coolest object in the scene. **Example** -The wall with a handprint may appear cooler than the hand. It may not be real cold just colder than the hand and the “thermal signature” the hand left behind.
 - **WHITE** being the presence of the most heat in the scene. **Example** - A handprint on the wall may appear **WHITER** than the surrounding area. It does not mean it is on fire, it only means that it is hotter than the rest of the area being viewed.
 - **BLACK and WHITE** are relative to the overall image being viewed.
 - Shades of **GRAY** represent the temperature range between **BLACK** and **WHITE**. These shades of **WHITE, BLACK** and **GRAY** and their differences in colorization are known as Thermal Contrast.
- Some TICs in service also associate colors such as **RED** or **ORANGE** with specific temperature ranges. Operators **MUST** be thoroughly familiar with the specific TIC they are using as functions vary from camera to camera. Refer to TB Tools 27, Data Sheets for specific camera function.
- **LOW Contrast - May occur in cooler areas where images may be difficult to view due to the lack of heat present, and all objects being close in temperature. The overall area being viewed may have little or no contrast and appear darker.**

- **HIGH Contrast** - The more heat present, both generated and subsequently absorbed by objects, the clearer and sharper the image will appear. This is true until the area being viewed reaches the point of thermal saturation. This occurs when everything in the viewing area is heated to temperatures beyond the capabilities of the TIC being used. The overall area being viewed will lose all contrast and appear whiter and featureless.
- **Changing Thermal Contrast**
Thermal image cameras “thrive” on heat. As conditions change from cooler to hotter back to cooler, the image viewed by the TIC will also change. This is known as changing thermal contrast. This changing thermal contrast may be an indication of fire being in close proximity. Operators using TICs must be aware of changing thermal contrast and constantly be monitoring for the change from LOW Contrast (cooler/darker) to HIGH Contrast (hotter/whiter).
- To compensate for changing thermal contrast, some TICs change modes by shuttering and then shifting. This change may be indicated on the display by **EI** or **L**. A shift of the camera into these modes allows the camera to compensate for higher temperatures. (See TB Tools 27, Data Sheets for camera specific function)
- **Convected Heat:** When using a TIC, convected heat movement may appear as WHITE swirling waves or smoke. Because heat rises, most often it will appear when viewing the ceiling area. However it may also appear from the floor area when entering or operating above the fire. When searching for fire location or extension, operators should make every attempt to detect the presence of convected heat along with its direction and velocity earlier rather than later. This movement may give the operator an indication of the location of the fire.
- When operating a TIC, it must be understood that the ability to thermally image is dependant on the amount of energy being absorbed by objects or generated by fire or a heat source. The object or heat source in question may be concealed by thickness or layering of materials preventing them from being viewed with the TIC. **Example** -When searching for fire, walls or multiple layers and thickness of materials such as drop ceilings and insulation, may conceal fire. When searching for life, it must be understood that furniture or layers of blankets, sheets and clothes may conceal a person.

◆ **TACTICAL APPLICATIONS**

Thermal imaging cameras shall be carried and used at all structural fire operations by all units equipped with this tool.

In order to allow the operator to function safely by having both hands available to perform search, rescue and firefighting functions, operators of thermal imaging cameras shall utilize the carrying strap and ensure that it properly interfaces with their Personal Protective Equipment. Proper application of the TIC may be invaluable in most situations including but not limited to:

- **Initial Size-Up**
 - Occupants at open windows who are obscured by smoke
 - Fire location
 - Fire extension
- **Structural Fires**
 - **Residential** - Private and Multiple Dwellings
 - **Commercial** - Stores, Warehouses, Schools, Theaters, etc.
 - **Hi Rise** - Residential and Commercial
 - **Vacant** - All types
- **Interior Search and Rescue Operations**

Operators of TICs should remember to stay low and slowly scan the area. Operators should begin at the ceiling and use a side-to-side scanning motion, slowly working their way to the floor area. This will compensate for the narrow field of view of the TIC.

- Objectives:
 - A) Search for Life
 - Firefighters – accountability - Members who are operating/missing
 - Civilians - Location, Route of removal
 - B) Search for Fire
 - Location
 - Size
 - Extension
 - C) Structural Considerations
 - Construction features and hazards

•Avenues of extension

- **Fire Suppression Operations**
 - Expedite interior handline placement
 - While operating interior handlines or exterior Tower Ladder/Master Streams, the TIC may assist in proper; a) Direction, b) Application, c) Effectiveness

- **Roof Operations**
 - Firefighter accountability while operating
 - Ventilation – Location
 - Extension
 - Navigation & Safety

- **Overhaul Operations**
 - Location
 - Extension

- **Odor of smoke/evaluation for fire**
 - Chimneys
 - Flues
 - Duct fires
 - Brush Fires – Location & Hot Spots

- **FAST Truck Operations**
 - Monitor exterior changing conditions
 - Follow hoselines
 - Locate missing or downed members
 - Image obstructions and entanglements
 - Locating alternate means of egress

- **Emergencies**
 - Electrical
Overheated:
 - a) Motors
 - b) Circuits
 - c) Ballast
 - Exterior Search Operations
 - a) Person in water (surface)
 - b) Person in woods
 - c) Victim thrown from vehicle

- **HAZ-MAT**
 - Spilled liquids
 - Some vapor clouds
 - Liquid levels in containers

◆ **LIMITATIONS**

- Thermal imaging does not see through clear glass or plastic. These act as a mirror to IR.
- Shiny surfaces will reflect IR creating a mirror effect. The actual source of the image may be opposite the reflected surface. **Example** - Glass, waxed floors, tiled walls, some painted or polished surfaces or water on the floor.
- Thermal imaging will not see through water.
- Average field of view of a TIC is approximately 50 degrees.
(Refer to TB Tools 27, Data Sheets)
- Focal point of a TIC is approximately 3 feet from the camera lens. Operators viewing objects within 3 feet are too close. As a result objects within 3 feet may be blurry, out of focus or featureless. To help prevent this, operators should scan an area before entering or advancing.
- Depth perception in TICs is rarely represented in a 1:1 ratio and may vary from camera to camera. Specific camera familiarization is essential.
- Steam and condensation or fogging on the SCBA facepiece, display screen and camera lens may distort the clarity of the image that is displayed and cause it to be featureless. If there is fogging or condensation build up on the SCBA facepiece, it probably exists on the camera lens and display also. Wiping all 3 places, SCBA facepiece, the display screen and camera lens, will greatly improve the clarity of the image. This may have to be done repeatedly before image clarity is improved.
- Thermal imaging cameras are not rated as intrinsically safe.
- RFI - Radio transmissions may cause the TIC to malfunction.

◆ **FUNCTIONAL CHECK, INSPECTION, MAINTENANCE AND REPAIR**

- Functional Check, Inspection and Maintenance of the TIC shall be made:
 - Immediately after the 0900 and 1800 hour roll calls
 - After each use
- **Functional Check** shall include the following in accordance with the associated TB Tools 27 Data Sheet:
 - Turn the camera ON
 - Check for proper warm up and electronic self-test.
 - Verify that the camera is functioning properly by placing the TIC close to your face and viewing your outstretched hand or another firefighter.
 - Verify POWER/BATTERY LEVEL
 - Verify proper function of all buttons and switches.
 - Verify that all LEDs and ICONS are properly displayed and functioning.
- **Inspection** of the TIC shall include but not be limited to:
 - Carrying Strap attached and adjusted.
 - Proper FDNY tech services and company identification, camera make, model and warning labels intact.
 - Physical, heat and/or chemical damage.
 - Mechanical hardware to ensure no screws or fasteners, bumpers or guards are loose or missing.
 - All lenses for heat and/or chemical damage, cracks, breaks and condensation.
 - Batteries and terminals for leakage, damage and discoloration.
 - Battery compartments and terminals for damage or condensation and proper cover placement and fastening devices.
- **Maintenance**
 - Although TICs are manufactured for a structural firefighting environment, they are sensitive electronic equipment and should be treated with as much care as possible. They shall not be used to vent windows, make examination holes in walls, or for forcible entry purposes.
 - The TICs shall NEVER be taken apart for any reason.

- TIC maintenance performed at the company level shall consist of:
 - Battery charging as per TB TOOLS 27 DATA SHEETS.
 - External screws should be examined for tightness.
 - The TIC is water-resistant, not waterproof. NEVER submerge the camera.
 - Clean and inspect the carrying strap and all external surfaces by wiping with a solution of mild detergent and warm water.
 - Dry with a soft, lint free cloth to avoid scratching the optical surfaces.
- **Repair/Replacement**
 - Notify Technical Services for further instructions on replacement or pick-up when:
 - The TIC does not meet the inspection as described or does not operate properly.
 - Battery chargers or other components are defective.
 - Battery operational/charging time is not consistent with TB TOOLS 27

DRAGER PAC 6500 CO METER

1.1 INTRODUCTION

The Drager PAC 6500 CO Meter is a pocket-sized measuring and warning device issued to all units for monitoring Carbon Monoxide (CO) gas in ambient air (Figure 1). Use of the instrument is intended to alert the user to CO presence in the environment. A visual display shows the amount of CO present in parts per million in the atmosphere.



Figure 1

NOTE: The unit is water resistant with a concussion-proof housing, however, do not use detector when it is damaged.

2. OPERATIONAL USE

- 2.1 The Drager PAC 6500 CO Meter is always to remain on. The on/off function has been disabled. There are two buttons on the meter; units are only required to use the green (OK) button to silence the alarm.
- 2.2 Fire Officers and Firefighters assigned riding positions that have a CO meter are required to wear the meter whenever they are out of quarters (emergency and non-emergency operations). The CO meter shall be affixed to the handie-talkie strap above the remote mic.
- 2.3 Alarm threshold 1, (A1) is activated at 35 ppm. Alarm threshold 1, (A1) can be acknowledged and silenced by pressing the OK button.
- 2.4 When the concentration of CO in the atmosphere is 35 PPM or greater, the meter will signal the following alarm:
 - a slow modulating tone (every 1 second)
 - with slow flashing red lights (every 1 second)
 - and a slow vibration (every 1 second)

The display will alternate between A1 and the measured amount of CO in PPM. See Figures 2 and 3.

When the CO concentration falls below 35 PPM, the alarm will automatically turn off.



Figure 2

Press to
acknowledge
and silence
alarm



Figure 3

- 2.5 Alarm threshold 2 (A2) is activated at 100 PPM. Alarm threshold 2 (A2) cannot be acknowledged or be silenced.
- 2.6 When the concentration of CO in the atmosphere is 100 PPM or greater the meter will signal the following alarm:
- a fast modulating tone (every ½ second)
 - with fast flashing red lights (every ½ second)
 - a fast vibration (every ½ second)

The display will alternate between A2 and the measured amount of CO in ppm.
See Figures 4 and 5.

When the CO concentration falls below 100 PPM, the meter will go into Alarm threshold 1, (A1), and the alarm can be silenced, see Section 2.3.

- 2.7 The Dräger CO Meter will retain the highest reading the meter has been subjected to. Due to the CO Meter remaining constantly on, this peak reading is not to be relied on or used during any operation or incident.



Figure 4



Figure 5

NOTE:

CO meters will display readings up to 2000 PPM (Figure 6). When readings exceed 2000 PPM, the CO meter will display “rrr” (Figure 7), indicating concentration too high to measure.



Figure 6



Figure 7

3. MAINTENANCE

- 3.1 Instrument should be kept clean and dry.
- 3.2 Calibration will only be done by Haz Mat Operations Meter Room every 6 months on a scheduled basis. An error message (notification) will appear on the screen 2 days prior to the required 180 day calibration cycle.
- 3.3 Field units are not to perform any maintenance on, or open the device (opening the device will void the manufacturer’s warranty). **The CO meter will always remain on.**
- 3.4 Battery life is dependent on use, alarm activations and temperatures. The lithium ion battery has a maximum life of two years under ideal conditions (on 24/7 but no alarm activations). There are two low battery alarms.
 - Pre-Alarm - A battery “pre-alarm” activates when there is 5% battery life left. The battery icon will flash, and a visual and audio warning is given similar to the A1 alarm without the vibration. The battery pre-alarm can be acknowledged and silenced by pressing the green OK button. However, there is limited battery life left, between 1 day and two weeks. The Officer on duty must contact the Meter Room at Haz-Mat Operations for a replacement.
 - Main Alarm - A battery main alarm will display a rapid visual, audio and vibration alarm. This alarm cannot be acknowledged, and the meter will countdown from 10 to zero and shut down. The meter will be unusable and must be placed OOS. The Officer on duty must contact the Meter Room at Haz Mat Operations for a replacement.
- 3.5 When marking meter with company ID, do not etch or use marker (sticker/tape is acceptable).

4. Radio Signal 10-38

Radio Signal 10-38 shall be transmitted for any type of Carbon Monoxide Response.

- Code 1:** Detector Activation: Carbon Monoxide Investigation (low battery, defective detector, unwarranted alarm, etc.)
- Code 2:** Detector Activation: Carbon Monoxide Incident (CO Meter Reading of 1-9ppm)
- Code 3:** Detector Activation: Carbon Monoxide Emergency (CO Meter Reading of greater than 9ppm)
- Code 4:** No Detector Activation: Carbon Monoxide Incident or Emergency (Specify)
e.g.: no detector present in affected area, detector present in affected area, but did not activate.

OPERATIONAL GUIDELINES FOR RADALERT 50 / RADIOLOGICAL MONITOR

1. INTRODUCTION

- 1.1 The *Radalert™ 50* radiological monitor has been issued to all Engine and Ladder companies, Rescues, Squads, HMC1, Haz Tac, Battalion and Division Chiefs throughout the city to protect FDNY members from the hazards of a radiological release.

2. OPERATIONAL PROCEDURES

- 2.1 When units leave quarters, they shall turn on their *Radalert™ 50* monitor for the purpose of constant monitoring for radiation hazards. The following procedures shall be adhered to:

1. Remove the *Radalert™50* monitor from the protective case.
2. Turn on monitor using OFF/ON/AUDIO switch. The switch should be in the AUDIO position for proper operation.
3. Ensure mode switch is in the mR/Hr position.
4. On the top of the monitor next to the alpha window, depress the alert *Set* button once. The LCD display should read current alarm level for the alert mode. This reading should be 1.000 mR/Hr. This alarm level should only be altered under the supervision of an officer from the hazardous materials group.
5. Depress the *Set* button again and the monitor will be in the alert mode. Also, you will see a radiation-warning icon appear on the LCD when the unit is in alert mode.
6. A spare 9-volt alkaline battery shall be kept with the *Radalert 50*

NOTE: After turning the unit on, it requires one full minute to show a complete reading on the LCD. During this warm-up period an hourglass icon will be displayed on the LCD to warn the user that the reading is still not complete.

- 2.2 After the unit has been turned on for one minute, the hourglass icon will disappear, and the unit is now ready for use. The continuous screen readings will reflect normal background radiation. Background radiation will vary, maintaining normal levels between .02 and .05 millirems per hour (mR/Hr).

- 2.3 When moving toward the suspected area of contamination, move slowly to allow the monitor to detect any abnormal amounts of radiological activity.

NOTE: The unit takes a full minute for a change to be indicated on the LCD display, therefore progress slowly. As a safety factor, if the rate at any time goes over 1 mR/Hr, the monitor will immediately sound the alert tone.

- 2.4 Particular attention should be paid to explosive debris, broken shipping packages, damaged equipment or machinery, and any injured patients. When examining any of these for contamination, slowly move the monitor one to two inches from the surface with the *alpha* port (open window on the top of the case) facing the object, area or person to be tested. Continually size up the operating area for any additional clues that there is radiological contamination.
- 2.5 All reports (positive and negative) should be communicated to the Incident Commander or Haz-Mat Group Supervisor. Any area that causes the *Radalert*TM 50 to alarm requires confirmation by a second unit. Perform the Initial Event Status Assessment and determine if the situation is a Radiological Incident or a Radiological Emergency
- 2.6 The *Radalert*TM 50 alarms at 1.000mR/Hr, indicating an area that has radiation above normal background. A circular pattern should then be used around the object or area to determine the size of the isolation zone as scene size-up continues. The Fire Department of New York uses 1 mR/Hr as an *action* level. The Hotline (defining the Hot Zone) should be established at a rate of 2 mR/Hr, and marked with the red "hazardous materials" barrier tape supplied by Tech Services. Access to this area is restricted to first responders conducting life saving operations and protection of life and major property. In those incidents with obvious or known viable victims, the officer in charge must carefully weigh the risk (level of radiation in the area and the time members would be in the zone to complete the rescue) versus the benefit (saving a known viable victim), before committing personnel.

3. ANNUAL BACKGROUND READINGS

- 3.1 Using the *Radalert*TM 50, all units will monitor the area in front of quarters for 5 minutes at each of the times on the designated day and determine the background rate for each. This information will be recorded on the RAD-3 report, titled "Radiation Background Monitoring Chart." Any unusual or elevated background readings (>.05mR/Hr but <.9mR/Hr) shall require the officer on duty to forward a copy of RAD-2, titled "Elevated Background Radiation Readings Above 0.05mR/Hr to Haz-Mat Operations.
- 3.2 A copy of this data chart must be forwarded to their respective Battalions for consolidation and forwarding to the Division. The Division shall collate their Battalion reports, highlighting any elevated readings, and forward a report to their Borough for forwarding to the Bureau of Fire Operations.

NOTE:

Normal background readings for some areas may be several times higher than others.

4. MAINTENANCE

- 4.1 Maintenance of the *Radalert*[™] 50 requires that the 9-volt alkaline battery be changed every 3 months. The 9-volt alkaline battery shall be changed on Jan. 1, April 1, July 1, and Oct. 1 of each year.
- 4.2 An entry shall be made in the Office Record Journal to include:
- ◆ The date of maintenance.
 - ◆ Serial number of *Radalert*[™] 50.
 - ◆ Name of firefighter making the change.
 - ◆ Name of Company Officer supervising the change.
- 4.3 Companies shall use the firehouse expense fund to purchase replacement 9-volt alkaline batteries.



PORTABLE LADDERS

OBJECTIVE:	To introduce to members the various types of portable ladders used by the Department & Familiarize members with: <ul style="list-style-type: none">• Basic laddering procedures• Maintenance• Ladder usage		
CONTENTS:	<table border="0"><tr><td>Part One:<ul style="list-style-type: none">• Glossary of terms• Sizes & Types of Portable Ladders• Uses• Hazards</td><td>Part Two:<ul style="list-style-type: none">• Illustrations of ladders and laddering• Methods of transporting, raising, extending, placing, carrying, securing & lowering portable ladders.</td></tr></table>	Part One: <ul style="list-style-type: none">• Glossary of terms• Sizes & Types of Portable Ladders• Uses• Hazards	Part Two: <ul style="list-style-type: none">• Illustrations of ladders and laddering• Methods of transporting, raising, extending, placing, carrying, securing & lowering portable ladders.
Part One: <ul style="list-style-type: none">• Glossary of terms• Sizes & Types of Portable Ladders• Uses• Hazards	Part Two: <ul style="list-style-type: none">• Illustrations of ladders and laddering• Methods of transporting, raising, extending, placing, carrying, securing & lowering portable ladders.		
FDNY REFERENCE:	Part One: <p>FFP, Vol., 3 Book 1</p> <ul style="list-style-type: none">• Everything excluding Section 6 and with edited versions of sections: 2, 5, 8.4, 9.3.1, 10.2.5, 12.6.3 & 13.2.2. Part Two: <ul style="list-style-type: none">• Evolution 16• Study Guide 1 (2 Two Member Raise on 24' Portable Ladder)		
	15		

PART ONE

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
	Glossary.....	i
2	Sizes and Types of Portable Ladders in Use.....	1
3	Construction of Portable Aluminum Ladder	3
4	Advantages of Aluminum Ladders.....	4
5	Disadvantages of Aluminum Ladders	4
6	Marking Portable Ladders.....	4
7	Placing Portable Ladders in Service - Initial Operations.....	5
8	Climbing and Operating on Portable Ladders.....	8
9	Other Uses of Portable Ladders.....	10
10	Uses of Portable Ladders at Fires	12
	10.2 Buildings Requiring Portable Ladders	12
	10.2.1 Tenements and Multiple Dwellings	12
	10.2.2 Brownstone Buildings.....	15
	10.3 Other Uses of Portable Ladders at Fires.....	18
	10.3.1 Forcible Entry	18
	10.3.2 Ventilation.....	18
11	Uses of Portable Ladders – Emergencies	20
12	Safety	21
	12.1.16 Electrical Hazards.....	22
	12.2 During Operations	22
13	Maintenance of Portable Ladders	24

GLOSSARY

Beam	The solid or trussed main structural side member of a ladder, supporting the rungs.
Bed ladder/Bed section	The lower section of an extension ladder into which the upper section retracts.
Butt	The bottom or base end of a ladder.
Butt plates / Cleats / Spikes / Spurs / Shoes	The steel spikes mounted on the butts to provide a more secure base for the ladder on hard surfaces such as concrete. They also serve as a protection against excessive wear on the ends of ladders.
Combination ladder	A versatile ladder that can serve as a straight ladder or be converted to an "A" type ladder: i.e., Metal Duo-Safety "A" Ladder and Little Giant Ladders.
Extension ladder	A ladder with two sections that can be nested for ease of handling and extended to provide the needed height.
Fly ladder/fly section	The extendible top section of an extension ladder.
Folding ladder	A ladder designed for use in inaccessible areas where ordinary ladders will not fit: the rungs fold completely into the beams when fully closed.
Guides/channels	Light wood strips or metal channels which guide the fly ladder while it is being raised.
Gusset plate	A flat metal plate used in truss constructed ladders, which connects the rails of the beams and supports the rungs.
Halyard	A rope used to elevate the fly section of an extension ladder.
Hook ladder/roof ladder	A ladder equipped with folding hooks at the top
Ladder locks	A locking mechanism that secures an extension ladder in the desired extended position by engaging the beams of the fly ladder to the rungs of the bed ladder. Also called dogs or pawls.

Latching device	A device used on combination ladders to lock the ladder in position. Consists of hinges/pins.
Pulley	A grooved wheel attached to the bed ladder of an extension ladder, through which the halyard is drawn.
Rails	The two lengthwise members of a trussed ladder beam, which are connected by the gusset plates.
Rungs	The cross members between the beams of the ladder, used as footrests in climbing.
Safety shoe	A swivel type butt plate consisting of rubber tread and a spike. It may be used with either the rubber or the spiked end on the ground.
Solid beam ladder	A ladder with beams of solid construction (see trussed ladder).
Stops	A limiting device on extension ladders to prevent fly ladder from over-extending out of the bed ladder.
Straight ladder	A ladder with only one section.
Telescoping Ladder	A compact, lightweight ladder with multiple segmented beams that nest or "telescope" inside of each other.
Tip or top	The upper end of a ladder.
Trussed ladder	A ladder with beams of open construction consisting of rails and gusset plates.

1. Deleted.

2. **SIZES AND TYPES OF PORTABLE LADDERS IN USE**

2.1.1	Extension Ladders	Closed Length	Weight
	35'	20'	135 lbs.
	24'	14'	80 lbs.
2.1.2	Straight Ladders		Weight
	20'		55 lbs.
	20'(Hook)		60 lbs.
	12'(Hook)		35 lbs.
2.1.3	Special Ladders	Closed Length	Weight
	14' 'A' Frame	7'	35 lbs.
	10' Folding	11'	16 lbs.
	12' Telescoping	32"	32 lbs.

Note: All weights, and the closed lengths of the extension ladders, are approximate, due to variation between manufacturers. Refer to Figure 1 for the various parts of a metal extension ladder.

SAMPLE METAL EXTENSION LADDER

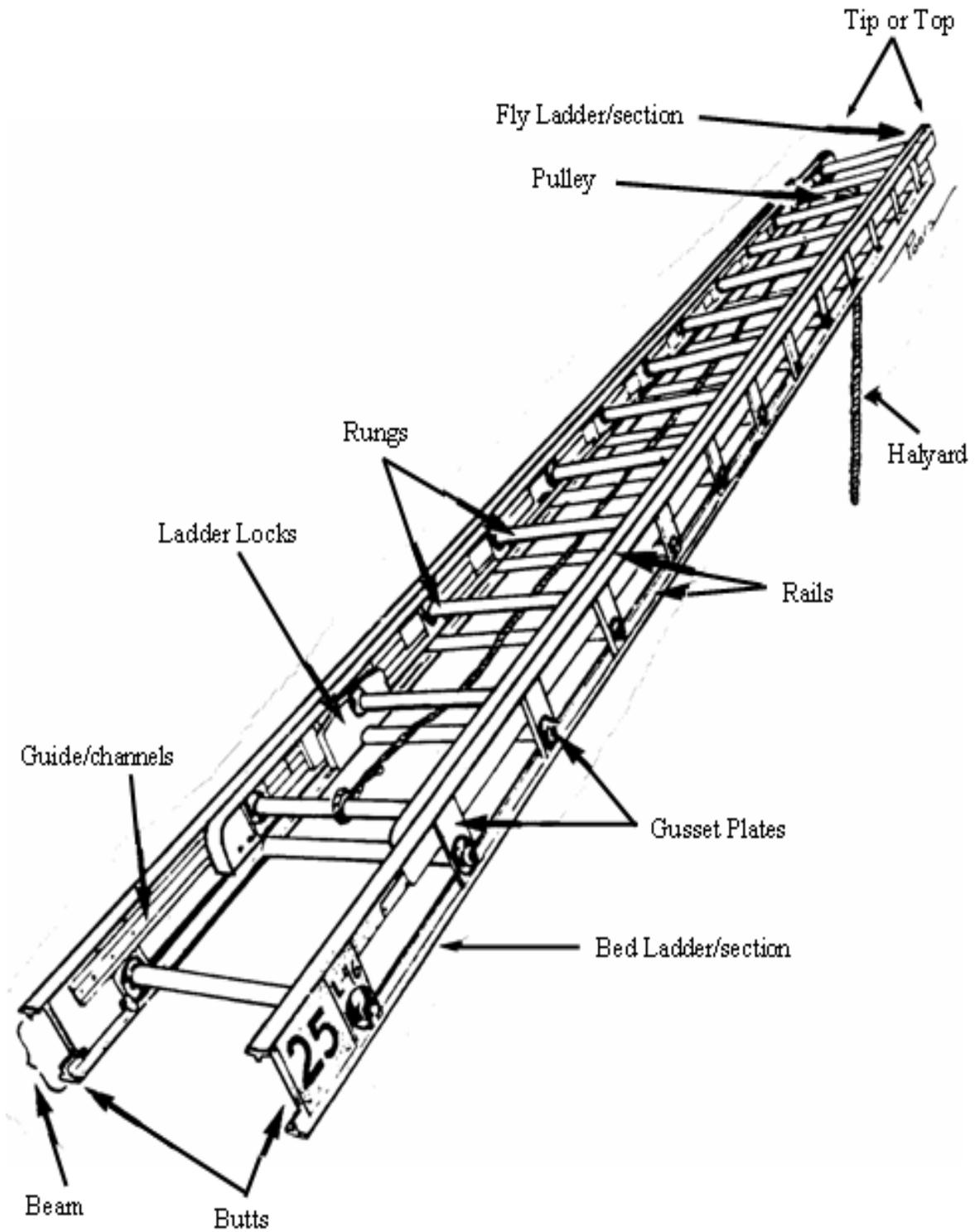


Figure 1

3. CONSTRUCTION OF PORTABLE ALUMINUM LADDERS

3.1 Aluminum ladders are divided into two basic types of construction, viz: solid beam and truss.

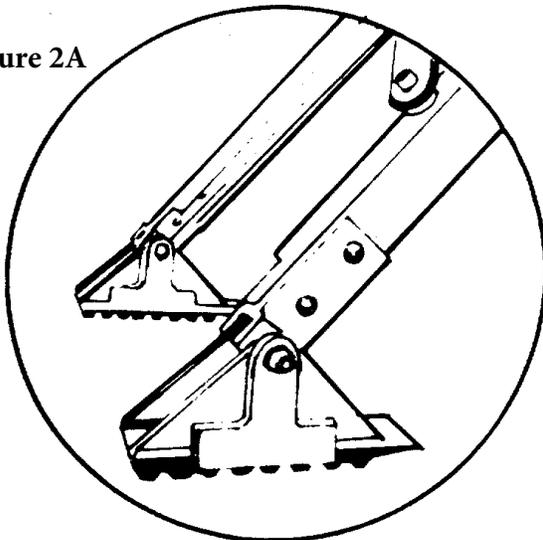
3.1.1 **Solid Beam Aluminum Construction** - This type of ladder has a solid side rail construction with aluminum rungs connecting with the side rails at fourteen inch intervals. The connection is generally either by a welded joint between rung and side rails, or by an expansion plug pinching the rung tightly to the side rails and internal backup plates. (Figure 2 A)

3.1.2 **Aluminum Truss Construction** - In the aluminum truss design, the top and bottom rails are connected to rung assemblies or rung blocks by rivets. The rungs are either welded or expansion plugged to the rung plate assemblies, which are supported by the top and bottom rails. (Figure 2B)

A. This construction allows greater side beam heights for greater carrying capacities without requiring massive solid beams that add to the overall weight of the ladder.

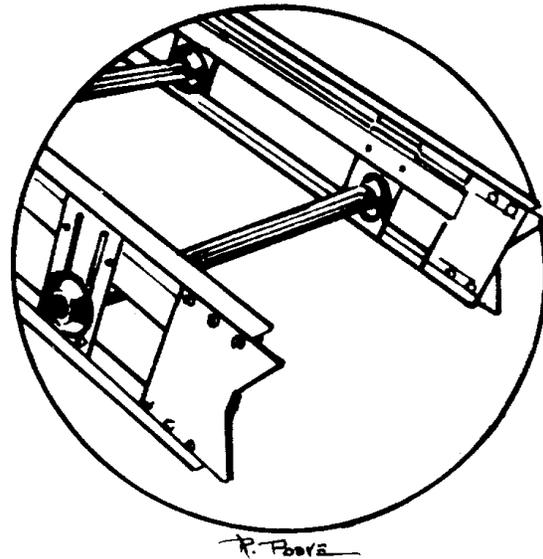
3.2 The base of the portable aluminum ladder is provided with either steel spikes or swiveling rubber safety shoes and aluminum spikes. For ladders equipped with the swiveling device, the rubber pads should be utilized when the ladder is to be raised and used on hard surfaces. (Figure 2A, 2B)

Figure 2A



Solid Beam Construction with Swivel Safety Shoes and Aluminum Spikes

Figure 2B



Truss Construction with Steel Spikes

4. ADVANTAGES OF ALUMINUM LADDERS

- 4.1 Aluminum ladders are generally lighter in weight and stronger than comparable wood ladders.
- 4.2 They are made of a high tensile, heat treated aluminum alloy and can sustain daily wear and tear very well. The aluminum will not weaken with age. It has a long life expectancy.
- 4.3 Aluminum ladders in general are tough. They will dent but will not chip or crack when subjected to severe impact nor will they fail suddenly because of overloads. They will bend but not break, as wood does.
- 4.4 No protective finish is required on aluminum ladders, as they will not dry out and weather with age or sunlight exposure. A slow oxidizing of the surface occurs but it can be polished off.

5. DISADVANTAGES OF ALUMINUM LADDERS.

- 5.1 Aluminum ladders readily conduct electricity. Refer to Sections 12.1.16 and 12.2.3A.
- 5.2 The ladders conduct heat very rapidly.
- 5.3 If an aluminum ladder has been subjected to excessive heat exposure at a fire, even for a brief period, it may have lost its heat treatment. This may affect its load carrying capacity, even though the metal shows no signs of any change. A discoloration may indicate a loss of structural strength. In either of the above cases, the Fire Tools and Equipment Unit shall be notified.

6. MARKING PORTABLE LADDERS

- 6.1 The numerical length of a ladder shall be marked on the side of the rails within 12 inches of the end of the ladder.
 - 6.1.1 **Straight ladders** - The ladder length shall be marked on each end of each rail.
 - 6.1.2 **Extension ladders** - The ladder length shall be marked at the butt end only of each rail of the bed ladder.
 - 6.1.3 Ladder length markings shall be visible when ladders are stored on the apparatus.
- 6.2 The unit designation shall be marked within 18 inches of each butt end as outlined in Sections 6.1.1 and 6.1.2 for numerical ladder length markings.

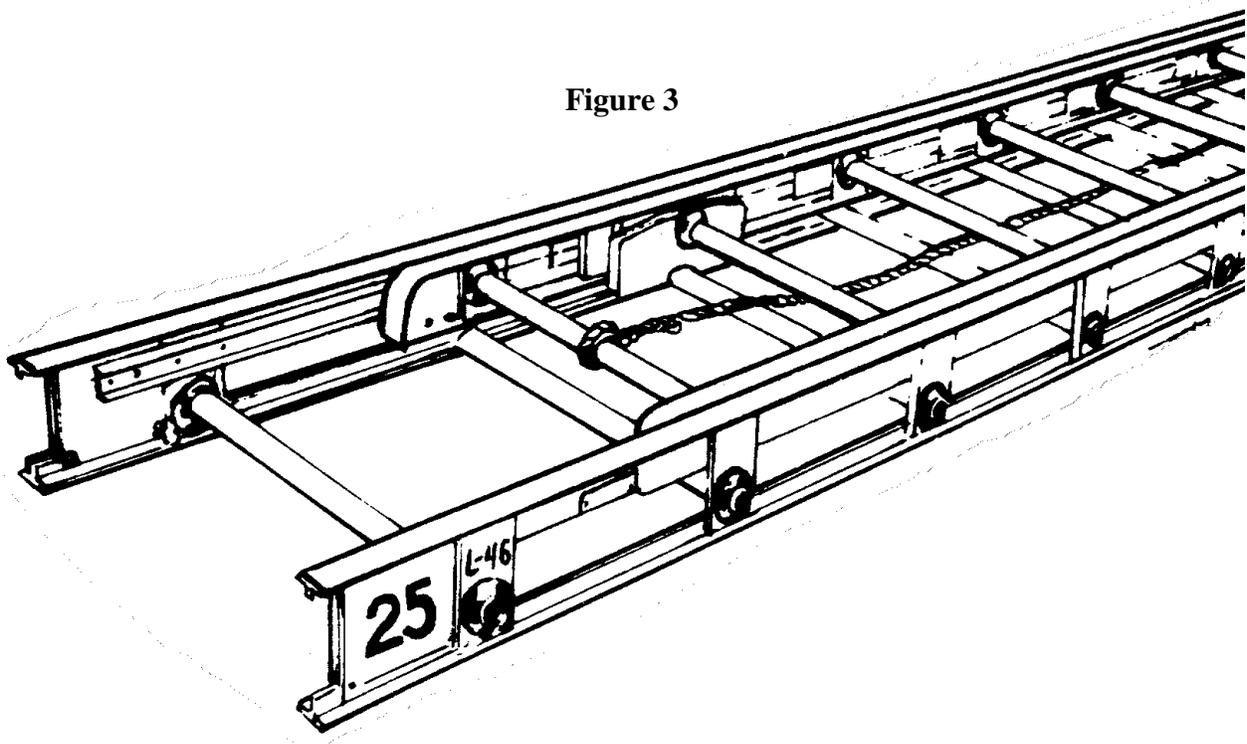


Figure 3

7. PLACING PORTABLE LADDERS IN SERVICE - INITIAL OPERATIONS

7.1 Avoiding Obstructions to the Removal of Portable Ladders from Ladder Company Apparatus.

7.1.1 20 foot straight and/or 35 foot extension ladders are carried in the internal slide-in racks on many ladder company apparatus. If another apparatus arriving at a fire or emergency is positioned closer than 20 feet to the rear of the ladder apparatus, the 20 foot straight or the 35 foot extension ladder cannot be removed from these racks due to insufficient clearance.

7.2 The advantage of an extension ladder is that its height can be adjusted for safe and accurate positioning. Choosing the precise ladder length is not as critical when using an extension ladder as it is when using a straight ladder which has a fixed length.

7.3 **Ladder Climbing Angle** - Climbing angle for a ground ladder is approximately 65-75 degrees.

7.3.1 The 65-75 degree angle allows the ladder to provide its maximum strength and best service.

7.3.2 An angle steeper than 75 degrees increases the chances of the climber falling off and sustaining injuries.

7.3.3 Ladders angled less than 65 degrees require a reduction in maximum loading. (See Section 8.4)

- 7.4 A simple formula used to obtain a 75 degree angle is to place the base of the ladder at a distance from the vertical plane equal to 1/4 the total working length of the ladder. The working length is the distance from the base of the ladder to the top of its support. (Fig. 4, 5)

Figure 4

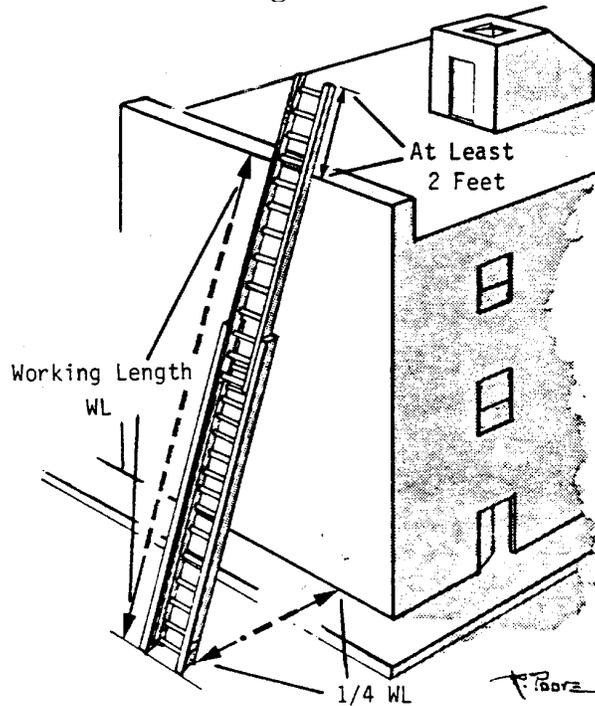
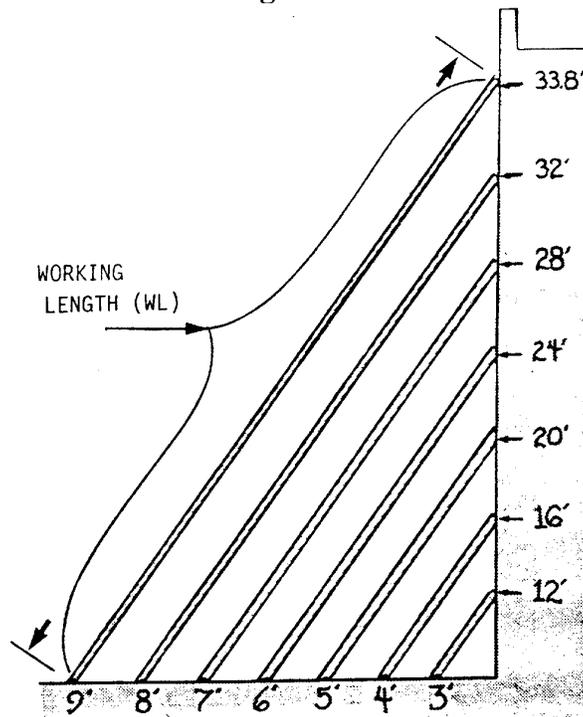


Figure 5



7.5 **Ladder Placement** - Proper placement of the tip of the portable ladder provides for easier and safer mounting and dismounting of the ladder and it allows the user to maintain his balance by providing a handhold.

7.5.1 Rules for Portable Ladder Placement.

- A. **Placed at a window for VEIS** - Tip shall be level with window sill.
- B. **Placed at a roof or parapet**- Tip shall be at least 2 feet above the roof or parapet.
- C. **Placed alongside a fire escape on a building wall** - Tip shall be 1 to 3 feet above the fire escape railing.
- D. **Placed on a fire escape railing**- Tip shall be slightly above the fire escape railing.
- E. **Placed to vent a window** – Tip, if possible, shall be level with, or higher than the top of the window.

7.6 Butting and Securing the Portable Ladder.

7.6.1 In order to prevent slippage of the butt, or movement of the top, of a raised portable ladder, it is important that it be butted by a member. In any case for fire, emergency or rescue work, a butt man shall be used to stabilize the ladder and prevent slipping.

- A. The butt firefighter places his left foot in the center of the bottom rung of the ladder and maintains a downward pressure. The members right foot is positioned behind him at a comfortable distance to maintain balance and provide resistance against ladder movement.
- B. The butt firefighter places both hands are placed against and grasp the ladder beams to aid in steadying the ladder.
- C. If a member is working off one side of the ladder, the butt firefighter moves his/her foot from the center of the bottom rung of the ladder to the side opposite the one from which the member is working, and places his/her foot next to the beam. This will prevent the bottom of the beam from shifting due to the relocated weight of the member working on the ladder.

7.6.2 The butt firefighter must be aware of the force that causes the outward slippage of the butt of the ladder. This force is in direct proportion to the climbing member's weight, increases as he ascends the ladder, and is maximum at the top of the ladder. Because of this, extra care must be exercised when a member receives a victim at the top of the ladder.

7.6.3 The aluminum portable ladder, if it is to be left unattended, should be secured at the tip by the first member that climbs the ladder. This is to prevent the ladder from being dislodged from its position by the wind or by the impact of water from a hose line or a large caliber stream.

8. CLIMBING AND OPERATING ON PORTABLE LADDERS

8.1 When the portable ladder has been raised and placed in position, one member butts the ladder as outlined in Section 7.6.1. The assigned member climbs the ladder in the following manner:

8.1.1 Climb on the balls of the feet near the arch, left and right of the center line up and down the ladder.

8.1.2 The underside of the beams are grasped with the hands.

8.1.3 Climbing is done in a rhythmic, coordinated manner.

8.1.4 During the climb, the eyes look up or forward.

8.1.5 If a tool is carried, it should be balanced in the carrying hand, which holds onto the side of the beam. The free hand continues to grasp the underside of the beam.

Do not carry the tool close to the body or inside the ladder over the rungs because of the danger to the butt firefighter below should the tool be accidentally dropped

8.1.6 During freezing weather when ice forms on the ladder due to water spray, to ensure safe ascending and descending:

A. Position the rung of the ladder under the arch of the boot, next to the heel.

B. Position the feet on the rungs directly next to the beams with each step, to avoid slipping.

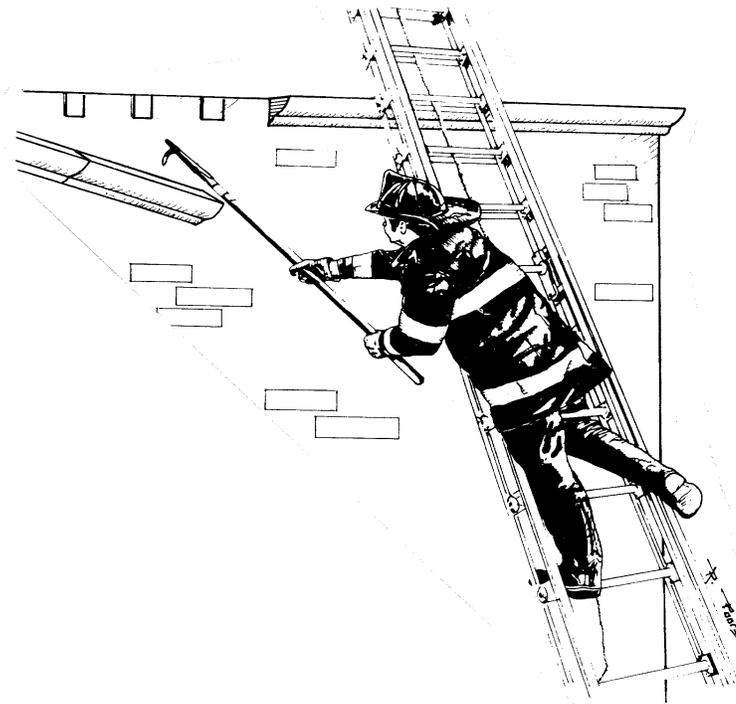
C. The hands remain on the underside of the beams. Should a member slip while climbing, they should immediately pull themselves into the ladder and regain their footing.

8.1.7 Whenever a member operates on a ladder of any kind, they must have enough hand control to ensure his/her safety. This is an absolute necessity when on vertical ladders, such as fire escape drop ladders and gooseneck ladders to the roof. Greater physical effort is needed when using a completely vertical ladder, because a missed step or a slip of the hand will result in a vertical drop and a serious injury. A similar mishap on a ladder which is angled into an objective could result in the member falling toward the ladder other than straight down.

8.2 Duties that require the member to work from the ladder necessitate the use of a leg lock or the life belt for safety.

8.2.1 The Leg Lock:

A. The leg performing the locking maneuver is opposite the working side. For example, if the member wants to lean to the right and vent a window, he will lock their left leg on the ladder.



- B. To perform the leg lock, the locking leg is placed over and under the rung that is two rungs above the one on which the member is standing.
- C. The instep of the locking leg is placed on the beam of the ladder opposite the member's working side. (See Figure 6).
- D. The arch of the foot on the rung is placed against the other beam.
- E. The butt man must reposition his foot as in Section 7.6.1C.

Figure 6

8.2.2 Using the Personal Harness:

- The snap hook of the personal harness hooks directly to the ladder rung.

8.3 Checking Ladder Lock Assemblies:

8.3.1 The mechanical ladder lock assemblies on the extension ladders are positive action automatic spring loaded locks. If in good condition, they will work and lock in either the fly out or the fly in position. The advantage of the fly out position is that the fly ladder tends to tighten its hold on the bed ladder, when it is extended at the proper climbing angle. For this reason and for standardization, the FDNY has adopted the fly up position for the placement of extension ladders (*See Part Two*).

- A. The first member ascending the ladder should always check the ladder lock assemblies to ensure that they are completely engaged on the rung.
- B. Before dismounting from ladder, the surface to be stepped on should be probed with a tool for stability, especially when visibility is poor.

8.4 Ladder Load Capacity:

8.4.1 The maximum load capacity imposed on a ladder includes the weight of the victims, members and their equipment, and any other weight such as a hose line. The ladder must be positioned correctly as outlined in Section 7.4.

8.4.2 Portable Ladder Capacities are as follows:

- A. **Special Ladders: Folding, A-frame and Telescoping** - up to 300 pounds load.
- B. **Roof, straight and extension ladders** (26' or less) - up to 500 pounds load.
- C. **Extension ladders** (27' to 35') - up to 600 pounds load.

8.5 Telescoping Ladders:

Telescoping ladders are extremely compact and versatile and may be particularly useful in many non-fire emergencies.

Easily carried by 1 member, the ladder can be transported through crowded, confined spaces such as elevator cars, narrow twisting hallways and revolving doors to where it is needed. Its length when nested is 32" and can be extended incrementally up to just over 12'. (See Photo 1)

8.5.1 Due to the nature of the construction of telescoping ladders, they must **NOT** be:

- used for laddering a fire building due to lack of heat resistance.
- used horizontally as a bridge or a plank.
- secured at the top and hung vertically (as in a straight hook ladder).
The mechanism will not support weight when deployed in this manner.



Photo 1

9. OTHER USES OF PORTABLE LADDERS

9.1 Portable ladders may be used in many ways and with different tools to perform a variety of functions at fires and emergencies. The most innovative uses of ladders have resulted from quick responses to unusual situations.

9.2 Uses of portable ladders at fires or emergencies may include:

9.2.1 **Used to Bridge a Fence** - At times it's necessary to gain access to a particular area surrounded by a high fence with no immediately available entry way. If the situation does not require cutting the fence, entrance may be gained by using two short portable ladders, e.g., a 16' extension ladder and a 12' hook ladder, and a short length of rope or hose strap. (Figure 7)

- A. One short ladder is placed against the fence at the proper climbing angle and butted by a member.
- B. One member ascends the ladder to the point where the top of the fence is at about waist level.
- C. The butt end of the second ladder is passed to the member on the first ladder. He/she then places one beam on top of the fence. The second ladder is slid out a sufficient distance, pivoted downward from the fence top, and lowered to the ground.
- D. The second ladder is adjusted to provide a proper climbing angle.
- E. The adjacent beams of the two ladders are tied together securely where they intersect, to prevent ladder movement during use.



Fig. 6

Note: The 16' extension ladder is used first against the fence because of its heavier weight. The 12' hook ladder is lighter and less cumbersome than the 16' ladder and may be passed more readily. Other combinations of short ladders may be used, depending on the height of the fence to be laddered and the available ladder inventory. (Figure 7)

Figure 7

9.2.2 **Used as a Barrier** - Portable ladders may be utilized as barriers to dangerous areas or conditions, to protect members or civilians from injury.

- A. A portable ladder secured across a doorway in an area where operations are in progress will indicate that entrance to that section or room of the building is restricted.
- B. Portable ladders placed on one beam, elevated to the waist level on supports and properly secured, can act as a barrier to civilian pedestrian traffic near a hazardous condition or fire operation.
- C. Short ladders may be placed over holes in floors of buildings to prevent members from falling through during operations.
- D. During any operation where ladders are used as barriers and exposed to the public, care must be exercised to prevent theft.

9.2.3 Deleted

9.2.4 Used to support opened overhead doors and in other instances where it is necessary to supply support.

9.2.5 Used on ice covered ponds, lakes, etc. for rescues.

9.2.6 Used in bridging caved-in excavations where a person is partially buried.

10. USES OF PORTABLE LADDERS AT FIRES

10.2 Buildings Requiring the Use of Portable Ladders - In the following examples it will be assumed that a fire of moderate to severe intensity exists somewhere within the building.

10.2.1 Tenements and Multiple Dwellings:

- A. Tenements without front fire escape. (Figures 8A, 8B, and 8C)

When the fire is in the cellar, 1st floor, and/or 2nd floor, raise the portable ladders adjacent to and above the fire area even if the aerial ladder will be required on the upper floors. A severe fire may render the interior stairs untenable and portable ladders will be required, even if the need is not obvious from the street.

- B. Tenements and multiple dwellings with front fire escape.(Figure 9)

1. Fire escapes often become overcrowded when there is a fire anywhere within the building. Under these conditions, a portable ladder should be raised to the first balcony at a point opposite the drop ladder. If more relief for the fire escape is required, another portable ladder should be raised to the second balcony.
2. If panic conditions reign on the fire escape, attempt to keep the ladders out of reach of the people while raising and positioning them. If a panic stricken victim interferes with the ladder raising procedure, members may lose control of the ladder and it may fall and cause injury.
 - a. Panicky victims on portable ladders are a danger not only to themselves but to the rescuer as well.
 - b. If time and conditions permit, lash the ladders to the fire escape for safety.
3. When the overcrowding conditions have been alleviated use the portable ladders for other duties if necessary.
4. Be cognizant of persons in rooms not served by fire escapes.

Figure 8

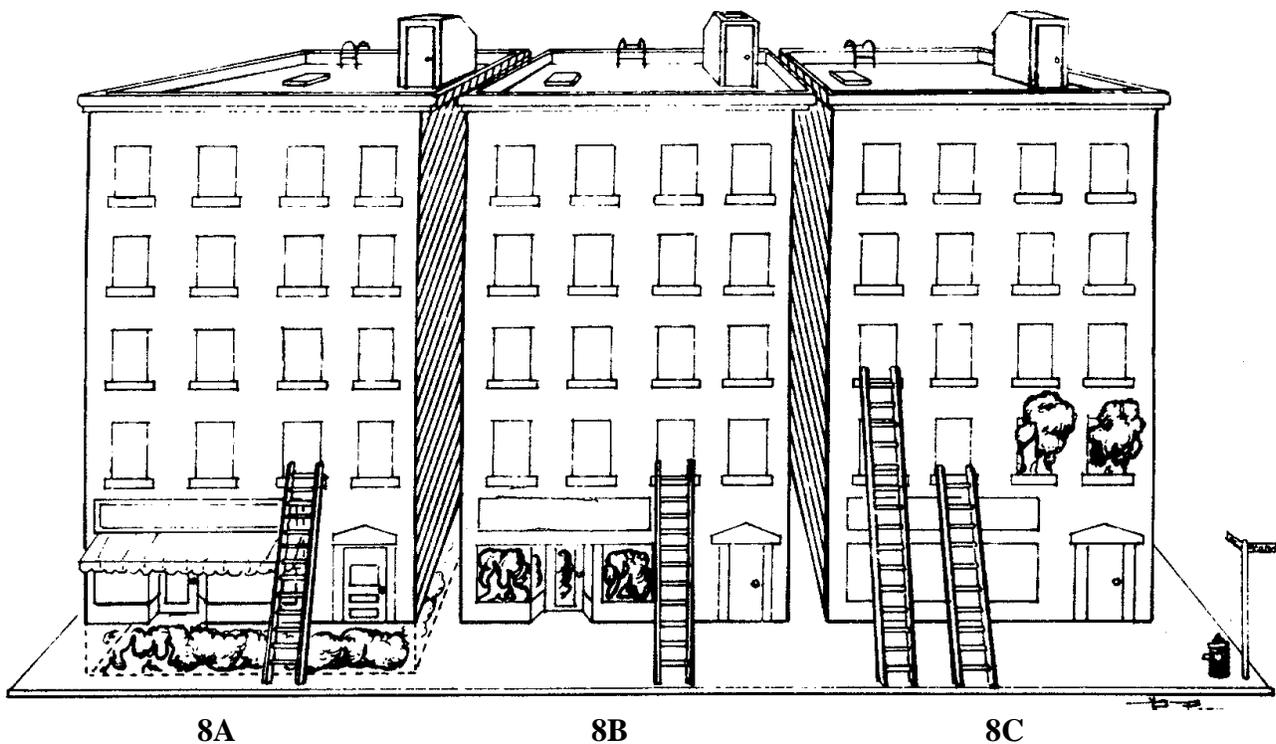
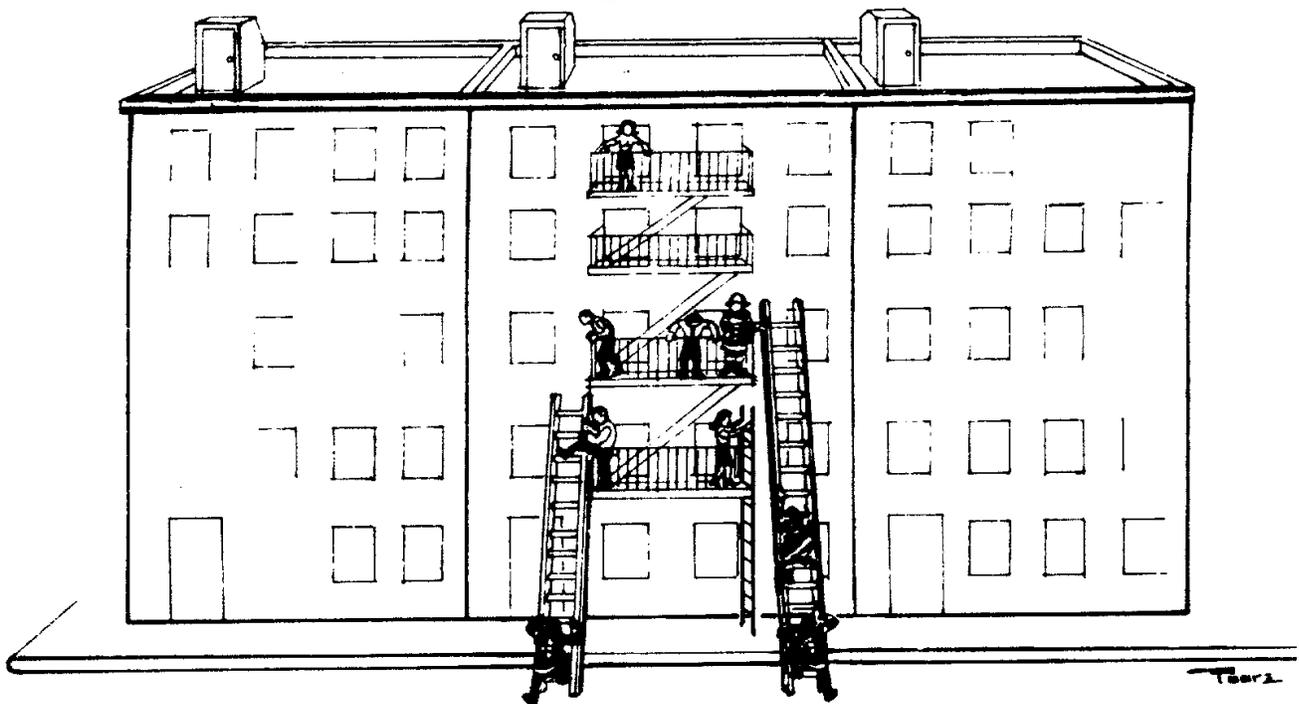


Figure 9



- C. Tenements and multiple dwellings with fire escapes on the rear of the building.
1. Overcrowding on the fire escape in the rear may be relieved by members assisting occupants to the roof via the gooseneck ladder. **(Figure 10)**
 2. In the event of a fire in a building constructed with "party wall balcony fire escapes" where the fire has spread to the adjoining building, thereby eliminating it as a second means of egress, occupants may be trapped on the fire escapes. **(Figure 11)**
 - a. Portable ladders must, if possible, be taken through the 1st floor public hall, apartments or store to the rear yard to effect rescue.
 - b. Because of its portability the 12' hook ladder may be used to gain access to the various balcony levels by the roof firefighter or OVM for search and rescue procedures. The ladder may be brought to the rear yard as in a) above, or brought to the roof via the Aerial, Tower Ladder or utility rope and lowered to the top balcony.

10.2.2 Brownstone Buildings:

- A. Brownstone buildings are usually either 4 story (3 stories above a basement and a cellar) or 3 story (2 stories above basement and cellar)-the basement level is counted as a story. Most brownstones are similar in their construction. However, their type of occupancy varies. Although originally designed as 1 or 2 family private dwellings, they often are used as public or commercial buildings, multiple dwellings (3 or more families), and as Class 'B' rooming houses.

- B A serious life hazard is present in brownstone buildings due to the absence of fire escapes on many of the buildings, the number of occupants (often transients) resulting from single room occupancy, and the building's combustible construction. Ventilation, isolation, entry and search (VEIS) on the fire floor and above the fire may require the use of portable ladders. All horizontal ventilation tactics whether Ventilation for Extinguishment or Ventilation for Search, require communication with, and coordination by, the Ladder Company Officer operating inside the fire area to be vented.

Figure 10

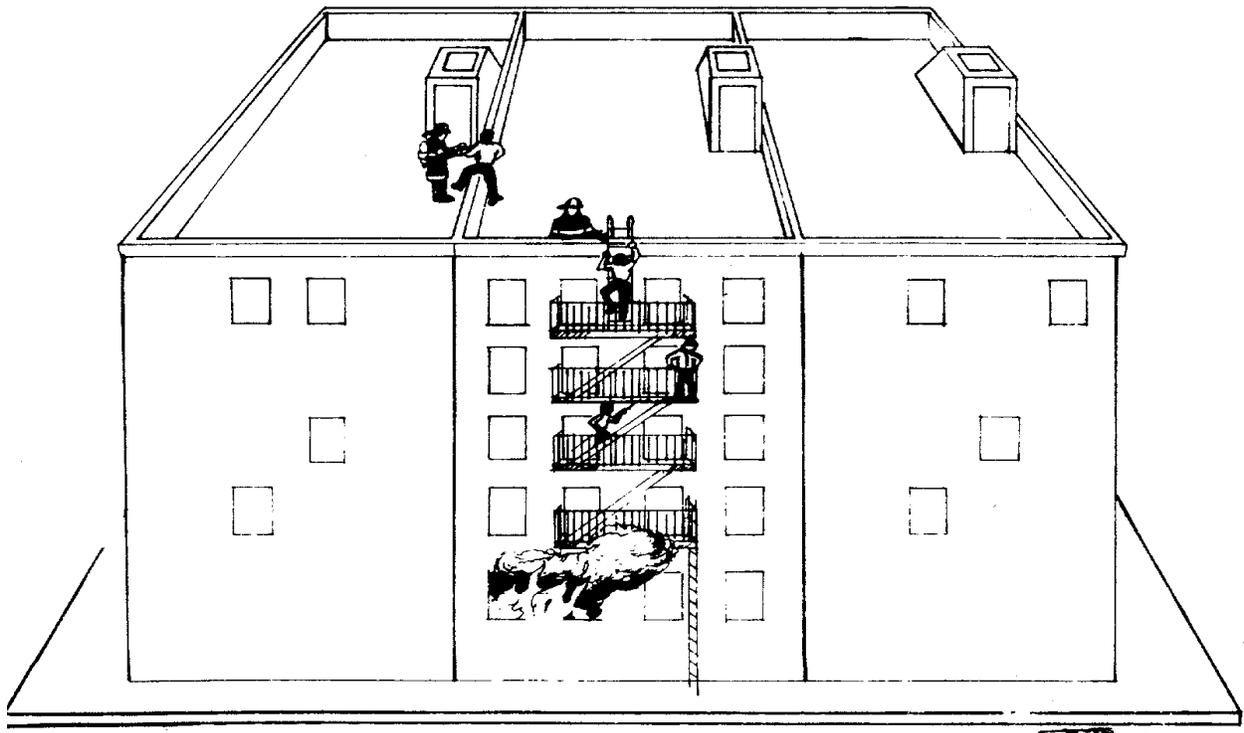
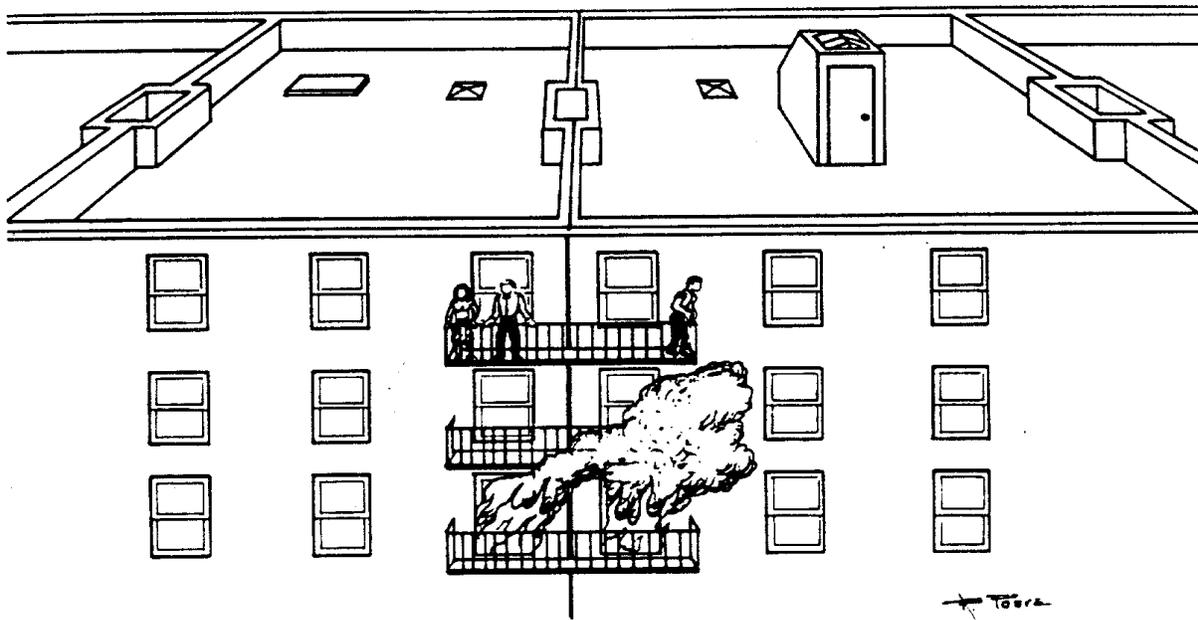


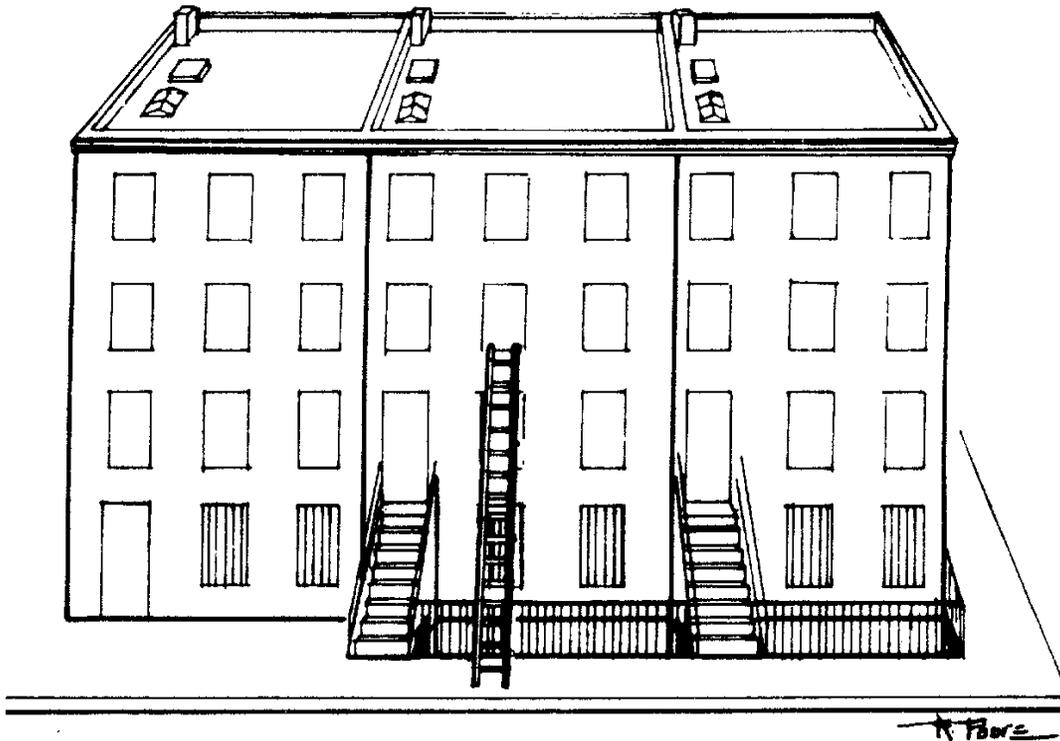
Figure 11



C **Brownstones - Laddering the Front of the Building:**

1. Placing a portable ladder at the window of the small room over the front entrance door will be difficult because of the long, high stoop, which may interfere with firefighting operations. Consider placing the ladder at the adjoining window to gain entrance to this small room. **(Figure 12)**
 - a. There generally are 2 doors to the small room, one from the large adjoining bedroom and one in the hallway.
 - b. If there is no door in the small room from the large bedroom, and hallway fire conditions prevent normal entry into the small room, access may be gained by breaking through the lath and plaster partition between the two rooms.
2. Additional laddering can be performed as outlined under 10.2.1A(1).
3. Some brownstones have small elevated or depressed courts in the front of the building adjacent to the stoop. They generally have a small wall of iron railing around them. These present additional obstacles to overcome when maneuvering and placing portable ladders.

Figure 12



D. **Brownstones** - Laddering the Rear of the Building:

1. The rear of the brownstone presents a severe life hazard if there is no fire escape. Portable ladders transported to the rear of the building and properly positioned are safer than a life saving rope rescue. They require less Staffing and effort.

a. Due to operations in the fire building, to barred windows at the basement level, and to floor layout, movement of portable ladders to the rear may be difficult and time consuming.

b. In most cases, taking the ladder through the second floor (parlor floor) of an adjoining brownstone, passing it out the rear window to another member in the yard below, is faster than using the fire building.

In a row frame, transporting a ladder through the interior of the building to the rear is generally less complicated because there are front and rear doors or window entries at ground level.

Note: In a Brownstone, it is important to take the ladder through with the butt facing rear of building. In a row frame, transporting a ladder through the interior of the building to the rear is generally less complicated because there are front and rear doors or window entries at ground level.

c. Fences constructed between the properties in the rear yard may be an obstacle for rapid ladder placement.

2. Most often, all floors in the rear of a brownstone can be reached with portable extension ladders. It is recommended that extension ladders be used in lieu of straight ladders because:
 - a. They are easier to transport because of the shorter nested length.
 - b. The ladder height can be adjusted.
 - c. One ladder may serve several floors.
 - d. Generally, floor and ladder working length are:
 - 1) 4th floor - 35' extension ladder.
 - 2) 3rd floor - 24' or 35' extension ladder.
 - 3) 2nd floor - 24' extension ladder, or 14' "A" Frame ladder.

10.3 Other Uses of Portable Ladders at Fires:

- A. **Forcible Entry** - Straight ladders have been successfully used to force entry into stores and other occupancies having wood frame inward opening doors. This method will provide a margin of safety where conventional methods of forcible entry would place members in a hazardous position, e.g., when, working in return show window area of plate glass panels, heat or flame prevents close approach, or where the possibility of back draft exists.
- B. **Ventilating Lexan Windows** - Some occupancies have used Lexan panels instead of conventional glass in their windows. At times, the Lexan panel is protected by a wire screen on the exterior. These windows may be forced with a portable ladder if the window is at ground level.
 1. Remove the exterior screen.
 2. Place the butt of the ladder on the Lexan window in the corner adjacent to the window frame.
 3. Three or four members apply a gradual leaning pressure against the window until it is forced inward.
 4. If a section of window snaps off, continue forcing around the window perimeter until a sufficient opening has been made.

10.3.1 Ventilation of windows on upper floors may be accomplished by the use of portable ladders with or without a member operating from the ladder. In all cases, horizontal ventilation must be controlled, communicated and coordinated with the Ladder Company Officer inside the fire area.

A. **Member on the Ladder:**

1. The ladder is placed upwind from the window to be ventilated. The placement should provide a margin of safety to the member if the fire extends out of the window.

2. The tip of the ladder, if possible, should be level with, or higher than the top of the window.
3. The member's eye shield shall be in the down position.
4. When the member is positioned on the ladder and prepares to use a tool to ventilate the window (a 6 foot hook is preferable), he/she should extend his/her arms upward and slant the tool downward and strike the glass. This will prevent the window glass from sliding down the tool handle and causing injury to the member.
5. Placing the ladder upwind from the window will allow the falling glass, to some degree, to be blown away from the member butting the ladder below.

B. Portable ladder with only one member:

1. The member using a portable ladder to ventilate a window must wear full firefighting clothing, eye shield down, and boots pulled up. This will help prevent injury if he is struck by falling glass.
2. The ladder should be positioned so that it will break the desired window glass area when dropped against the window.
3. When the ladder strikes the glass, there should be no contact between the member and the ladder. The reason for this is that there is a great probability that the window glass will slide down the ladder beams. By the member maintaining a 'no contact' position, he reduces the chances of personal injury. Care should also be taken to ensure that no other personnel are in the 'danger area'.
4. As soon as the glass sections have fallen or are clear of the ladder, the member must stabilize the ladder to prevent its falling to the ground.

10.3.2 Hook ladders, in addition to their use as conventional straight ladders, may be used on sloping roofs, to gain access to piers or bulkheads, or any other application where a hanging ladder may be required. To prevent slipping on peaked roofs, set hooks into roof by pulling down on ladder.

10.3.3 Portable ladders may be placed over weakened, damaged or burnt-out stairs in order to safely gain access to upper stories of a building. The preferred ladder for this is the 24' extension ladder rather than a straight ladder. The shorter nested length allows easier maneuverability and positioning, while the adjustable length should ensure proper coverage of the entire stair span. The butts shall be supported by the floor at the base of the stairs, while both the upper beams at the tip of the ladder should rest at the upper floor landing for proper support.

- 10.3.4 Portable ladders may be used to gain access to a higher or lower roof level from an adjoining roof
- 10.3.5 When portable ladders are placed over holes in a floor or roof or over a shaft opening, they aid in preventing members from falling into these unprotected openings. Other objects placed on top of the ladder will identify the hazard and can provide additional coverage over the opening.
- 10.3.6 Portable ladders used in bridging operations can span courts, alleys, shafts and similar openings between floors and roofs. Extension ladders must be used only in the nested position when bridging.
- 10.3.7 Short ladders are used to support a bent cellar pipe during its operation, from exterior cellar stair or below grade openings. The ladders can also be placed across trench cuts, holes in a floor, or other openings to facilitate distributor use in cocklofts, cellars or wherever they are required.
- 10.3.8 In order to prevent electrically operated overhead doors from closing when power in the fire building is shut down or affected by fire, a short ladder may be used to chock the door in the open position.
- 10.3.9 All Unit Circular 200 states that, during winter months when snow conditions prevent or restrict approach of the apparatus close to the fire area, in transporting heavy equipment and rolled or folded hose, the ladder as a sleigh should be considered. The ladder should be covered lengthwise with a tarpaulin, wide boards or other materials to help support the hose or other equipment and prevent it failing through the ladder, dragging in the snow, or being lost.
- 10.3.10 When a ladder has been positioned and used by a member to gain entry to a fire building, there is the possibility that he/she will also need it as a means of retreat. He/she expects the ladder to be there. Therefore, do not move or reposition a ladder used in this manner except if it is necessary to use the ladder for rescue. Members should be notified that the ladder was repositioned and should be returned to the original location or replaced as soon as possible.

11. USES OF PORTABLE LADDERS - EMERGENCIES

- 11.1 In order to perform an emergency search, portable ladders may be used as a brace where there is partial collapse of a floor area. The ladders may be used singly or in groups depending upon the extent of the collapse and the amount of stress to which the ladders will be subject. To ensure that the searching members' lives are not jeopardized, the collapse condition must not be underestimated. Therefore extreme care and judgment must be exercised.

- 11.2 Portable ladders may be used in an emergency to shore excavations, or reinforce weakened walls. The proper placement of ladders and planks can prevent refilling of areas that are being dug out.
- 11.3 During winter months, portable ladders may be used for the rescue of victims that have fallen through ice that has formed on bodies of water. Laid flat on the ice, the ladder distributes the weight of the rescuer and/or the victims over a larger area of ice. It thereby reduces the total weight concentrated at any one point.
 - 11.3.1 If it is necessary for a member to proceed out on the ladder to attempt rescue, he shall be secured with a life safety rope as a safety precaution.
- 11.4 Elevator emergencies may at times necessitate the use of a portable ladder.
 - 11.4.1 The ladder may be used to remove occupants from a stalled elevator car stuck between the floors of a building. The occupants are first relocated to the roof of the car via a ladder and then to a landing or a breached wall by a portable ladder.
The 10' Folding and 12' Telescoping Ladders as particularly well suited for this application
 - 11.4.2 Victims sometimes fall through a shaft opening and into an elevator pit or onto the top of an elevator car. Portable ladders may be required to gain access to such victims.
 - 11.4.3 See *Chapter 18 "Elevator Emergencies"* for details.

12. SAFETY

12.1 General:

- 12.1.1 Extension ladders in general are not made to be taken apart and used as single section ladders. The upper sections normally are not furnished with any type of safety foot. Therefore they are prone to slip when used as a single ladder.
- 12.1.2 Extension ladders and Telescoping should never be used upside down, that is, with the round ends down, since this will cause the ladder to slip on the ground. Also, the lock assemblies will not be able to function correctly.
- 12.1.3 When an extension ladder is raised, the halyard shall be tied off to the lower section of the ladder as a safety measure and prevent the ladder locks from accidentally unlocking by a pull on the rope.
- 12.1.4 Telescoping ladders have no heat resistance and must not be used for laddering in firefighting operations or any other situation where the ladder could be exposed to heat.
- 12.1.5 Make sure the ladder is set on a firm foundation. Before climbing, take care to see that it does not wobble.

- 12.1.6 Ladders should never be placed against window panes, window sashes, or loose boxes, barrels, or other surfaces that may break or collapse.
- 12.1.7 Always face the ladder when ascending or descending.
- 12.1.7 Do not climb higher than the third rung from the top on either straight or extension ladders.
- 12.1.9 Resist the temptation to overreach. It is better to get down and move the ladder.
- 12.1.10 When using a ladder for access to high places, it shall be securely lashed or otherwise fastened at the top to prevent slippage.
- 12.1.11 Never maintain a defective ladder in service. When a defect in a ladder is found during an in-quarters inspection or damaged at a fire, remove the ladder from service and notify the Technical Services Division for their recommendation as to collection, repair or replacement.
- 12.1.12 Hooks of roof ladders in general are used to secure the ladder over the peak of a house or to hang it from a wall edge or window opening. Be sure the bolts are secure on the roof hooks and that the hooks have not been accidentally bent open.
- 12.1.13 Many pumper extension ladders, when in position in the ladder holding brackets on the side of the apparatus, protrude enough to create a potentially hazardous condition. Care should be exercised when mounting the back step of the pumper.
- 12.1.14 Electrical Hazards:
 - A. Both metal and, under certain conditions, wooden portable ladders can conduct electricity. The fact that a metal ladder will conduct electricity is obvious. However, wet wooden ladders or the metal component parts such as tie rods, wire cables, ladder lock assemblies and the like, when in contact with electrical wires or equipment can do likewise.
 - B. Whenever a portable ladder is to be raised and transported in a vertical position, special care must be exercised near overhead electrical wires.
 - C. If a member becomes part of an electrical circuit, either by raising a ladder that touches a live wire or by the member touching a live wire while on a ladder, he can receive an electrical shock and be seriously or fatally injured.
 - D. Depending upon the voltage in overhead wires, the proximity of a metal ladder to them, and the quality of the grounds (ladder and electrical circuit), it may not be necessary to actually touch the wires to suffer an electrical shock. Electrical current can arc and jump the distance between the ladder and the wires and cause death to an unsuspecting member.

12.2 During Operations:

- 12.2.1 After a portable extension ladder has been raised and placed into a position against a building, do not lower the ladder by pulling the butt end further away from the building.
- A. Doing it will reduce the load capacity as the angle becomes more shallow.
 - B. There is a great possibility that it will unlock the lock assemblies in the upper section.
 - C. Always lower the fly ladder below the desired level and re-raise it in order to ensure a safe 65 - 75 degree climbing angle and also the proper locking action of the lock assemblies.
- 12.2.2 When ventilating the upper windows of a building with a portable ladder, watch for glass shards sliding down the beam. (*Section 10.3.2.B*)
- 12.2.3 When placing a metal portable ladder against a building constructed with an aluminum siding exterior, the member should release the ladder before contact is made with the building.
- A There have been occasions when the aluminum siding was energized due to a faulty electrical service connection or a faulty ground, or due to the service being damaged by fire conditions. If a member places an aluminum ladder on such a building, they could make themselves part of an electrical circuit and receive an electric shock.
- 12.2.4 Position metal ladders away from electrical service wires entering buildings from utility poles. Injury to a member can be caused by the member brushing against wires having an outer insulation covering that is in a deteriorated condition.
- 12.2.5 When operations are to be conducted at electrical generating stations or substations, under NO circumstances shall metal ladders or tools be brought inside the gates.
- A. Never place a ladder of any type, wood or metal, against what appears to be metal superstructure. It may turn out to be some form of electrical conductor.

13. MAINTENANCE OF PORTABLE ALUMINUM LADDERS

13.1 Aluminum ladders require considerably less maintenance than wood ladders and with a few simple precautions should provide long service.

13.2 General Maintenance:

13.2.1. At the beginning of each tour, portable ladders should be inventoried, slid out of their holders to ensure they are easily accessible and halyards are properly fastened.

A. Hydraulic ladder racks on engine apparatus should be tested to ensure they are operating and halyard is properly fastened.

13.2.2 Aluminum ladders shall be maintained free of dirt and grime. They shall be washed when necessary with warm soapy water and rinsed thoroughly.

13.2.3 Nicks or burrs that are found on the ladder shall be removed with a fine file in order to prevent injury to member's hand during ladder handling.

13.2.4 A visual inspection of portable ladders shall be made weekly, and also after use, to determine their condition and serviceability. Examples of ladder defects are as follows:

A. Cracked welds.

B. Loose rungs.

C. Bent rungs or beams.

D. Missing or loose rivets, nuts, or bolts.

E. Discoloration signaling excessive exposure to heat.

F. Broken mechanical lock assemblies on extension ladders.

13.2.5 If aluminum ladders are stored in a horizontal position they must be supported at a sufficient number of points to prevent sagging and permanent set.

13.3 Extension Ladders:

13.3.1 Ladder slides and channels.

A. Materials used to allow the ladder sections to slide easily on each other are candle wax, paraffin and grease.

B. Grease is normally used only for internally guided aluminum truss ladders. The grease shall be cleaned from the guiding grooves, and they shall be recoated each year, or when the grease has dried out and is no longer an effective aid to sliding.

- C. On all ladders, plain candle wax or paraffin shall be applied every three months to all contacting surfaces of multiple section ladders to ensure smooth operation. Apply the candle wax or paraffin where there is contact between rungs, guides or side rails.
 - 1. Any wax that is thinner than candle wax or paraffin either spreads too thinly or rubs off almost immediately. The net result is no lubrication and the sections do not slide easily.
 - 2. If, after the application of candle wax or paraffin, the ladder sections do not move smoothly, or if they bind during use, check the ladder for damage and/or alignment problems.

13.3.2 Pulleys:

- A. Pulleys are found on all extension ladders. These pulleys usually have a ball-bearing center that requires 1 to 2 drops of oil once a year.

13.3.3 Halyards:

- A. The halyards on the 24' extension ladder are generally made of manila rope. The halyards on the 35' extension ladder are made of a poly blend. When either rope becomes frayed or twisted from usage, it should be replaced.

13.3.4 Mechanical Lock Assemblies:

- A. The mechanical lock assemblies are spring loaded devices. These springs have, at times, broken or rusted off thereby placing the ladder out of service. The assemblies shall be given careful scrutiny during inspections and kept clean and well oiled.

13.4 Hook Ladders:

- 13.4.1 The hooks of the hook ladders are spring loaded and are covered assemblies to ensure operation even under freezing conditions. These assemblies, like the mechanical lock assemblies in Section 13.3.4A, must be carefully inspected, kept clean and well oiled to ensure proper functioning.

13.5 Telescoping Ladders

- 13.5.1 If the ladder becomes very wet during use, it should be wiped down and allowed to dry before being stored. Do not use candle wax, paraffin or grease to lubricate a telescoping ladder. If lubrication is required, use a silicone-based furniture polish (such as Pledge) on the beams of the ladder. Never use WD-40 or similar oil-based lubricants. These may clog mechanisms inside the ladder.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

PART TWO

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
1	Transport Ladder	29
2	Raise Ladder	32
3	Extend Fly Ladder	33
4	Place Ladder Against Building	34
5	Carry Vertical Ladder	35
6	Secure Ladder.....	36
7	Lower Ladder to Street	37
8	Raise 35 ft. Ladder	38
9	Extend Fly Ladder of 35 ft. Ladder.....	40
10	Place 35 ft. Ladder Against Building	41
11	Carry 35 ft. Vertical Ladder	42
12	Secure 35 ft. Ladder	43
13	Lower 35 ft. Ladder to Street.....	44
14	Raise Ladder from Position Flat on Ground	46
15	Extend Fly Ladder With Tip Against the Building	47
	Study Guide – 2 Member 24ft. Raise	48

EVOLUTION # 16 MANEUVER PORTABLE LADDERS

EQUIPMENT:

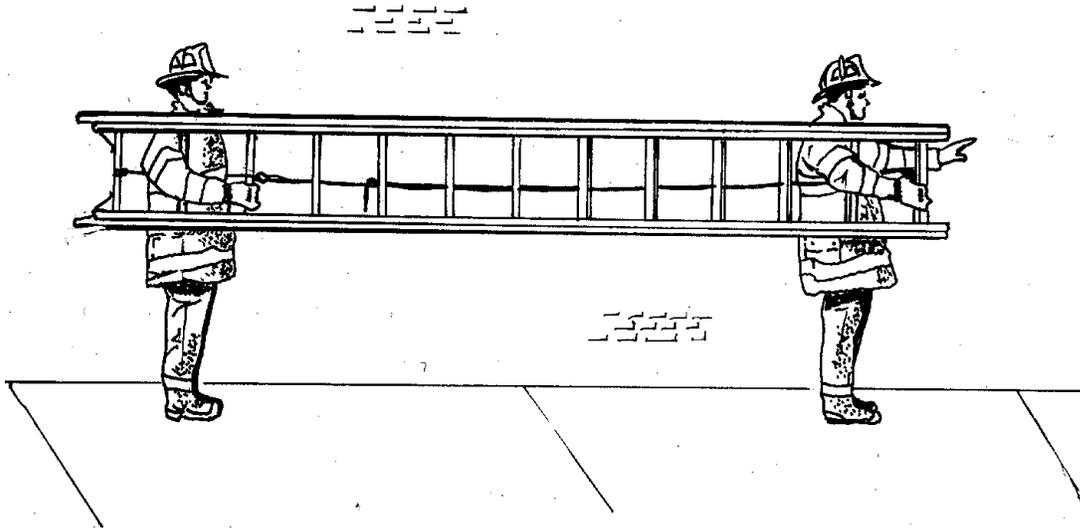
- ◆ **1 Portable ladder**
 - A. Portable straight ladder**
 - B. Portable extension ladder**

OBJECTIVE:

To describe methods for transporting, raising, extending, placing, carrying, securing and lowering portable ladders.

Procedures will apply to all portable ladders except 35 ft. metal Duo-Safety extension ladders for which separate instructions have been included.

Figure 1



1. COMMAND: "Transport ladder" - Figure 1

OBJECTIVE: To transport portable ladders from apparatus or other location to point of operation.

- 1.1 Two firefighters, positioned one at each end of the ladder, with fly out, grasp upper beam.
- 1.2 Rear firefighter, gives command "Ready, Lift" (see Note E)

FRONT FIREFIGHTER

REAR FIREFIGHTER

- 1.3 Ladder is raised to shoulder in unison with rear firefighter, with underside of upper beam resting on shoulder.
- 1.4 Places arm through 2nd and 3rd rungs from tip, grasping 1st rung from tip. Free arm is used to avoid obstructions.
- 1.5 Gives command "Ready, Transport" and moves toward operation point.
- 1.6 When destination has been reached, gives command "Ready, Halt." Halts.
- 1.7 Gives command "Ready, Lower." Lowers ladder to ground

- Ladder is raised to shoulder, in unison with front firefighter, with underside of upper beam resting on shoulder.
- Places arm through last two rungs and grasps 3rd rung from butt.
- Transports ladder towards operation point.
- Halts and awaits next command.
- Lowers ladder to ground.

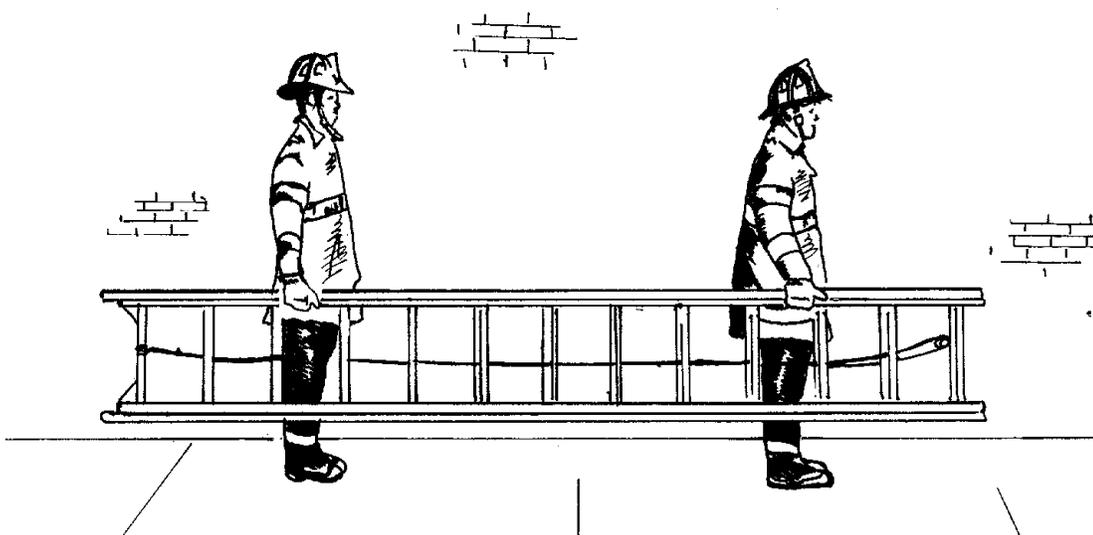
ALTERNATE METHOD: Hand carry for short distances - Figure 2

Two firefighters, one near butt, the other near tip. Members, on command carry ladder by the upper rail farthest from body (as with a suitcase). (See Note D). Carry ladder to objective.

DUO-SAFETY METAL LADDER:

When 35' Duo-Safety Metal Ladder is to be transported, 3 firefighters may be employed with the additional firefighter positioning himself on the same side and at the approximate center of the ladder.

Figure 2



2. COMMAND: "Raise Ladder" - Figures 3 and 4

Two Firefighter Raise (1 butt FF, 1 raising FF).

- 2.1 Ladder is positioned on beam parallel to building, fly facing away from building, butt directly below objective.

BUTT FIREFIGHTER

- 2.2 Takes position with back to building, foot (nearer tip) is placed on lower ladder shoe, hand(near tip) grasps underside of upper beam at approximately the 3rd rung, palm up. Other hand grasps upper beam shoe, palm down, other leg is extended for leverage.
- 2.3 Give command "Prepare to Raise".
- 2.4 Gives command "Raise" and, as ladder is being raised, pushes down with hand on shoe and pulls up with hand nearer tip: stretches extended leg away from the butt until ladder reaches vertical position.
- 2.5 At this point the firefighter is in a position opposite rungs on building side of ladder.

RAISING FIREFIGHTER

- Takes position one-third the distance from the tip, on the street side of the ladder facing the tip.
- Does partial knee bend, grasps upper beam on rail closest to building.
- Lifts ladder from the ground. Pivots in under lower beam to a position facing the butt firefighter. Raises ladder to a vertical position using a hand under motion along lower beam.
- Takes position on street side of ladder opposite butt firefighter

Figure 3

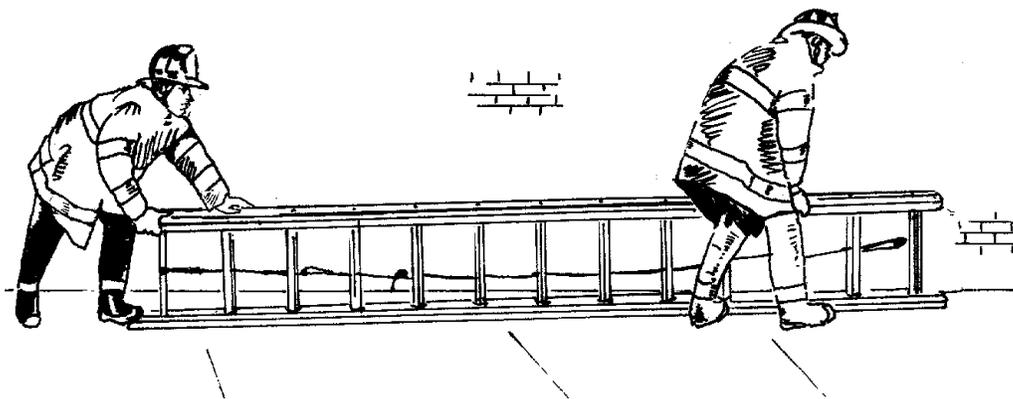
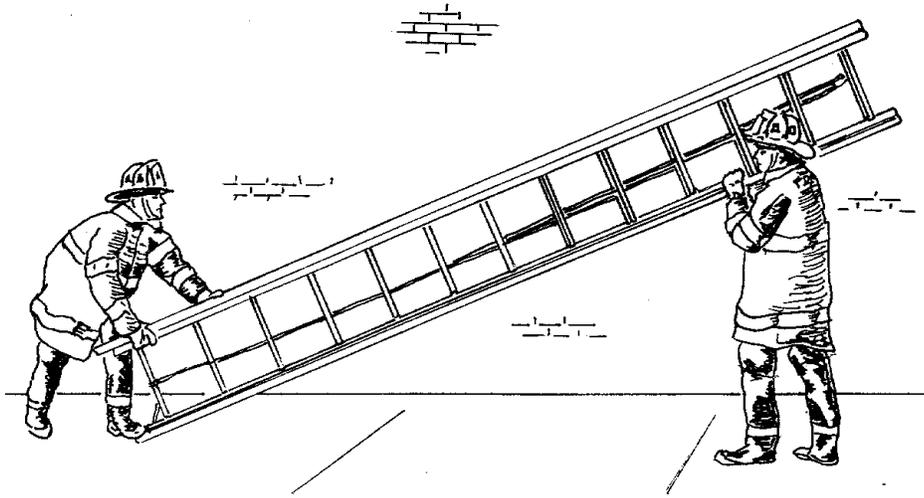


Figure 4



3. **COMMAND: "Extend Fly Ladder"** - Figure 5

BUTT FIREFIGHTER

3.1 Snubs left beam with left toe, unties knot, extends fly ladder to desired height. Locks fly. (note C) (note B)

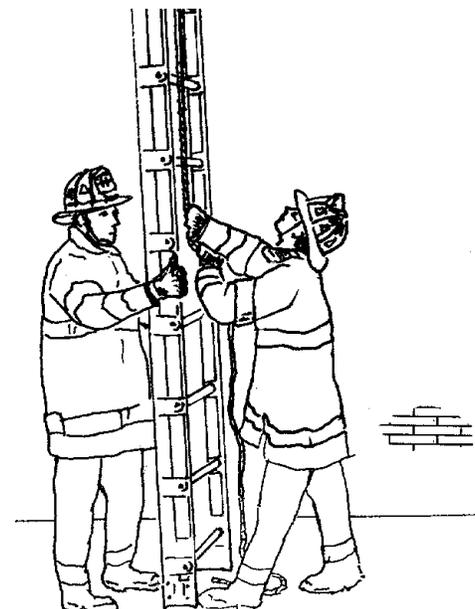
RAISING FIREFIGHTER

Takes boxer's stance, left foot forward dead center between beams. Both hands grasp beams on inner rail about shoulder high. Steadies ladder as it is extended. (Note A)

Figure 5



Figure 5A



4. **COMMAND:** "Place Ladder Against Building" - Figure 6

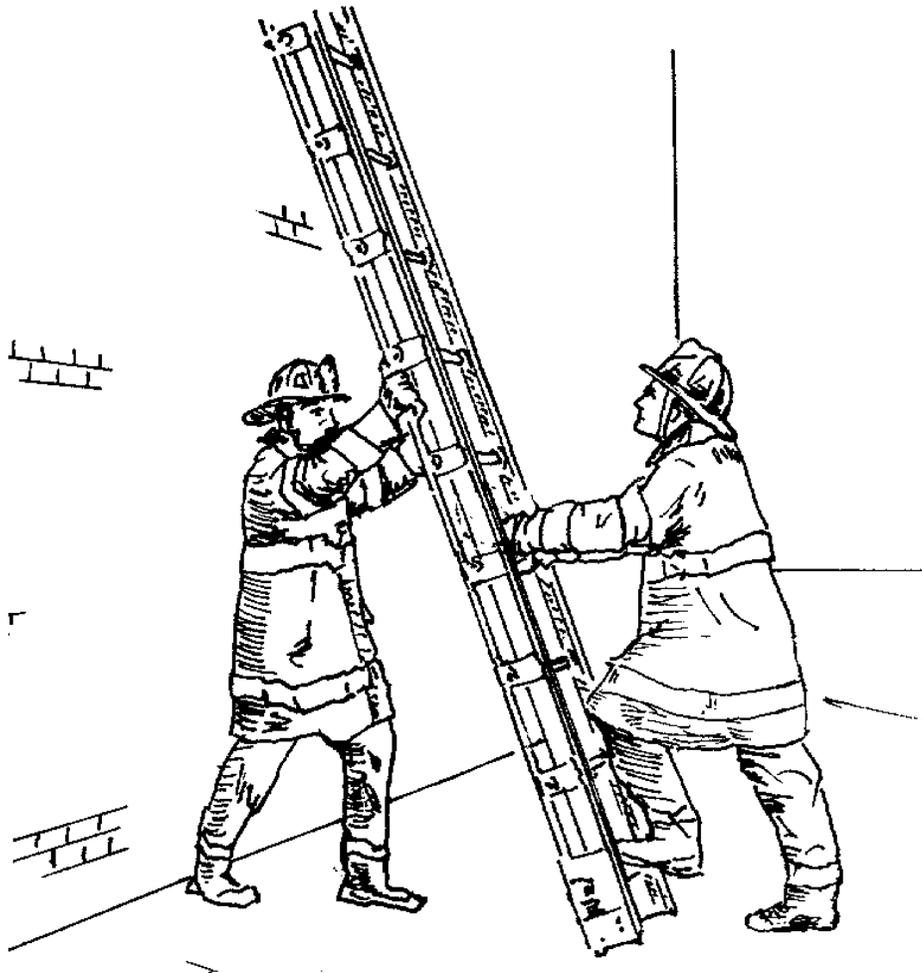
BUTT FIREFIGHTER

- 4.1 Grasps both beams on inner rails about shoulder high, steps backward lowering ladder into building. Looks forward, not upward.
- 4.2 Secures halyard by making clove hitch and binder on taut part of rope above the 3rd rung.

RAISING FIREFIGHTER

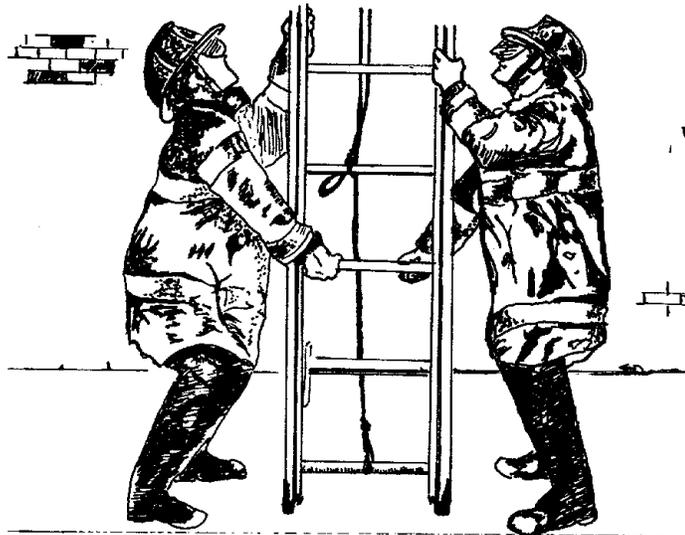
- Places left foot on center of bottom rung, grasps rung at shoulder level with both hands, palm down, looks up and guides ladder into building.
- Adjusts angle of ladder if necessary.

Figure 6



5. **COMMAND:** "Carry Vertical Ladder" - Figure 7
- 5.1 Ladder is returned to vertical position in reverse order of the way it was placed against the building.
- 5.2 Each firefighter moves to his right, facing beams, grasps beam in front of them about head high with lefthand, grasps 3rd rung from butt with right hand, palm up.
- 5.3 The firefighter facing direction of travel gives command "Ready, Lift". Both lift ladder a few inches off ground.
- 5.4 The firefighter facing direction of travel gives command "Prepare to carry". Both men set themselves to carry ladder.
- 5.5 Member facing direction of travel gives command "Carry". Both firefighters carry ladder to objective. The firefighter facing direction of travel looks alternately at tip and direction of travel to avoid obstructions.
- 5.6 When ladder reaches objective, the firefighter facing direction of travel gives command "Ready, halt". Both members halt. Place ladder on ground.

Figure 7

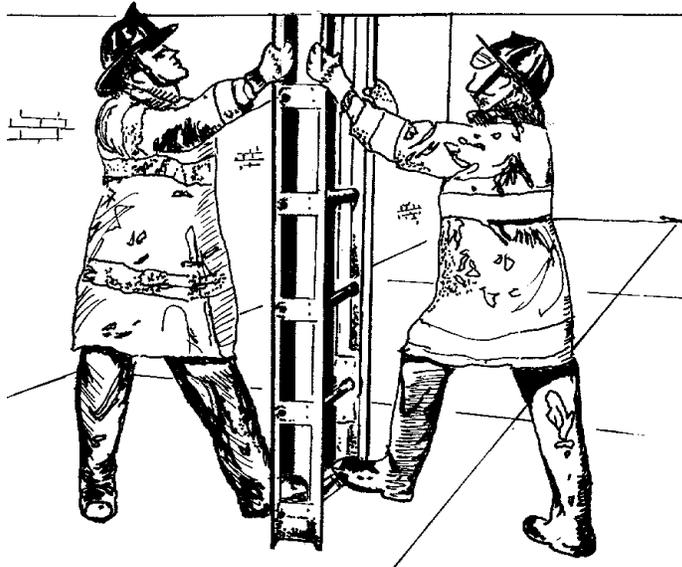


6. COMMAND: "Secure Ladder" - Figure 8

Given by Butt firefighter when ladder is in vertical Position between commands or by man having difficulty if ladder starts to get out of control

- 6.1 Firefighters **FACING RUNGS:** At command "Secure Ladder" each firefighter grasps both beams about shoulder level, and simultaneously places ball of left foot on bottom rung with side of foot against right beam, right foot is used as stabilizer. Both men exert downward pressure with feet and hands.
- 6.2 If they are facing beams when secure command is given, rest ladder on ground if necessary, each grasps beam in front of them at eye level one hand on each rail and exert a downward pressure, pivots to the left, and assumes secure position as in step 6.1.

Figure 8



7. COMMAND: "Lower Ladder to Street" - Figure 9

- 7.1 Ladder is returned to vertical position in reverse order of placing ladder against the building.
- 7.2 Lower fly ladder where necessary in reverse order of extending procedure. Secure halyard.

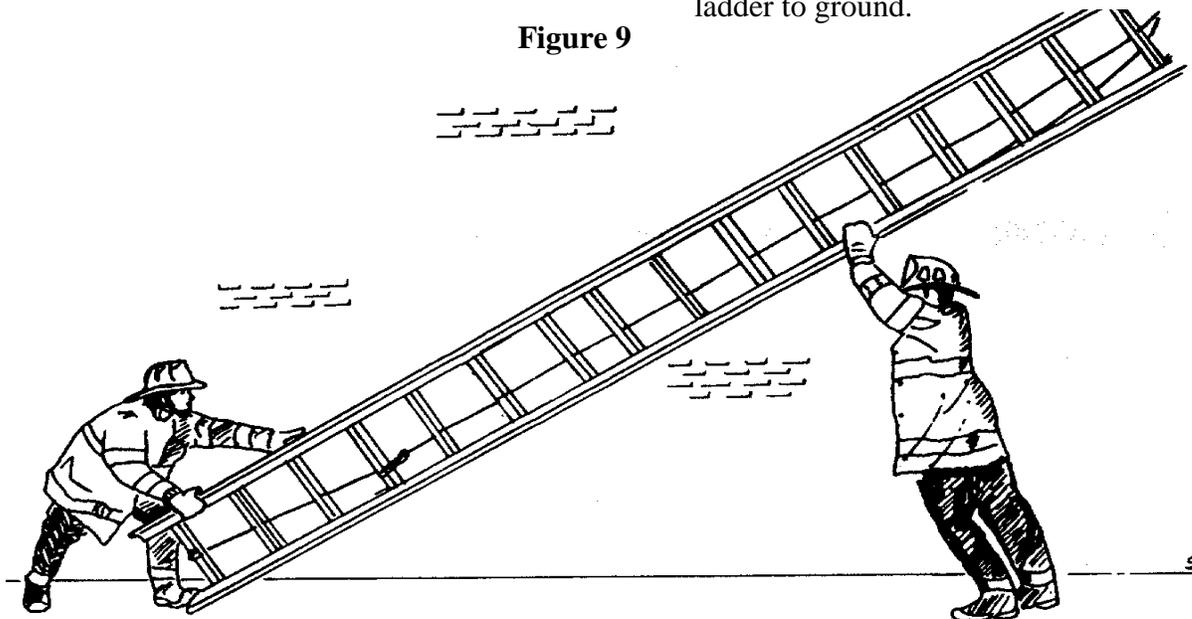
BUTT FIREFIGHTER

- 7.3 Butt firefighter with back to building, places foot closer to direction of lowering, on lower ladder shoe. Other leg is extended for leverage.
- 7.4 Both hands grasp beam opposite raising firefighter, one hand on shoe in pushing position, the other hand higher up on beam in pulling position.
- 7.5 Gives command "Ready, Lower". As ladder is lowered, pushes with hand on shoe and pulls with hand on beam, until ladder reaches ground.
- 7.6 Gives command "Prepare To Step Out," when raising firefighter approaches 1/3 distance from the tip.
- 7.7 Gives command "Step Out" when raising firefighter reaches 1/3 distance from the tip.

RAISING FIREFIGHTER

- Stands facing beam on lower side of ladder.
- Grasps beam about head high with both hands.
- Pulls ladder so that it leans in his direction. Lowers ladder with hand over hand motion along lower beam.
- Raising firefighter keeps moving but is alert to next command "Step out".
- On command of butt firefighter to step out from under beam, turns to street side of ladder, facing tip, grasps upper beam on inner rail and lowers ladder to ground.

Figure 9



THREE FIREFIGHTER BEAM RAISE (1 Butt FF, 2 Raising FFs)

DUO-SAFETY 35' METAL EXTENSION LADDER

8. COMMAND: "Raise Ladder" - Figures 10 and 11

8.1 Ladder is positioned on beam parallel to building, fly facing away from building, butt directly below objective.

BUTT FIREFIGHTER

8.2 Takes position with back to building. Foot (near tip) is placed on lower shoe. Hand (nearer tip) grasps underside of upper beam near 3rd rung, palm up. Other hand grasps upper beam shoe palm down. Other leg is extended for leverage.

8.3 Gives command "Prepare to Raise".

8.4 Gives command "Raise". As ladder is being raised, pushes down with hand on shoe and pulls up with hand on beam, extends leg for leverage until ladder reaches the vertical position.

8.5 Is in position facing rungs, on building side of ladder, ready to extend, carry, or lower ladder into the building.

RAISING FIREFIGHTER

Take position on the street side of the ladder, about 1/3 the distance from the tip, facing the tip. Taller PERSON nearer tip.

Both do partial knee bend, grasp upper beam on inner rail (near building) with hand near building.

Both lift ladder from the ground, then pivot in under lower beam to position facing the butt firefighter. (Figure No. 10). They raise ladder to a vertical position using a hand under hand motion along lower beam. As ladder nears vertical position raising man nearer butt steps out and proceeds to far side of the ladder and faces the beam.

When ladder reaches vertical, both men are facing opposite beams ready to extend ladder or perform other operations.

Figure 10

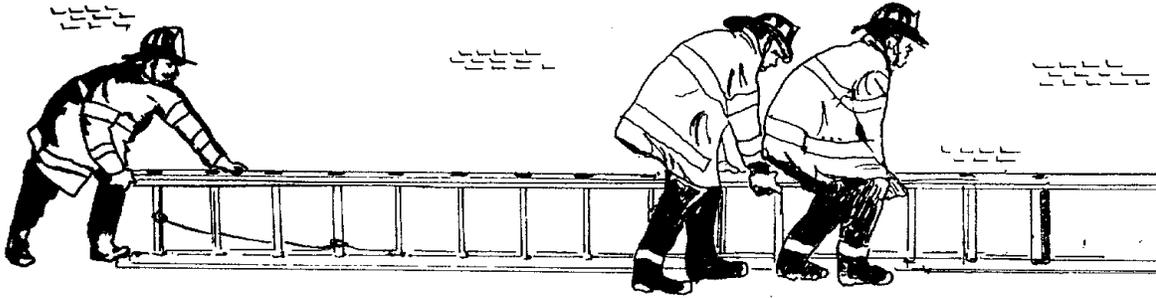
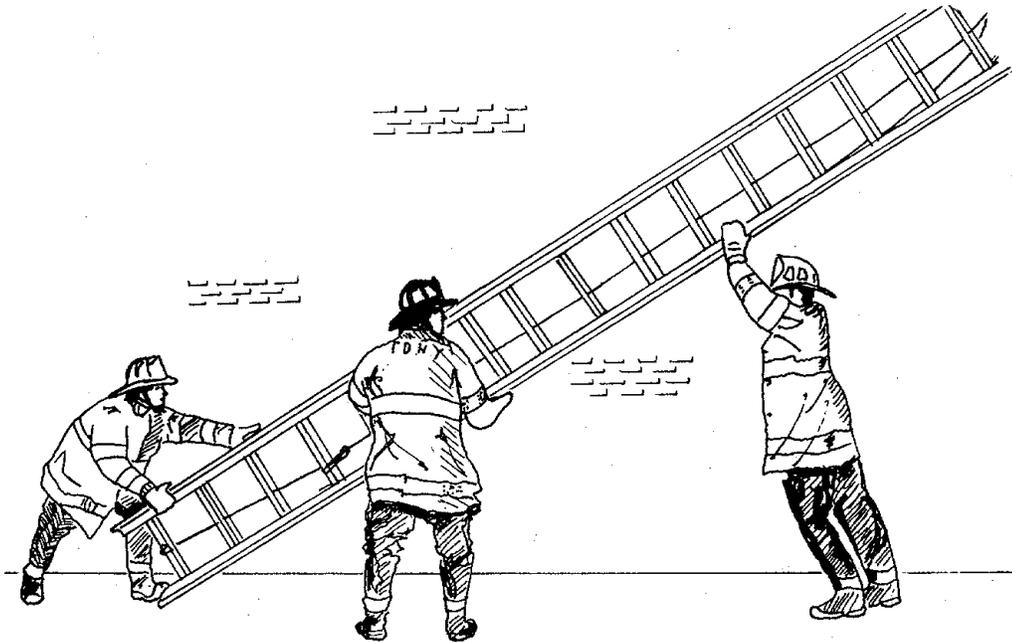


Figure 11



9. COMMAND: "Extend Fly Ladder" - Figure 12

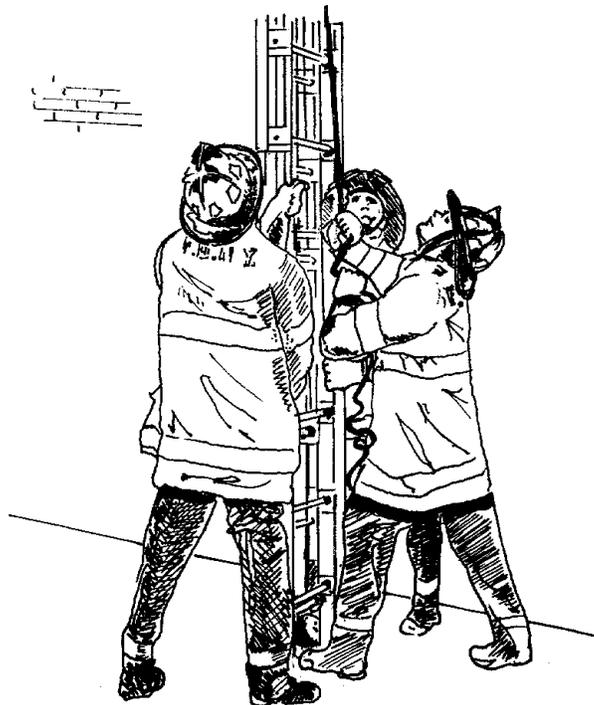
BUTT FIREFIGHTER

9.1 Snubs left beam with left toe, unties knot, extends fly to desired height, locks fly. (Note C). See Figure 5 for correct position of hands on halyard when extending fly. (Note B).

RAISING FIREFIGHTER

Both men stand facing beams grasp beams on rails of bed ladder with left hand about head high and right hand waist high. Feet are about two feet apart. (Note A). Both steady ladder as it is extended. Look up.

Figure 12



10. COMMAND: "Place Ladder Against Building" - Figure 13

BUTT FIREFIGHTER

RAISING FIREFIGHTER

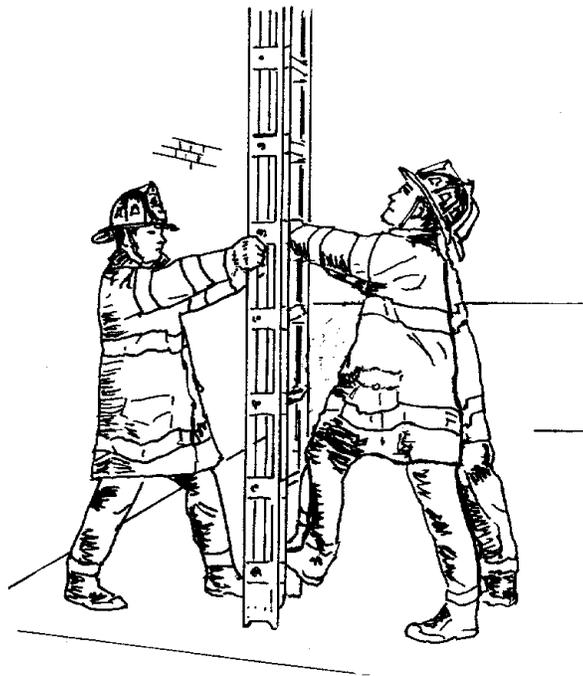
- 10.1 Takes position on building side of ladder facing raising firefighter. Gives command "Prepare to place ladder against building".
- 10.2 Grasps beam about shoulder high, gives command "Place ladder". Steps backward while looking forward, lowering ladder into building.
- 10.3 Does not look up as ladder angle is being adjusted. Secure halyard as in two firefighter raise.

Take position on street side of ladder, facing butt firefighter.

Both men place foot near partner on bottom rung and grasp rung shoulder high, palms down. They guide ladder into building as butt firefighter steps back. Look toward tip to avoid obstructions.

Adjust ladder if necessary.

Figure 13



11. COMMAND: "Carry Vertical Ladder" – Figure 14

11.1 Ladder is returned to vertical position in reverse order of placing procedure.

BUTT FIREFIGHTER

11.2 Grasps rungs just above head with hand on side opposite of travel, palm down. Other hand grasps 2nd rung from bottom, palm up.

11.3 Gives command "Ready, Lift". Looks alternately from tip to direction of travel to avoid obstructions and help maintain ladder in straight position.

11.4 Gives command "Ready, Halt". Ladder is placed on ground.

RAISING FIREFIGHTER

Each faces outside of beam nearer him. Grasps beam about head high with left hand, grasps 2nd rung from bottom with right hand, palm up. (see foot note)*

Both men lift ladder slightly off ground and carry it to objective. Eyes are kept looking at tip to avoid obstructions and to maintain ladder in level position.

Both firefighters halt and place ladder on ground.

***NOTE:**Taller firefighter may grasp 3rd rung from bottom if this position is more comfortable. However, both must grasp same rung.

Figure 14



12. COMMAND: "Secure Ladder" Figure 15

Given by Butt Firefighter when ladder is in vertical position between commands or by man having difficulty if Ladder starts to get out of control.

12.1 All men facing rungs:

BUTT FIREFIGHTER

12.2 Grasps each beam about shoulder high, places one foot on center of bottom rung.

RAISING FIREFIGHTERS

Each grasps nearer beam with both hands - left hand at eye level, right hand 12" below left. Places ball of foot nearer partner on bottom rung against beam in front of them, other foot is used as a stabilizer.

12.3 All firefighters exert downward pressure with hands and feet.

12.4 Raising firefighters facing beams, butt firefighter facing rungs:

12.5 At command ladder is reset on ground if necessary.

BUTT FIREFIGHTER

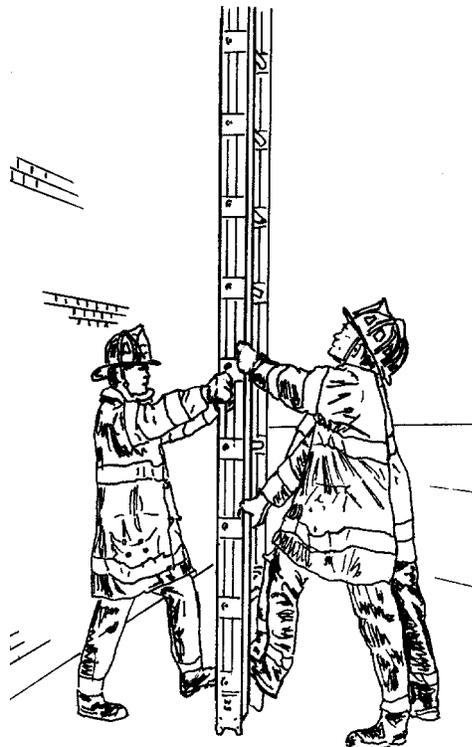
RAISING FIREFIGHTER

12.6 Same as in 12.2.

Each grasps beam in front of them at eye level, one hand on each rail exerting a downward pressure, pivots into position as in 12.2.

12.7 All exert a downward pressure with hands and feet.

Figure 15



13. COMMAND: "Lower Ladder to Street" - Figures 16 and 17

- 13.1 Ladder is returned to vertical position in the reverse manner it was placed against building.
- 13.2 Lower fly ladder where necessary in the reverse manner of the extending procedure. Secure halyard.

BUTT FIREFIGHTER

- 13.3 With back to building, places foot closer to the direction of lowering on lower ladder shoe. Other leg is extended for leverage.
- 13.4 Both hands grasp beam opposite raising men. One hand on shoe in pushing position. The other hand higher on the beam in pulling position.
- 13.5 Gives command "Prepare to Lower".
- 13.6 Gives command "Lower". As ladder is lowered, pushes with hand on shoe and pulls with hand on beam. Extends leg for leverage until ladder reaches ground.

RAISING FIREFIGHTER

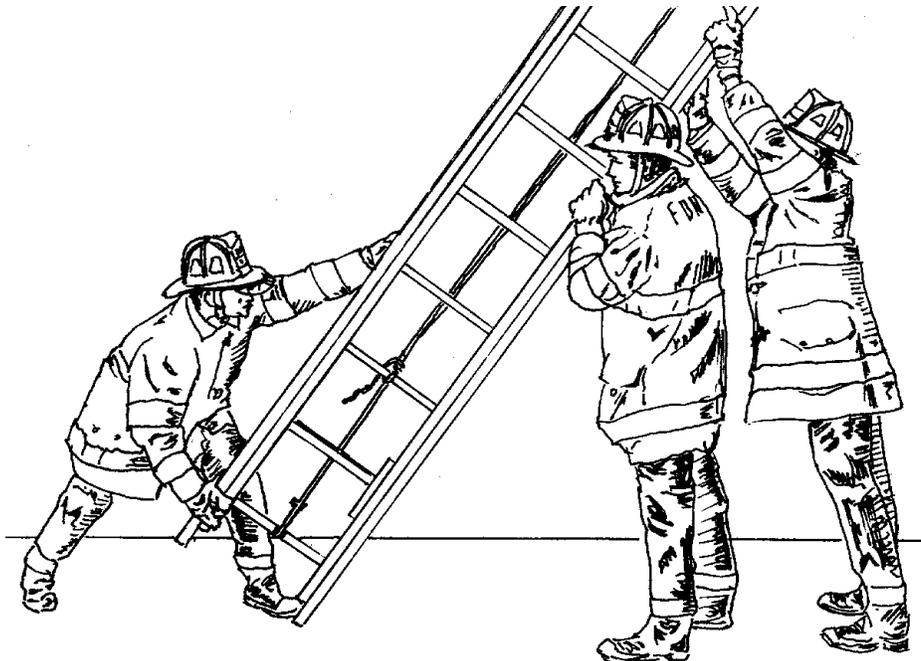
Taller firefighter takes position facing beam on lowering side of the ladder. Shorter firefighter stands next to them on street side.

Taller firefighter grasps beam about head high with both hands. Shorter firefighter stands by.

Taller firefighter prepares to lower.

Taller firefighter pulls ladder so that it leans in their direction, lowers ladder in a hand over hand motion along the lower beam. As ladder is lowered, shorter firefighter steps in under same beam as taller one and assists them in lowering ladder.

Figure 16



13.7 When raising firefighters reach 1/3 distance from tip, gives command "Prepare to step out."

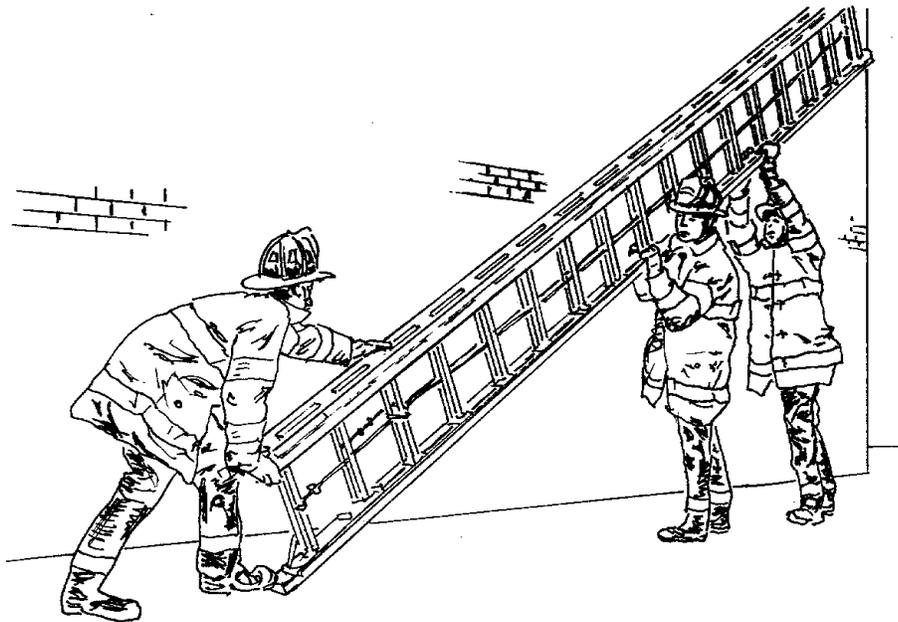
13.8 When raising men reach one third distance from the tip, gives command "Step Out."

RAISING FIREFIGHTER

Keep moving but be alert for the next command to step out.

On command of butt man, both men step out from under the beam, turn to street side of ladder facing tip. Grasp upper beam on inner rail and lower ladder to ground.

Figure 17



NOTES:

- A. Raising firefighter keeps their hands clear of the moving fly ladder by grasping the side rails of ladder beams furthest from them (toward building). The left toe must be dead center to avoid descending fly.
- B. When extending or lowering fly ladder, hands grasp halyard at right angles to direction of pull to prevent rope from slipping through hand. (See Figure No. 5).
- C. Halyard may be left untied if situation warrants. If time permits or if ladder is to be rolled or carried vertically, the halyard must be tied by taking a turn around the third rung from the bottom and tying a clove hitch and binder on the taut part of the rope.
- D. This method prevents lower beam from bumping into leg as ladder is carried.
- E. To ensure smooth operation and avoid injury a preliminary command "Ready", or "Prepare to" is used to alert members to the next command.

14. COMMAND: "Raise Ladder from Position Flat on Ground, fly up, perpendicular to building with both shoes against the building".

Figures 18 and 19

This method is used when methods previously described are impracticable.

One FF: All ladders except 35' Duo-Safety Metal Extension Ladder (Figure 18).

Two FFs: 35' Duo-Safety Metal Extension Ladder (Figure 19).

- 14.1 Firefighter(s) stand(s) at tip of ladder facing building, grasp top rung of ladder.
- 14.2 Swing(s) ladder up and steps in under ladder.
- 14.3 Move(s) toward building, raising ladder with a hand under hand motion on the beams, (one firefighter on each beam on Duo-Safety) until ladder is in vertical position against the building, fly in.
- 14.4 Adjust ladder range.

Figure 18

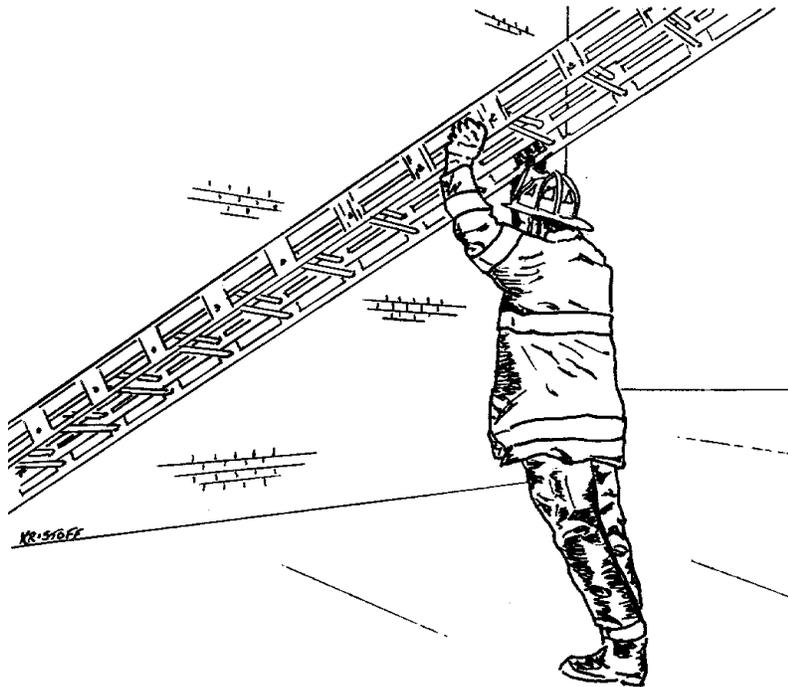
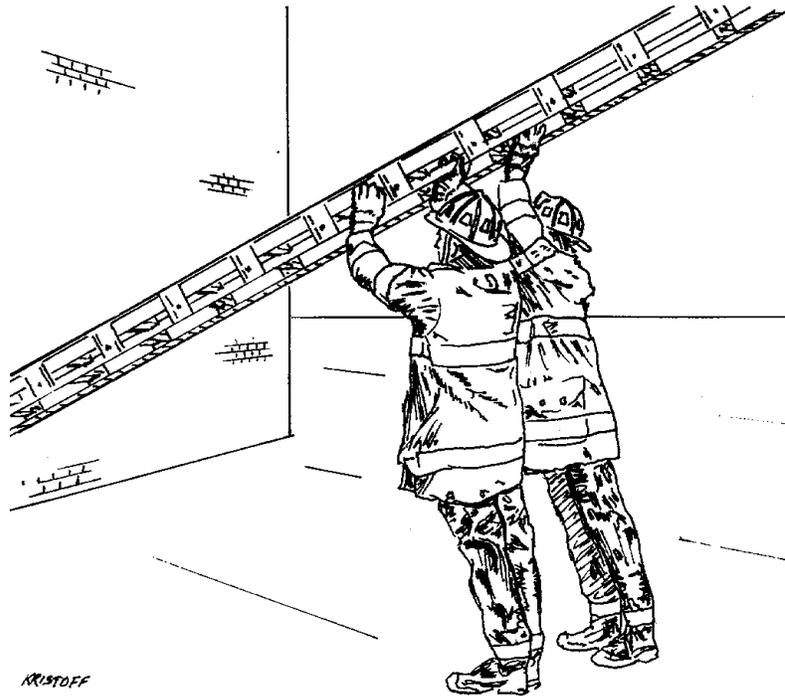


Figure 19

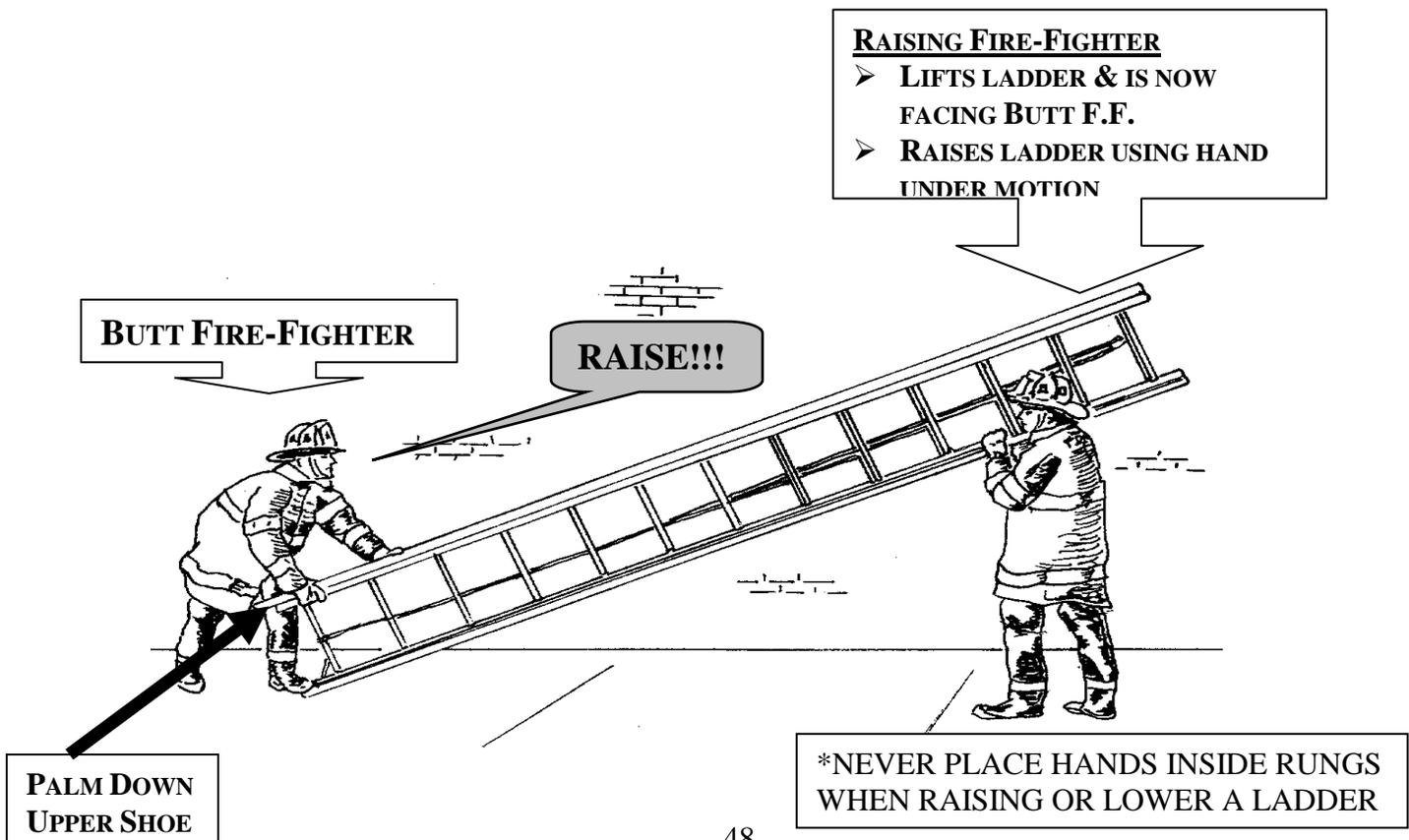
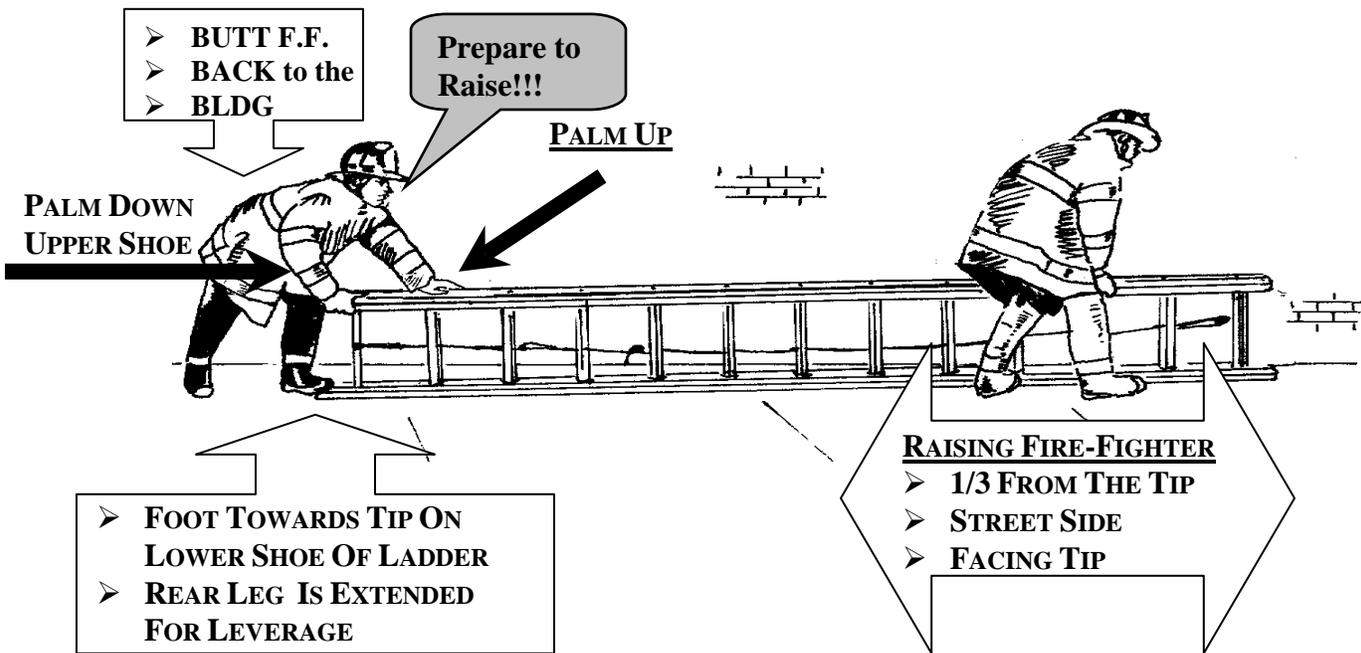


15. COMMAND: "Extend Fly Ladder"

- 15.1 With tip against building, one firefighter snubs toe against left beam.
- 15.2 Unties knot, raises fly ladder to desired height.
- 15.3 Roll ladder to turn fly away from building. (This must be done even if ladder is not extended).
- 15.4 Move ladder by rolling it along building where necessary. Readjust angle if required. Rope must be re-tied before ladder is rolled.

BY ORDER OF THE FIRE COMMISSIONER AND THE CHIEF OF DEPARTMENT

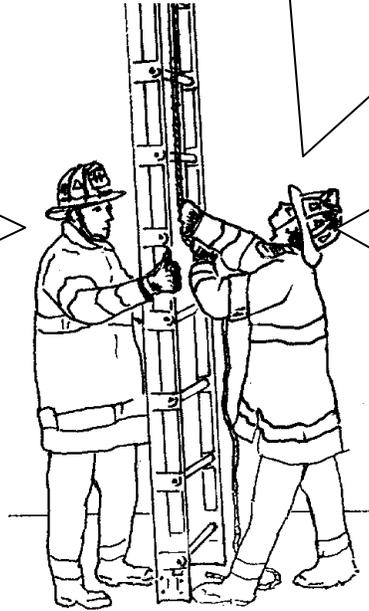
RAISING THE LADDER



EXTENDING THE FLY LADDER

RAISING F.F.

- STEADIES LADDER
- BOXER STANCE
- LEFT FOOT FORWARD, CENTER OF BEAMS ON THE GROUND
- HANDS GRASP BEAMS, SHOULDER HIGH, & CLEAR OF THE FLY



BUTT FIRE-FIGHTER

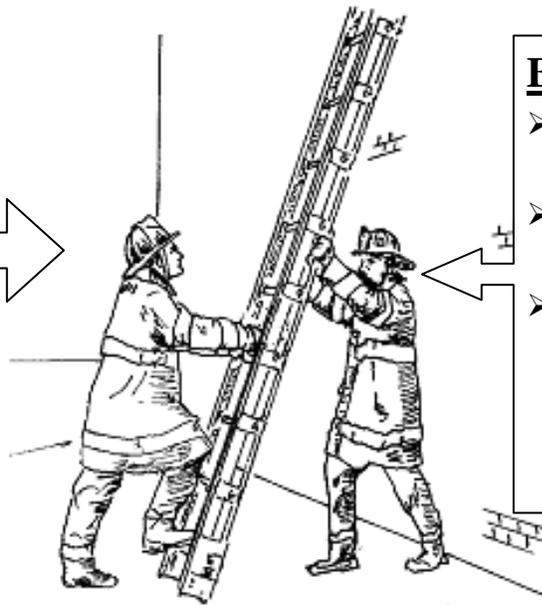
- EXTENDS FLY
- SNUBS LEFT BEAM WITH LEFT TOE
- CRIMP THE HALYARD AT RIGHT ANGLES TO PREVENT SLIPPAGE
- HAND OVER HAND MOTION

SNUB LEFT BEAM WITH TOE

PLACE LADDER AGAINST BUILDING

RAISING F.F.

- LEFT FOOT – BOTTOM RUNG, CENTER OF BEAMS
- HANDS GRASP RUNGS, SHOULDER HIGH,
- LOOKS UP & GUIDES LADDER



BUTT FIRE-FIGHTER

- GRASP BEAMS, SHOULDER HIGH
- LOOKS FORWARD, NOT UPWARD
- SECURES HALYARD



LADDER COMPANY OPERATIONS

OBJECTIVE:

- To provide a general explanation of ladder company fireground operations.

CONTENTS:

Part One:

- Ladder company positions, duties & tool assignments of the first arriving companies at various buildings

Part Two:

- Ventilation
- Forcible Entry
- Search

**FDNY
REFERENCE:**

- FDNY Firefighting Procedures:
 - Volume One:
 - Book 1: section 6.3 & Addendum 3
 - Book 2: sections 2.6, 2.7
 - Book 4: section 8
 - Book 5: section 8
 - Book 6: Chapter 4
 - Vol. 3, Book 3: sections 1.4, 1.6, 3, 5.3 & 5.6 – 5.9
- FDNY Training Bulletins:
 - Forcible Entry: 1 & 2
 - Search
 - Tools 9 Portable Power Saws

PART ONE

LADDER COMPANY POSITIONS

<u>TITLE</u>	<u>PAGE</u>
GENERAL AREAS OF RESPONSIBILITY	1
SIZE UP	4
NON FIRE-PROOF MULTIPLE DWELLINGS	6
BROWNSTONES & ROWFRAME	19
TAXPAYERS	23
PRIVATE DWELLINGS	26
FIRE-PROOF MULTIPLE DWELLINGS	30
WIND IMPACTED FIRES IN FIRE-PROOF MULTIPLE DWELLINGS	34
KO CURTAIN and FIRE WINDOW BLANKET DEPLOYMENT	45
HIGH RISE OFFICE	50

This chapter describes initial assignments and tools used by Ladder Companies operating at fires. Ladder Company assignments are given to each member at roll call. Each member shall personally check his/her firefighting gear and equipment including mask, PASS alarm, flashlight, personal rope and assigned tools. A copy of the riding positions shall be posted on the blackboard. Members shall inform their officer of the results of their apparatus, tool and equipment inspections.

GENERAL AREAS OF RESPONSIBILITY

First Ladder Company to Arrive:

- A. Ladder company operations on fire floor.
- B. Determine life hazard and rescue as required.
- C. Roof Ventilation and a visual check of rear and sides from this level.
- D. Laddering as needed.
- E. If second ladder-company will not arrive within a reasonable time, make interior search and removal of endangered occupants above the fire.

Second Ladder Company to Arrive:

- A. All floors above the fire floor for search, removal, ventilation and to check for fire extension.
- B. Confirm roof ventilation (assist first unit).
- C. Check rear and sides of buildings.
- D. Reinforce laddering and removal operations when necessary.

Ladder companies institute a two-team offense to cover their assigned area of responsibility. The charts that follow break down the tools, positions and duties for each member of the first and second arriving ladder companies at a fire in a non-fireproof multiple dwelling. The ladder company members' tools, positions and duties vary depending on the type of building. The types of buildings the FDNY has specific procedures for are: taxpayer buildings, row frame buildings, brownstones, private dwellings, vacant buildings, high rise office buildings and fireproof multiple dwellings. Non-fireproof multiple dwellings represent the bulk of the FDNYs' responses.

INSIDE TEAM:

- Officer
- Forcible Entry position (IRONS)
- Extinguisher position (CAN)

OUTSIDE TEAM:

- Chauffeur
- Outside Vent (OV)
- ROOF

Basic Gear

Bunker Gear- 19.5 lbs. (Coat, pants, boots, gloves, and hood)
Helmet-3.5 lbs.
SCBA (self-contained breathing apparatus)-27.5 lbs. (45 min. cylinder)
PSS (personal safety system)-6 ¾ lbs. (includes harness)
Radio-1 ¼ lbs. (includes battery & harness)
Light- 3 lbs.
Pocket Tools-1 to 3 lbs. (knife, wrench, screw driver, chock, etc...)
***Total Weight- 62 ½ -65 ½ lbs.**
*(hose strap 1 lb.)

Inside Team 1st due

Officer Complement of basic gear- 65 ½ to 68 ½ lbs.
Officers Tool- 3 to 5 lbs.
C.O. Detector-1/2 lb.
Thermal Imaging Camera -3lbs
***Total Weight-66-71 lbs.**

Can Complement of basic gear- 62 ½ to 65 ½ lbs.
6ft Hook-5 lbs.
Extinguisher-30 lbs.
***Total Weight-97 ½- 100 ½ lbs.**

Irons Complement of basic gear- 65 ½ to 68 ½ lbs.
Axe-7 lbs. or Maul 10 lbs.
Halligan-9 lbs.
Hydra Ram-12 lbs.
K-tool-3 lbs
***Total Weight-90 ½-93 ½ lbs.**

Outside Team 1st due

Chauffeur Complement of basic gear- 62 ½ to 65 ½ lbs.
Tools-what he/she deems necessary to complete their assignment
***Total Weight-depending on tools chosen**

Outside Vent (OV)* Complement of basic gear- 62 ½ to 65 ½ lbs.
Halligan-9 lbs.
Halligan Hook-6 ½ lbs.
***Total Weight-78-81 lbs.**

Roof Complement of basic gear- 62 ½ to 65 ½ lbs.
Halligan-9 lbs.
Halligan Hook-6 ½ lbs.
Life Saving Rope-17 ¼ lbs. (includes atlas life belt)
***Total Weight-95 ¼- 98 ¼ lbs.**

*Top floor fires in some occupancies the OV will go to the roof with the saw (25 lbs.) & halligan (9 lbs.), also in other situations the OV may choose to take the maul (10 lbs.) in place of the halligan hook (6 ½ lbs.).

Inside Team 2nd due

All tools remain the same

Outside Team 2nd due

The OV Firefighter tools remain the same.

The Roof Firefighter will take a halligan (9 lbs.) and a 6 ft. halligan hook (6 ½ lbs.).

***For top floor fires:** a saw (25 lbs.) and a halligan hook (6 ½ lbs.) shall be taken to the roof.

- The Thermal Imaging Camera has become a very common tool in initial operations, which can be utilized by any member, (2.8 lbs.) also the Rad. 50 (1 lb.) is used more frequently.
- There are times when an Engine company may be utilized as a Truck company, or an Engine member may be detailed to a Truck for the tour, so it is important that all members are aware of the weight imposed upon them when assigned certain positions with the associated tools that accompany that position. Engine Company members performing their normal duties should be aware of the weight placed upon them also. Aside from the weight of the basic gear & pocket tools which will include a hose strap **(1 lb., 63 ½ to 66 ½ lbs., total weight of basic gear)**, members will be under an additional weight strain as in standpipe operations where they will carry a 2 ½ roll up (35 lbs., 37 lbs. with a nozzle attached & a standpipe kit (control bag) 25 to 35 lbs.).
- A length of 1 ¾ hose weighs 22 lbs., once charged the weight increases to approximately 52 lbs., as stated above a length of 2 ½ hose weighs 35 lbs. once charged the weight increases to approximately 135 lbs. . . . Factor in several lengths (of either size hose) and the friction of stretching (dragging) along the ground, floor, or around obstacles you will note that this can be an arduous task.
- The weight of the basic gear may vary depending on the height & weight (size) of the member wearing the PPE (personal protective equipment). Weight of tools and equipment may vary depending on the manufacturer of such.
- Refer to the Proby Manual Volume 2 Chapter 12 (engine company operations) for Engine company member's positions and equipment assignment with the associated weight.

SIZE UP

Size up is an ongoing evaluation of the problems confronted within a fire situation. Size up starts with the receipt of the alarm and continues until the fire is under control. This process may be carried out many times and by many different individuals during a fire.

◆ The factors which all members must consider in size-up are:

1. *Time*

Governs the life hazard. Night fires mean poor visibility; buildings locked effecting delay in access. A tenement fire is more serious at night than in daytime.

2. *Life*

The most serious factor at any fire. What is the location of the life hazard in relation to the fire. Life hazard to firefighters must also be considered.

3. *Area*

Building or occupancy area. Large areas to be searched requiring search lines. Large areas generate fires of great intensity, heavy volumes of smoke and severe heat.

4. *Height*

Building height will govern the use of the Aerial and/or Tower Ladder and portable ladders.

5. *Construction*

Non fireproof contains vertical voids that allows for extension. Alterations may have introduced larger voids, both vertical and horizontal. Wooden "I" beams, lightweight truss, *Energy Efficient Windows* and membrane roofs can effect the safety of operations within the structure. The presence of front or rear fire escapes or party balconies, will also have an effect on fireground operations.

6. *Occupancy*

This determines the severity of the life hazard and the intensity of the fire. *For example:* A commercial occupancy with an increased fire load on the first floor with apartments above.

7. *Location & Extent of Fire*

A fire in the cellar, shaft, or apartment on the top floor will determine access and areas to be searched.

8. *Water Supply*

Hydrant availability, and the placement and readiness of hoselines

9. *Street Conditions*

Effect apparatus access and the placement of Aerial/Tower ladders to the fire building.

10. *Auxiliary Appliances*

Standpipe/sprinkler systems, and the location of outlets, O S & Y, and/or check valves.

11. *Weather*

Snow and freezing conditions, wind velocity and direction are major factors in safety and fire operations.

12. *Apparatus & Equipment*

Be aware of the units on the scene. The arrival of those units assigned on the alarm, Engines and Ladders, 1st due, 2nd due, etc.

13. *Exposures*

May be adjoining buildings or areas within the fire building itself (auto exposure). E.g., floor to floor via windows, and across shafts or adjoining apartments.

NON-FIREPROOF MULTIPLE DWELLING

FIRST (1ST) LADDER COMPANY TO ARRIVE

INSIDE TEAM

◆ **POSITION:**

- Door to the fire area reached via the interior stairs of the fire building

◆ **DUTIES:**

- **Forcible Entry**

- Maintain Control of Fire Apartment Door

- **Locate the Fire**

- Try to contain it by shutting a door or using the portable extinguisher
- Provide & maintain an unobstructed path through which the hose line can advance

- **Search & Removal of victims**

- Ventilate as ordered by the Ladder Company Officer.
- Verify that all areas of the fire apartment have been covered

◆ **TOOL ASSIGNMENTS:** All ladder co members shall be assigned a HT radio.

- **CAN**

- 6 ft Hook
- Pressurized water extinguisher

- **IRONS**

- Axe & Halligan or Maul & Halligan
- Rabbit Tool (Hydra Ram)

OUTSIDE TEAM

OUTSIDE VENT (OV):

◆ **POSITION & DUTIES:**

- Assist chauffeur in front of fire building with laddering
- Exterior of fire area to provide horizontal ventilation, after receiving permission from Ladder Co. Officer.
- Vent, Enter, Isolate & Search (VEIS) fire apartment; ventilation is accomplished after receiving permission from Ladder Co. Officer. Isolation is accomplished by the closing of doors or windows thereby controlling the *flow path* of fire, heat and smoke.

- ◆ TOOL ASSIGNMENT:
 - 6 ft. Hook & Halligan

- ◆ VARIATIONS:
 - Ustore Fire – ventilate the rear of the store from exterior after receiving permission from Ladder Co. Officer.
 - Top Floor Fire – to the roof with saw & Halligan, then, if possible, exterior of fire area to prepare for VEIS.
 - If company is a Tower Ladder & there is no front fire escape, operates as basket firefighter for ventilation

Roof

- TOOLS ASSIGNMENT :
- Handie-Talkie
 - Flashlight
 - Halligan tool
 - 6`Halligan Hook
 - Life Saving Rope

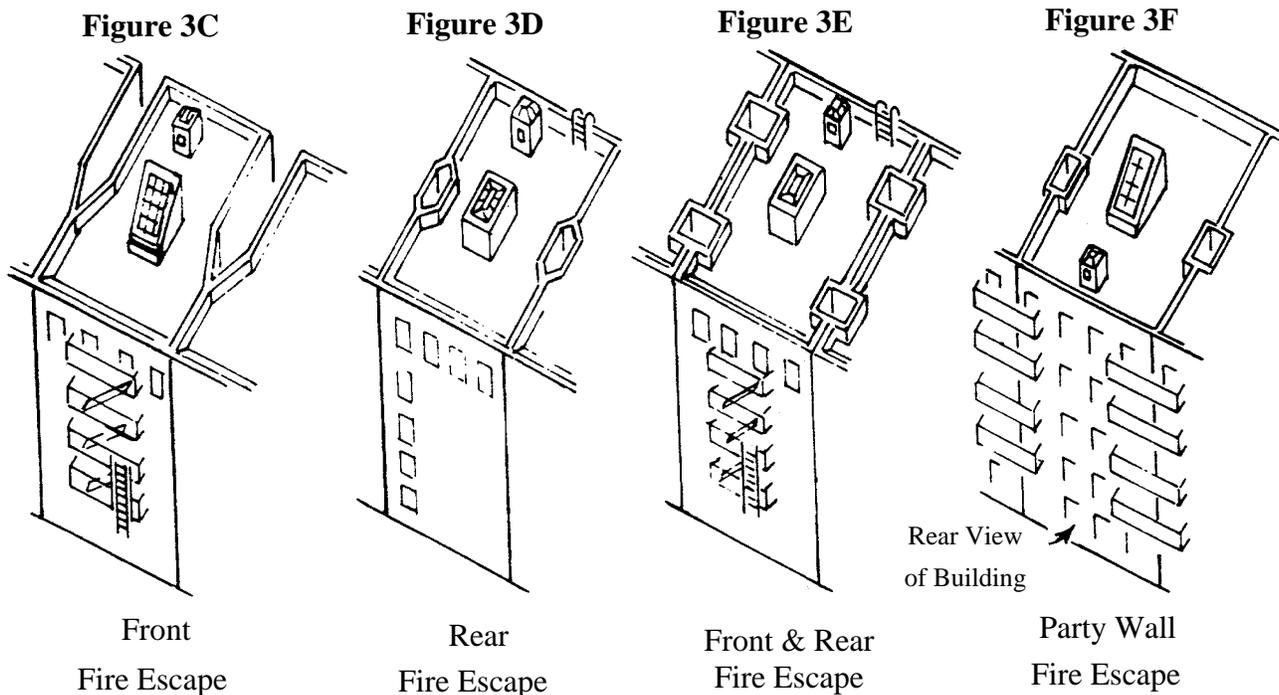
POSITION: Roof of the fire building.

ACCESS TO THE ROOF:

1. *Adjoining Building* - Generally, there are contiguous buildings making this the safest and most dependable method. Be aware of possible extension of fire to exposures.
2. *Aerial Ladder* - The aerial ladder is used when the building is isolated or the roof cannot be reached, or accessed from the adjoining building, due to a difference in height or obstructions caused by security barriers, fences etc. Roof access from the aerial can be dangerous. The cornice slopes towards the roof and in some instances there is a high front parapet wall. Use caution stepping off the aerial, especially when visibility is poor.
3. *Rear Fire Escape* - This access to roof is least desirable. It is only used when other means are not available and when the fire floor can be safely passed at this location. It is obviously dangerous to try to pass the fire floor when the fire is exposing the fire escape or is on the verge of venting itself in this direction. Rear fire escapes extend to the roof (**Figures 3D and 3E**) unless of the party wall balcony type (**Figure 3F**). Front fire escapes do not extend to the roof (**Figures 3C and 3E**).

NOTE: The interior stairs are NEVER used for the following reasons:

- Danger of being trapped above the fire.
- Banked heat and smoke may prevent member from reaching roof.
- Will lead to a delay in roof ventilation when it proves dangerous or impractical.



DUTIES: The duties of the Roof Firefighter demand an experienced, observant and determined member capable of decisive action. The responsibility of this position covers three broad areas; life, communication, and ventilation. *NOTHING SHALL DETER* the member assigned the roof position from carrying out the assigned duties. Whenever possible, the first and second Roof Firefighters should team up to safely complete roof duties. The Roof Firefighter should always confirm their way off the roof as soon as they reach the roof. The Roof Firefighter is responsible for the following: **(Figure 3G)**

1. Conduct a size-up of the roof for available vertical ventilation points including a visual survey of the exterior of the building. Look for any life hazard and reassess the ventilation profile of the fire conditions. Communicate findings to the Ladder Company Officer (such as life hazards, fire and smoke conditions).

2. The Roof Firefighter shall then perform initial vertical ventilation unless ordered to delay or withhold this action by the Ladder Company Officer operating inside the fire area.

Note: Initial vertical ventilation is the venting of bulkheads, scuttles or skylights over stairwells and hallways. When skylights are vented, members must recognize that this action is non-reversible.

- If the Ladder Officer **does not** want initial vertical ventilation performed; the Roof Firefighter will not perform vertical ventilation.

However, in an attempt to reach potential victims who may be trapped inside the bulkhead as soon as possible, the Roof Firefighter will perform the following actions, which are not considered vertical ventilation. They will force open the bulkhead door, if conditions are tenable, the member should reach in and probe the immediate area of the bulkhead for potential victims and then immediately **close** and **control** the door until the Ladder Officer orders vertical ventilation.

If the bulkhead door cannot be closed and controlled for any reason (e.g. victim removal, damaged door), immediately notify the Ladder Officer.

- If the Ladder Officer **does** want initial vertical ventilation performed, the Roof Firefighter will force open the bulkhead door, if conditions are tenable, the member should reach in and probe the immediate area of the bulkhead for potential victims, then continue to ventilate the bulkhead and take additional vertical ventilation tactics, as needed.

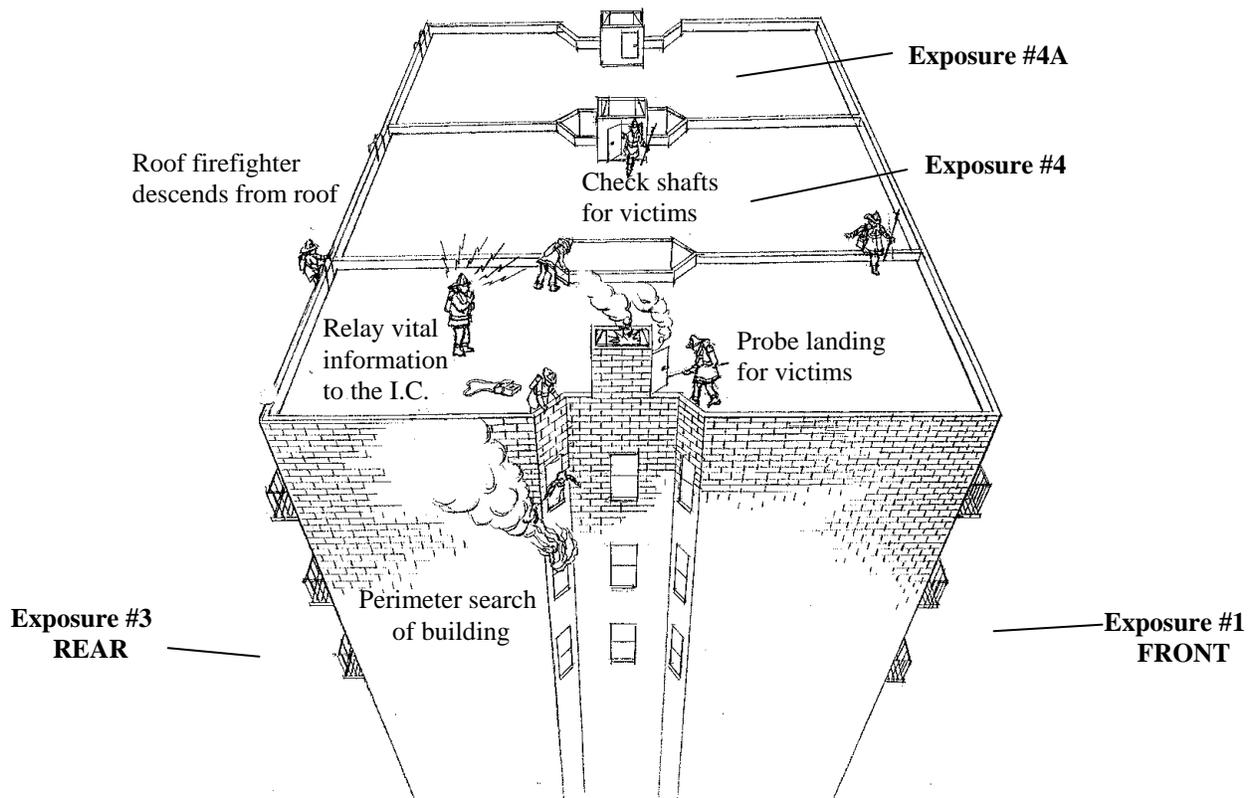
NOTE: Never attempt to climb onto or off a bulkhead or similar type structure at a spot near or next to an open shaft or near a building wall that faces on a shaft, areaway, courtyard or street.

3. When necessary, team up with the OV to VEIS the fire floor and, if not needed for search on that floor, proceed to VEIS the floors above the fire.
4. When necessary, team up with second Roof Firefighter to VEIS all floors above the fire.

5. At top floor fires, ventilate top floor windows from roof level. Prior to conducting any horizontal ventilation tactics from the exterior, the Roof Firefighter shall request permission from the Ladder Company Officer in order to coordinate ventilation tactics with interior operations. Communication with the Ladder Company Officer must be maintained in order to coordinate the horizontal ventilation as the hoseline is applying water to extinguish the fire. The Roof Firefighter is also responsible for utilization of the saw to vent the cockloft and top floor when necessary after completing initial duties.
6. Conveying information to second Ladder Company. Inform them of the extent of the search completed, so that all floors above the fire may receive a thorough search. Also inform the second Ladder Company when proper examination of exposed interior stairs and public hall has not been made due to other duties. The second Ladder Company shall complete the above mentioned examinations.
7. Reports back to their Company Officer (generally located on the fire floor) when assignment is completed or when relieved by second Ladder Company and apprise them of all pertinent information.

NOTE: One of the greatest hazards is the possibility of fire cutting off the roof Firefighter's escape route. Conditions on the roof often change without warning, cutting off the initial access point. The Roof Firefighter must plan alternative routes, then continually monitor the fire and its effect on the alternatives for as long as they are on the roof

Figure 3G



8. *Roof Ventilation* - Building will have either a bulkhead with a skylight or a scuttle with a roof level skylight over the interior stairs.

- If building has a bulkhead, open the bulkhead door. These doors are almost always self closing. To keep the door open, either remove the upper hinge or block the door open (Figures 3H and 3I).

Figure 3H

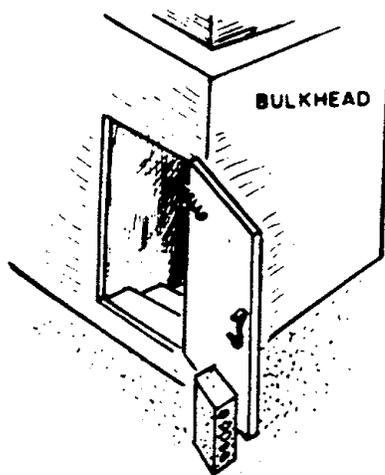
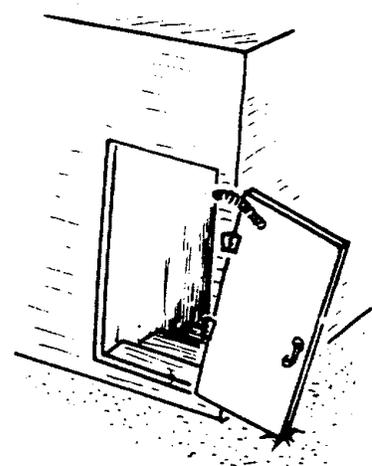
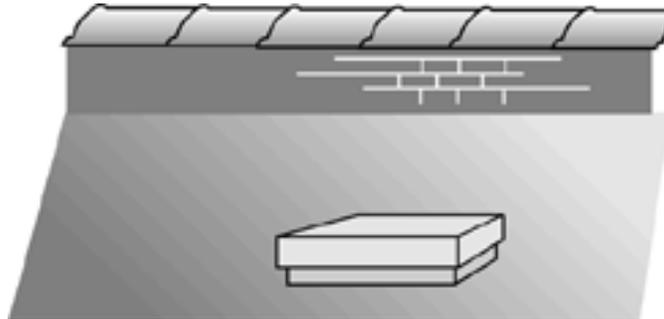


Figure 3I



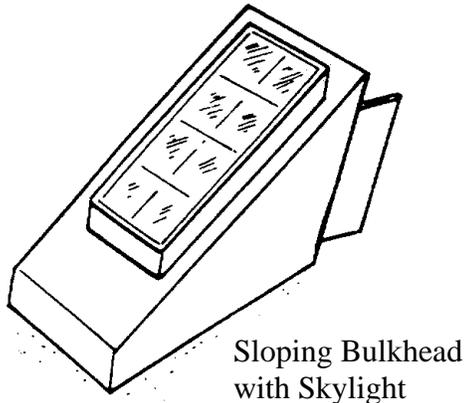
- If building has a scuttle cover, remove scuttle cover (Figure 3J). This may be difficult because scuttle cover may be nailed down, have several coatings of tar at the seams and/or secured by hooks, chains, etc. on the underside of the cover.

Figure 3J



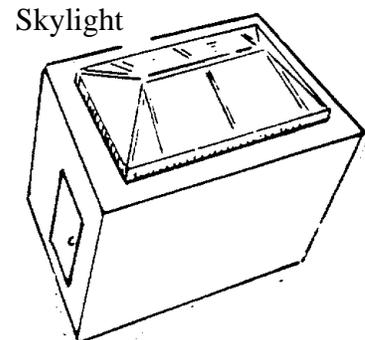
- Heavy smoke and high heat issuing from the bulkhead doorway or scuttle would obviously require further ventilation such as removal of the skylight. The absence of these indications does not necessarily mean that skylight ventilation is not required. Opening a bulkhead door or scuttle cover will not always give a true indication of interior fire conditions; the door to the fire apartment may not be open, either because it has not been forced or because it is being held in a closed position. Evaluate other factors (heavy smoke or fire showing from several windows, etc.) in determining the amount of ventilation that will be required when the door to the fire apartment is opened.
- Remove skylight over stair bulkhead (Figures 3K and 3L) or on roof level. (Figure 3M) If fire and smoke conditions are obviously heavy, immediate venting of the skylight prior to the removal of the scuttle cover to relieve the interior would be justified.

Figure 3K



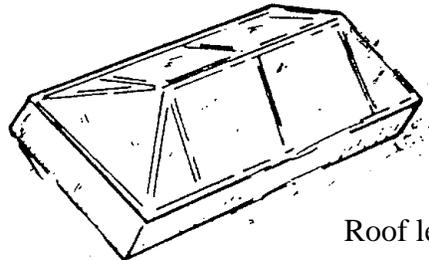
Sloping Bulkhead
with Skylight

Figure 3L



Skylight

Figure 3M



Roof level skylight

- If difficulty is encountered opening the bulkhead door, vent the bulkhead skylight first. Units operating below shall be warned by HT prior to breaking glass. Pause after breaking the first pane, as this serves as a warning to members below and also allows the Roof Firefighter to determine the wind direction.
- Work with the wind at your back, when possible. When protective wire screens cover skylights, insert the tool beneath screen to remove glass.

NOTE: Skylights at roof level may have been removed and openings covered with roofing materials. It may be necessary to cut a hole over the stairs to vent stairway. The Incident Commander should be informed that a saw is needed to accomplish this.

- Remove skylights or coverings over all shafts if indicated by heavy heat and smoke conditions. This includes dumbwaiter shafts, light shafts, etc. (**Figures 3N and 3O**) To ensure an unobstructed outlet for shafts other than dumbwaiter shafts, probe with hook to detect possible presence of a glazed sash or other covering and remove it.

- After removing roof level skylight or scuttle cover, returns can be opened into cockloft to gain knowledge of conditions or to ventilate. (Figure 3P)

Figure 3N

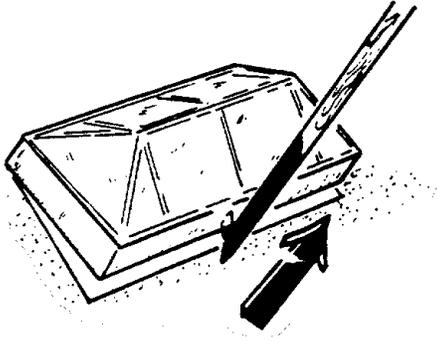
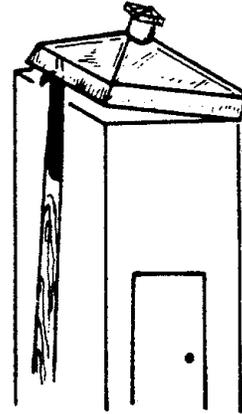


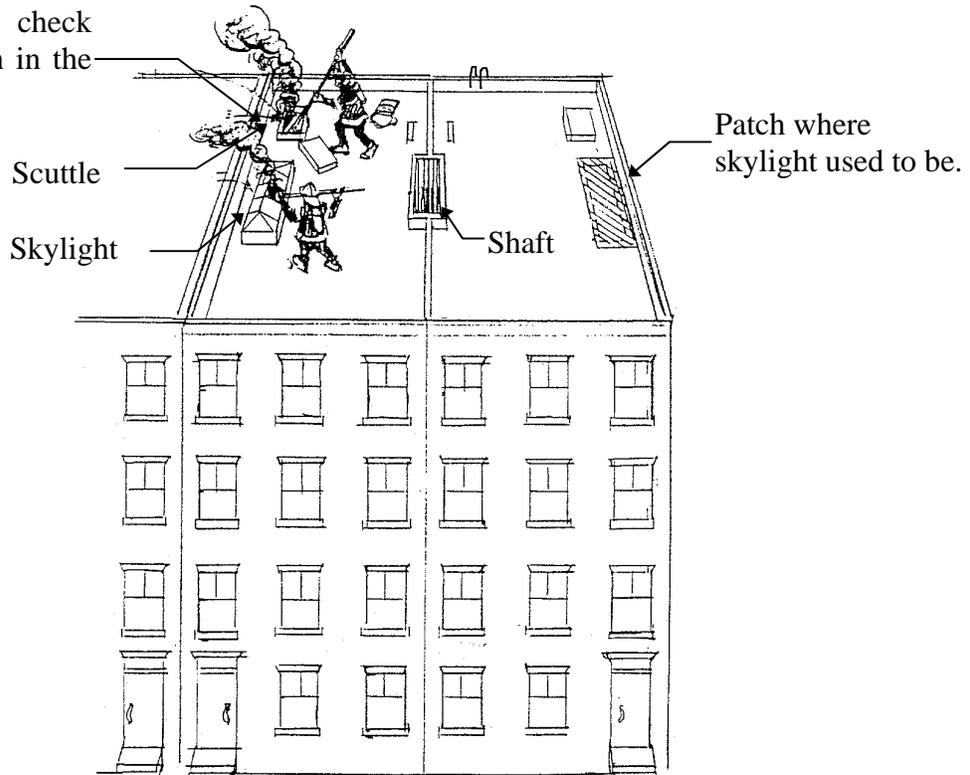
Figure 3O



Dumbwaiter Bulkhead

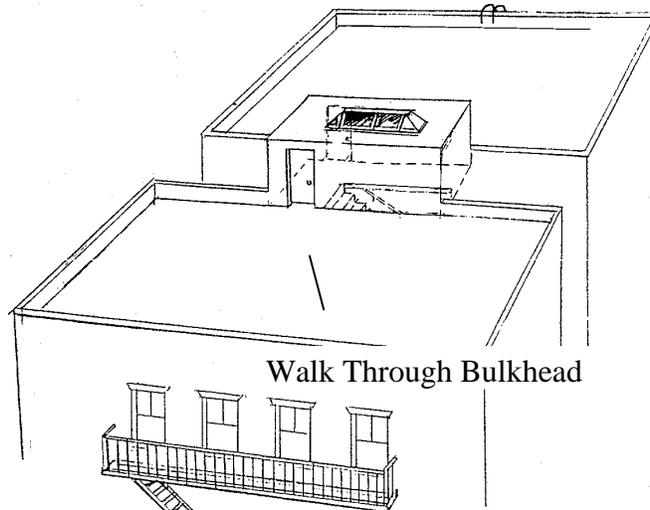
Figure 3P

Open returns to check for fire extension in the cockloft.



9. *Walk Through Bulkhead* - A structure at the uppermost portion of interior stairs that may isolate the front section of the roof from the rear. One must walk through the bulkhead to reach the other section of the roof (Figure 3Q).

Figure 3Q



10. Teaming up to vent and search
- After duties on the roof have been completed, the Roof Firefighter shall descend the rear fire escape to team up with the OV firefighter to VEIS.
 - Where the fire is in the front of the building and there are three or four apartments on a floor, the OV and Chauffeur will be teamed up in the front of the building. In this situation, the Roof Firefighter can then team up with the second Roof Firefighter to VEIS the floors above the fire using the rear fire escape. Pay particular attention to the top floor, especially the public hallways. The public hall and stairs, including bulkhead landing are frequently severely exposed and require examination for victims as soon as possible. The Roof Firefighters can get from the rear apartment to the front apartment using the public hall, or if necessary, open the common wall between apartments. When searching the floor above the fire, assist in venting the fire apartment when approved by the Ladder Company Officer by venting windows below with a tool.
 - In either case, the Ladder Company Officer shall be notified when and where the search will commence.

CHAUFFEUR:

- POSITION & DUTIES:
 - In front of building to raise and use aerial and/or portable ladders for either rescue or roof access. Prior to conducting any ventilation the chauffeur shall request permission from the Ladder Company Officer.
- TOOL ASSIGNMENT: Whatever he/she deems necessary.

SECOND (2ND) LADDER COMPANY TO ARRIVE

INSIDE TEAM

◆ POSITION:

- Door to the apartment directly above the fire, reached via the interior stairs of the fire building
- Top floor fire – adjacent apartments

◆ DUTIES:

○ **Prior to Proceeding Above, Size Up Conditions of the Fire Floor**

- Severity & location of fire
- Line placement & availability of water
- Control of fire apartment door
- Consideration of an area of refuge before going above

○ **Forcible Entry**

- When operating above the fire, members should force one or more doors on each floor to provide an area of refuge

○ **Search & Removal of Victims**

- Ventilate as required in order to conduct this search, keeping in mind that the fire can be drawn to the area vented.
- Verify that all floors above the fire have been covered.

The adjacent apartments to the one directly above may be more severely exposed due to the construction of Old Law Tenements.

○ **Check for Extension of Fire**

- Feel baseboards, walls, etc.
- Call for a line, if needed.

◆ TOOL ASSIGNMENTS:

- Tools remain the same, as the first (1st) to arrive ladder, except for top floor fires CAN firefighter should take two 6 ft. Hooks in lieu of the pressurized water extinguisher

OUTSIDE TEAM

OUTSIDE VENT (OV):

◆ POSITION, DUTIES & TOOL ASSIGNMENT:

- Same as first (1st) to arrive OV, except position is the floor(s) above and does not take a saw to the roof.

*NOTE: At top floor fires the 2nd due OV assumes the duties of the 1st due OV.

ROOF:

◆ POSITION:

- Roof of Fire Building
- Contact the 1st to arrive ROOF to determine:
 1. Method of access to the roof, an alternative route may be needed
 2. If any problems have been encountered
 3. Need for assistance

**Interior stairs are NEVER used.*

DUTIES:

1. Assist and confirm all duties of the 1st to arrive roof firefighter have been completed. Must team up with another member for efficiency and safety. Whenever possible, the first and second roof firefighters should team up to safely complete roof duties.
NOTE: Never attempt to climb onto or off a bulkhead or similar type structure at a spot near or next to an open shaft or near a building wall that faces on a shaft, areaway, courtyard or street.
2. When necessary, team up with the 1st Roof firefighter or 2nd OV (or another available member) to search and ventilate all floors above the fire. Remove victims. Pay particular attention to top floor apartments, including the public hall.

• TOOL ASSIGNMENT:

- 6 ft. Halligan Hook
- Halligan
- For top floor fires, the saw & the Halligan Hook are taken.

CHAUFFEUR:

TOOLS: H.T.

Flashlight

The chauffeur shall select the tools he/she deems necessary to complete their assignment.

POSITION:

The front of the fire building, if not needed here, then go above the fire if teamed with the 2nd OV (or another available member).

DUTIES:

1. If possible, position apparatus to cover fire building.
2. Be alert to the possibility that the first to arrive ladder company may be blocked out. In this instance, if this position is not covered, the Incident Commander must be notified.
3. Assist laddering with 1st to arrive ladder company, if required.
4. Ventilate and search if teamed up with the 2nd OV (or another available member).
5. Be ready to use an aerial or portable ladder to remove members or civilians in distress.

BROWNSTONE & ROWFRAME FIRES

FIRST (1ST) LADDER COMPANY TO ARRIVE

Operations are the same as Non-Fireproof Multiple Dwellings with the following variations:

Ventilation

All horizontal and initial vertical ventilation tactics must be controlled, communicated and coordinated by the Ladder Company Officer inside the fire area to be vented. Initial vertical ventilation tactics include the venting of bulkheads, skylights and scuttles over stairways and hallways. Before ordering any horizontal ventilation the officer must evaluate the impact the ventilation tactic will have on interior conditions.

ROOF:

- ACCESS TO THE ROOF: (*Order of Preference*)
 1. Aerial Ladder or Tower Ladder Basket
 2. 2nd Arriving Aerial Ladder (if available)
 3. Access Via Adjoining Buildings*

* *Brownstones usually do not have fire escapes.*

NOTE: The immediate adjoining building, in ROWFRAME buildings should not be used for access to the roof due to the possibility of cockloft involvement.

OUTSIDE VENT:

- **DUTIES:**
 - If the basket is used for roof access the saw and life-saving rope will be brought to the roof. The OV will wait for completion of roof size up before repositioning the basket to the fire floor for ventilation.

CHAUFFEUR :

- **DUTIES:**
 - Prior to venting the top floor, the chauffeur shall communicate and coordinate with the Ladder Company Officer inside the fire area to be vented
 - Once assured that laddering is not needed, or after VEIS has been completed, the chauffeur will report to their officer with whatever tools necessary, keeping in mind that maximum utilization of 6' hooks is expected at top floor fires.

SECOND (2ND) LADDER COMPANY TO ARRIVE

INSIDE TEAM:

- **TOP FLOOR FIRE:**
 - BROWNSTONE:
 1. Check floors below to ensure fire did not start on lower floor.
 2. Unit should remain on the floor below until needed. They shall not block the stairs or hallway leading to upper floors.
 - ROWFRAME (*Brownstone Type*):
 1. Initially, the top floor of the most severely threatened exposure

OUTSIDE TEAM:

NOTES: All members of the outside team should be aware when an LSR rescue may be underway. The outside team shall be prepared to assist the 1st arriving ladder as needed.

Maximum use of 6' hooks is expected for top floor fires.

OUTSIDE VENT:

◆ **POSITION:**

Assist the chauffeur in front of the building when aerial or portable ladders are needed for rescue or removal.

◆ **DUTIES:**

1. Check rear for trapped occupants and to assure ventilation has been completed. This is especially important when the first to arrive ladder is a TL, as the 1st to arrive OV will be operating in the bucket in front of the building.
2. When not needed for ladder operations, report in to their officer above the fire.

◆ **VARIATIONS**

- Top floor fire - after checking the rear, report to the roof to assist in ventilation and opening up of the roof, or go into an exposure as directed by their officer.

ROOF:

◆ **POSITION:**

Roof of the fire building to ensure the roof has been opened and to assist the first arriving ladder in ventilation and opening up.

- For a top floor fire - proceed to the roof with the saw and Halligan hook.
- For fire below the top floor - be alert to 1st arriving Roof FF's request for a saw because of the inability to ventilate the interior stairs due to no roof level skylight (tarred over skylights), dumbwaiters and penthouse structures.

◆ **DUTIES:**

1. Where conditions warrant, commence initial ventilation of adjoining building roofs.
2. When the 2nd arriving aerial can be raised to the fire building or an exposure, the member assigned to the roof, should attempt access this way.
3. When there is no apparent need for their presence on the roof, reports to officer, via HT, for further duties.

CHAUFFEUR:

◆ **TOOLS:** HT

Flashlight

The chauffeur shall select the tools that he/she deems necessary to complete assignment.

◆ **POSITION:**

Reports to the turntable area of the 1st ladder Company to assist, or if necessary, team up with the chauffeur of the 1st ladder for top floor VEIS.

◆ **DUTIES:**

1. Position apparatus and place in Power Take Off (PTO) for use by the roof firefighter.
2. When no longer needed at the aerial or for other laddering operations on the front of the building, goes to work where their company officer directs.

TAXPAYERS

FIRST (1ST) LADDER COMPANY TO ARRIVE INSIDE TEAM

◆ **POSITION:**

- The store occupancy involved with fire

◆ **DUTIES:**

- **Forcible Entry**

- **Locate the Fire**

- Provide & maintain an unobstructed path through which the hose line can advance.
- Open ceilings, ducts and partitions
- Cellar fires might require the cutting of floors for ventilation & operation of cellar pipes, distributors, bent tips or high expansion FOAM

- **Search & Removal of victims**

- Ventilate as required in order to conduct this search.

- **Shut Down Utilities**

◆ **TOOL ASSIGNMENTS:**

- **CAN**

- 6 ft Hook
- Pressurized water extinguisher

- **IRONS**

- Axe & halligan or Maul & halligan
- Rabbit Tool (Hydra Ram)
- Security doors may dictate specialized equipment i.e. Forcible Entry Saw (aluminum oxide blade), duckbill, maul, etc.

OUTSIDE TEAM

OUTSIDE VENT (OV):

◆ POSITION & DUTIES:

- Check the rear & sides
- Provide ventilation at the rear
- Enter & Search when teamed up with another member

◆ TOOL ASSIGNMENT:

- Maul & halligan

ROOF:

◆ POSITION:

- Roof of Fire Building, via a portable ladder.

• DUTIES:

- Vertical Ventilation (scuttles, skylights, etc.)
- Communicate conditions found, e.g. location or extension of fire or heavy equipment on roof

• TOOL ASSIGNMENT:

- 6 ft. hook and saw
- For fires in the cellar, the halligan & 6' halligan hook are taken

CHAUFFEUR:

• POSITION & DUTIES:

- If Tower Ladder, position it in front of the building to cut off the off and drive it back to the point of origin.
- If an Aerial Ladder, place it away from the immediate front in order to leave area accessible for a tower ladder
- Join forcible entry team
- If fire extends to the cockloft, proceed to the roof & assist the roof firefighter

SECOND (2ND) LADDER COMPANY TO ARRIVE

INSIDE TEAM

- ◆ **POSITION:**
 - Adjacent stores
- ◆ **DUTIES:**
 - Check for fire extension
- ◆ **TOOL ASSIGNMENTS:**
 - Same as first (1st) to arrive inside team.

OUTSIDE TEAM

OUTSIDE VENT (OV):

- ◆ **POSITION, DUTIES**
 - Assist the 1st to arrive OV
 - If not needed, proceed to the roof or otherwise directed
- ◆ **TOOL ASSIGNMENT:**
 - Same as first (1st) to arrive OV

ROOF:

- ◆ **POSITION:**
 - Roof of fire building, via a second portable ladder
- **DUTIES:**
 - Assist & confirm all duties of the 1st to arrive ROOF
- **TOOL ASSIGNMENT:**
 - Saw & either an ax or a halligan

CHAUFFEUR:

- **POSITION, DUTIES & TOOL ASSIGNMENT:**
 - Same as the first (1st) to arrive ladder chauffeur

LADDER COMPANIES, OTHER THAN 1ST OR 2ND TO ARRIVE

- Should report in with their 10 and 12 foot hooks besides their normal tool complement. The hooks will be used by them or other personnel on the scene.

PRIVATE DWELLING FIRST (1ST) LADDER COMPANY TO ARRIVE INSIDE TEAM

- ◆ **POSITION:** Door to the main entrance
- ◆ **DUTIES:**
 - **Forcible Entry**
 - After gaining entry through the main entrance door, the door shall be controlled in a closed position by a member of the interior team
 - If the engine company requires assistance in order to advance the line through the cellar, one member of the interior team shall be sent to provide assistance.
 - **Locate the Fire**
 - Locate and confine the fire.
 - Attempt an examination of the cellar for fire
 - **Search & Removal of victims**
 - When the search of the room has been completed, the door shall be kept closed until the main body of fire has been extinguished
 - - Ventilate as required in order to conduct this search, keeping in mind that the fire can be drawn to the area vented.
 - - At cellar fires, if the 2nd arriving ladder company is not at the scene, conduct a rapid search of the first floor.
- ◆ **TOOL ASSIGNMENTS:**
 - **CAN**
 - 6 ft hook
 - Pressurized water extinguisher
 - **IRONS:** Axe & halligan

OUTSIDE TEAM - PEAKED ROOF

ROOF & OV:

- ◆ **POSITION & DUTIES:** (As determined by probable life hazard.)
- ◆ Survey the rear and sides for means of entry to cellar.
- ◆ Members proceeding to the side or rear must visually examine cellar windows to determine interior fire conditions. Members shall not vent windows unless ordered to do so by the Ladder Company Officer. All observations must be reported to the Ladder Company Officer and Incident Commander. All interior and exterior horizontal ventilation tactics must be controlled, communicated and coordinated by the Ladder company Officer inside the fire area to be vented.

- ◆ Conduct a quick survey around the perimeter of the dwelling for occupants in need of immediate rescue. Communicate and coordinate any rescue attempt with the Ladder Company Officer.
- ◆ Vent for extinguishment after the Engine Company is applying water to extinguish the fire.

TOOL ASSIGNMENT:

- 6 ft. halligan hook and/or halligan for each member
- Portable ladder

CHAUFFEUR:

• **POSITION & DUTIES:**

- At the turntable. May use the aerial for necessary ventilation if not needed by the Roof/OV team. Venting the attic window may greatly assist interior operations.
- Ventilation of the upper floors as directed by the Ladder Company Officer operating in the fire area to be vented.
- Vent for extinguishment after the Engine Company is applying water to extinguish the fire.

Note: Some buildings have exterior stairs to second floor (with no interior stairs) and fire escapes to attic.

FLAT ROOF

ROOF:

◆ **POSITION & DUTIES:**

- Roof of the fire building for vertical ventilation
- Survey sides & rear
- Vent attic window as directed by the Ladder Company Officer

◆ **TOOL ASSIGNMENT:**

- 6 ft. halligan hook , halligan & LSR

OUTSIDE VENT (OV):

◆ **POSITION & DUTIES:**

- Assist the chauffeur with any laddering needed
- Vent the fire area when ordered
- VEIS area most likely occupied, when teamed up

CHAUFFEUR:

• **POSITION & DUTIES:**

- Operating ladder apparatus in front of the building
- Place and/or assist ROOF on the roof
- VEIS when teamed up with another member

SECOND (2ND) LADDER COMPANY TO ARRIVE

INSIDE TEAM

◆ **POSITION:**

- All floors above the fire. (exception for cellar fires)

◆ **DUTIES:**

- **Prior to Proceeding Above, Size Up Conditions of the Fire Floor**

- Severity & location of fire
- Line placement & availability of water
- Control of fire apartment door
- Consideration of an area of refuge before going above

- **Search & Removal of Victims**

- When the search of the room has been completed, the door shall be kept closed until the main body of fire has been extinguished
- Ventilate as required in order to conduct this search, keeping in mind that the fire can be drawn to the area vented.
- Verify that all floors above the fire have been covered.

- **Check for Extension of Fire**

- At top floor fires, check floors below to ensure fire did not start on, or drop down to lower floors.
- Check exposures
- Be available to relieve the first to arrive ladder company

◆ **TOOL ASSIGNMENTS:**

- **Same as the first (1st) to arrive ladder**

OUTSIDE TEAM – PEAKED ROOF

ROOF & OV:

◆ **POSITION & DUTIES:** (As determined by probable life hazard).

- Survey sides & rear
- Vent roof when required
- VEIS upper floors
- Vent attic window as directed by the Ladder Company Officer

TOOL ASSIGNMENT: 6 ft. halligan hook and/or halligan for each member

CHAUFFEUR:

• **POSITION & DUTIES:**

- Assist the first to arrive ladder chauffeur

FLAT ROOF

ROOF:

◆ **POSITION & DUTIES:**

- Assist in roof ventilation of the fire building and necessary exposures.

◆ **TOOL ASSIGNMENT:**

- 6 ft. halligan hook & saw

OUTSIDE VENT (OV):

◆ **TOOLS:**

- Portable ladder, halligan and/or 6' hook.

◆ **POSITION & DUTIES:**

- Assist the chauffeur with any laddering needed
- Survey the sides & rear
- VEIS when teamed up with another member

CHAUFFEUR:

• **POSITION & DUTIES:**

- Assist with laddering of the fire building.
- When the OV and chauffeur of the 1st arriving ladder company have teamed up, then the OV and chauffeur of the 2nd arriving ladder company should team up and VES areas not covered/searched by the 1st arriving OV/chauffeur.
- For top floor fires with exposure problems, the chauffeur may be used to examine an exposure which has not been covered by the inside team.

Note: If the exposed building is an IDLH area, the chauffeur must team up with another member before entering.

FIRST (1ST) LADDER COMPANY TO ARRIVE

INSIDE TEAM

◆ **POSITION:**

- Fire Apartment

◆ **DUTIES:**

- **Take Elevator to at least two floors below (Less than 7 stories take the stairs)**
 - use precautions normally taken with elevators
 - Examine this floor and try to determine fire apartment location, stairway, etc. This slight delay will enhance your operation on the fire floor should you encounter a heavy smoke condition.
 - If it is determined the smoke and/or heat condition in the public hallway is due to a wind impacted fire, members shall remain in the stairwell and follow procedures outlined in *Wind Impacted Fires*.
- **Forcible Entry**
 - If conditions allow, enter the apartment to search.
 - Must be prepared to exit quickly and control door under all circumstances.
 - Do not chock the door open until a charged hose line is moving into the apartment.
- **Locate the Fire**
 - Provide & maintain an unobstructed path through which the hose line can advance
- **Search & Removal of victims**
 - Can be extremely hazardous based on the height of the building, weather and wind conditions, the location of the apartment and the stack effect.
 - The officer may decide that the fire can best be extinguished without additional exterior ventilation. *See Wind Impacted Fires*

◆ **TOOL ASSIGNMENTS:**

- **OFFICER**
 - Search Rope , carbon monoxide (CO) monitor & TIC
- **CAN**
 - 6ft. hook & Pressurized water extinguisher
- **IRONS**
 - Axe & Halligan or Maul & Halligan
 - Rabbit Tool (Hydra Ram)

OUTSIDE TEAM

OUTSIDE VENT (OV):

◆ POSITION & DUTIES:

- Conduct an outside survey with chauffeur, include apartment lettering in your report.
- If no outside operations are indicated, and building has fire service elevators, take control of an elevator until relief is provided by the Incident Commander.
- If no fire service elevators, proceed to the fire floor, and assist the inside team.

◆ TOOL ASSIGNMENT:

- Halligan & 6ft. hook or axe

ROOF:

◆ POSITION:

Apartment directly above the fire via attack stairway

• DUTIES:

- Make sure the attack stairway door is maintained closed on the floor above
- Gain entry into apt. above
- Check for occupants showing at windows on the fire floor.
- Notify officer of condition found, apartment layout, fire location on the fire floor
- Determine what windows serve the fire room and report on wind conditions. Size up this location for curtain deployment.
- Preplan tie off points in the event of a life saving rope rescue.

• TOOL ASSIGNMENT:

- KO Curtain, Halligan and Hydra-Ram

CHAUFFEUR:

• POSITION & DUTIES:

- Conduct an outside survey with OV.
- If no outside operations; proceed to the roof, for search & ventilation, with 2nd chauffeur via the evacuation stairway, if the elevators cannot be used.

• TOOL ASSIGNMENT:

- Halligan & axe

SECOND (2ND) LADDER COMPANY TO ARRIVE

INSIDE TEAM

◆ **POSITION:**

- Hallway on the fire floor

◆ **DUTIES:**

- **Take Elevator to at least two floors below**
- **Confirm the attack & evacuation stairways**
- **Search hallway**
 - Severe heat & smoke conditions or high carbon monoxide readings are two possible indications of the need to force adjacent apartments.
- **Search attack stairway for five floors above the fire, after searching hallway**
- **Assist 1st. ladder if curtain (WCD) is being deployed .**

◆ **TOOL ASSIGNMENTS:**

- **Same as the 1st to arrive ladder company**

OUTSIDE TEAM

OUTSIDE VENT (OV):

◆ **POSITION, DUTIES:**

- Contact 1st OV/chauffeur via Handie-Talkie
- If outside operations are in progress, team up with 2nd chauffeur and assist.
- If no outside operations are indicated, and building has fire service elevators, take control of a different elevator than the 1st OV.
- If no fire service elevators, proceed to the fire floor, and assist the inside team.

◆ **TOOL ASSIGNMENT:**

- **SAME AS THE FIRST TO ARRIVE OV**

ROOF:

◆ **POSITION & DUTIES:**

- Same as the 1st ROOF

• **TOOL ASSIGNMENT:**

- Forcible Entry Tools, Life Saving Rope and Life Belt

CHAUFFEUR:

• **POSITION & TOOL ASSIGNMENT:**

- The chauffeur shall select the tools he/she deems necessary to complete the assignment.

• **DUTIES:**

- Assist & confirm all duties of the 1st to arrive chauffeur.
 - If outside operations are in progress, team up with 2nd OV and assist with the same.
 - If LSR or WCD evolutions are in progress, assist if needed.
-
-

**THIRD (3RD) & FOURTH (4TH) LADDER
COMPANIES TO ARRIVE**

ENTIRE COMPANY

◆ **POSITION & DUTIES:**

- Report into the lobby & be directed by the Incident Commander
 - If roof operations were not initiated by the 1st & 2nd to arrive ladder companies due to outside operations, then the Incident Commander shall assign this responsibility to the 3rd to arrive ladder company.

WIND IMPACTED FIRES IN FIREPROOF MULTIPLE DWELLINGS

1. INTRODUCTION

1.1 A wind impacted fire may be one of the most dangerous operations members of the FDNY will encounter. The term “wind impacted” fire shall be used to describe a fire in which the wind has the potential to, or is already causing, a dramatic, sudden and unexpected increase in fire, heat and smoke conditions. Experienced, respected members of this Department who have survived wind impacted fires have all described the following:

- Upon arrival, conditions appeared to be routine.
- Within seconds, fire, heat and smoke conditions changed without warning “from routine to life threatening.”
- An operating 2½” hoseline had little or no effect on the incredible heat being produced.
- Directly attacking these fires with one or two - 2½” hoselines proved ineffective and ultimately led to members incurring serious injuries.

Members of this Department and many civilians have lost their lives or suffered serious injuries when wind has impacted fire conditions causing the conditions to dramatically increase without any warning indications.

1.2 When responding to a reported fire in a Fireproof Multiple Dwelling (FPMD), an overriding consideration concerning size-up must be wind conditions and its potential effect on the fire. The following sections concerning operations in FPMDs are written to provide members with tactical guidance when wind is or may be a factor.

1.3 The FDNY and the National Institute of Standards and Technology (NIST) fire research group, conducted extensive research to determine the causes and effects of wind impacted fires in FPMDs. Live burns recreating wind impacted fires were conducted in vacant apartments on Governor’s Island. Based on data gathered from these burns, and from interviews conducted with officers and firefighters who have operated as the first to arrive units at wind impacted fires, alternate firefighting strategies and tactics were developed, tested and evaluated for effectiveness. This testing has resulted in a revision to firefighting tactics and procedures. In addition, new tools and equipment have been developed for the purpose of extinguishing wind impacted fires.

2. RECOGNIZING WIND IMPACTED FIRE CONDITIONS

2.1 The key to successfully operating at wind impacted fires in FPMDs depends on recognizing the wind impacted fire conditions that may change a seemingly routine fire into a blowtorching fire. Blowtorching is the appropriate description of what will occur when fire conditions are impacted by wind conditions.

When wind impacted fire conditions exist in a FPMD, the IC shall notify the Borough dispatcher so this information can be relayed to all responding units. Once the contributing factors are identified, steps can be taken to minimize the hazards to operating members.

2.2 The following five conditions must be present for a wind impacted fire to occur:

1. Wind.
2. Fire in an apartment.
3. Failed or opened window in the fire room.
4. Fire apartment door leading to the public hall left open or not fully closed.
5. An area of low pressure such as an opened stairwell door, or an opened apartment door on the opposite side of the public hallway from the fire apartment.

This characteristic of air movement is known as the Flow Path.

Note # 1: The term Flow Path describes the movement of fire, heat and smoke from an area of high pressure (the fire area) to an area of low pressure (all areas other than the fire area).

Note # 2: The impact of the wind will be affected by the size of the window opening, the fuel load and the stage of the fire when the window failed.

2.2.1 When these five conditions are present, a wind impacted fire condition may occur. The combination of wind feeding the fire and the natural airflow that results from the construction characteristics of all buildings, especially FPMD's, may cause fire to blowtorch from the fire area. In FPMD's, the flow path for these conditions will be towards the public hallway if the fire apartment door is open. The fire is drawn to an area of low air pressure such as an open door on the opposite side of the public hallway or open stairway door. Eliminating this flow path, by keeping these doors closed, is key to preventing a fire in a FPMD from becoming wind impacted. The one factor that cannot be controlled is an occupant in another apartment opening their apartment door, especially on the opposite side of the fire apartment.

Members must be aware and understand that the recognition of any of these factors is the critical first step in evaluating the potential for a wind impacted fire.

The IC and company officer must be notified immediately when any of these conditions are observed. The communication of this critical information to the IC and company officers operating inside the building must be acknowledged.

3. SIZE-UP

3.1 Size-up begins by observing the wind and weather conditions before the tour starts and knowing forecasted weather changes that will involve wind conditions. This information must be discussed at each roll call. Members must maintain constant situational awareness and accurately size-up conditions when responding to any reported fire in a FPMD. In addition to normal size-up of life, fire and exposures, particular attention must be paid to the following:

3.2 Size-Up: Building Exterior

3.2.1 When responding to a reported fire in a Fireproof Multiple Dwelling (FPMD), an overriding consideration concerning size-up must be wind conditions and its effect on the fire.

- The direction and speed at the street level is not a reliable indicator of wind conditions above the street level.
- Wind behavior is not consistent or predictable. Wind impacted fires have occurred on upper and lower floors. Building height, size, shape and location of adjoining or adjacent buildings add to the unpredictability of the effects of wind on fire conditions.
- It does not take high winds to dramatically increase fire conditions inside the building. When the wind subsides or shifts, pressure will equalize allowing the fire and smoke to vent out the window. This condition has also been described as fire and/or smoke pulsing in and out of a failed or opened window. Members operating in the fire area must be aware that when the fire and smoke pulse outward from the window, the condition in the interior will temporarily subside, giving a false sense that the interior conditions improved. When the wind gusts back into the window the interior conditions will dramatically deteriorate.

3.2.2 Fire or smoke visible inside the fire apartment that is not venting out of an open or failed window is a potentially dangerous, life threatening condition. This is the classic ventilation profile of a wind impacted fire.

- This indicates the wind is pressurizing the fire area, keeping the fire, heat and smoke from venting out of the window.
- The firefighter performing the outside survey may be the first member to observe this wind impacted fire condition.
- Their observations and size-up are critical to fire operations. These conditions must be immediately transmitted to the company officer and IC. The IC must immediately relay this information to all members on the scene.

Note: The IC must communicate with the officers on the fire floor to determine the interior conditions. The IC must determine if an alternate strategy for extinguishing the fire should be implemented. If so, the IC must communicate this to all officers and receive acknowledgement of the change to the regular SOP's for FPMD's.

3.3 Size-Up: Building Interior

- 3.3.1 Prior to advancing to the reported fire floor, member must gather information by surveying the floor below or two floors below if scissor stairs are present.
- Determine the location, the number of and letter designation of stairways serving the fire floor. This information is critical if confronted with heavy smoke conditions when arriving on the fire floor or if conditions unexpectedly deteriorate due to fire conditions.
 - All members must access the fire floor from the same stairway until the attack stairway has been determined.
 - The flow path of any fire will be towards the stairwell, the control of the stairwell door is critical. This door should be maintained closed as much as possible.
- 3.3.2 When conducting the survey of the floor(s) below, determine the layout, shape and size of the public hallway, especially if there are dead-end hallways. Heightened awareness is required when operating in any hallway that is unusually long, odd shaped, or has dead-ends.
- 3.3.3 Take note of the location and presence of any fire/smoke stop doors in the public hallway.
- 3.3.4 Take note of the apartment designations in sandwich type apartments; take note of the apartment layout designation.
- 3.3.5 The roof firefighter in the apartment above the fire may be able to provide the following information:
- Size and layout of the fire apartment.
 - Visible fire or smoke coming from the fire apartment.
 - By keeping the apartment door open and opening a window, the roof firefighter will be able to simulate how the wind will flow through the apartment.

4. ALTERNATE STRATEGIES FOR WIND IMPACTED FIRES

- 4.1 The utilization of alternate strategies to combat wind impacted fires will provide the following benefits:
- Ability to enter the public hallway to close the door to the fire apartment, thereby gaining control of the public hallway and decreasing the flow of smoke and heat from the fire apartment into other areas of the building.
 - Rapid deployment of units to search apartment(s), public hallway(s), and stairways.
 - Rapid knock down of the fire to quickly improve conditions on the fire floor.
 - Reduction of serious injuries to members and civilians.

4.2 Wind Control Devices (WCD) and Exterior Streams

4.2.1 Live fire testing and fireground deployments have shown that the deployment of WCDs (KO Curtains and Fire Blankets) will have the following effects:

- Will cause an immediate reduction in heat and intensity of the fire.
- Possible reduction of visibility in the fire area due to an increase in smoke production.
- Fire may periodically vent around the sides and top of the deployed WCD with the potential for auto-exposure to the floor(s) above. The deployment window must be closed after deployment of the device.
- Advancing a hoseline into the fire apartment after a WCD is deployed, may increase steam and/or heat production. This is due to:
 - WCD allowing members to move closer to the main body of fire.
 - WCD preventing any ventilation of the fire area.
- Firefighters must have all PPE in place and use the full reach of the stream to maximize cooling of the area ahead of the advancing hoseline.

Note: Refer to TB Tools 2, 3 and Evolutions 33, 33A, and 34 for additional information on this equipment.

4.2.2 In FPMDs, water applied to the main body of fire from a high rise nozzle (HRN), exterior stream, or flanking strategy can provide an offensive tactic designed to rapidly knock down the fire. An exterior stream may be a hoseline operated from street level, a setback, an outside terrace, another wing of the building or advanced up an aerial ladder. A tower ladder stream or ladder pipe may also be effective. Any exterior stream must be directed at the ceiling of the main fire area.

The IC shall consider the following:

- Resources available to place the stream into operation.
- Exterior stream such as the HRN is very effective in knocking down a wind impacted fire in a multiple dwelling due to the smaller compartmented areas/rooms.
- Water must be applied to the room where the main body of fire is located to be most effective.
- The stream shall be deflected off the ceiling for best results.
- If fire has extended to multiple rooms the exterior stream may have to be repositioned.
- Any use of an exterior stream requires communications between the IC and Fire Sector Supervisor to ensure that all members on the fire floor are accounted for and in a safe location before the water is applied from the exterior.

Note: Tests done by the Department concluded that the deployment of the HRN to combat a wind impacted fire greatly improves conditions in the public hallway and inside the apartment when the apartment door has been left open. If members are trapped and a wind impacted fire is preventing their removal, the use of a HRN or an exterior stream may protect members and allow for their safe removal. (Refer to TB Tools 7 Data Sheet 17, High Rise Nozzle)

4.2.3 WCDs and HRNs may be difficult or impossible to deploy in windows of buildings with the following construction features:

- Balconies that extend beyond the building face and are in front of a vented fire window.
- Luxury high-rise multiple dwellings having non-operating windows, limited opening type windows or window walls. In these instances, glass removal will be a time-consuming operation requiring specialized equipment. In addition, falling glass will present a hazard.
- Any type of façade or ledge that extends beyond the face of the building may prevent WCDs from being effectively deployed if they are above or below the fire window.

Note: Members must be aware of the obstacles that buildings in their area present. Drills shall be conducted to determine which alternate strategies may be used based on the building characteristics.

4.2.4 A Flanking strategy is the application of water from inside the fire building to control the main body of fire via a non-frontal attack. A small opening is made in the adjoining wall to the fire room as close to the exterior wall as possible, so as not to create a flow path. The hoseline is operated into the opening to extinguish the fire. Initially, the hole in the wall should be only large enough for the main stream tip of the nozzle to be placed into the opening allowing the stream to be directed at the ceiling of the fire room.

A. Flanking attack when the door to the fire apartment has been left open:

- This option is available based on the location of the fire apartment, the location of a stairway closer to the selected apartment, and the interior hallway conditions.
- Enter an adjoining apartment to apply the hose stream to the fire room or fire apartment via a breached wall adjacent to the fire area, if this adjoining area can be accessed and occupied safely.
- Once access is obtained to the adjoining apartment, the door to that apartment must remain closed and the hoseline stretched to this adjoining apartment from the apartment below via an exterior window or balcony using a utility rope.

B. Flanking attack when the door to the fire apartment is closed:

- Enter an adjoining apartment to apply the hose stream to the fire room or fire apartment via a breached wall adjacent to the fire area, if this adjoining area can be accessed and occupied safely.
- Once access is obtained to the adjoining apartment the hoseline will be stretched via the fire floor public hallway into the adjoining apartment to operate into the fire apartment.

4.3 INCIDENT COMMANDER

Considerations include, but not limited to, the following:

- Life hazard on fire floor and floors above.
- Information gained from the Sector/Group Supervisors and members operating in the fire building concerning fire, heat and smoke conditions in hallways, stairways and apartments.
- Communicate with the Fire Sector Supervisor to determine the conditions and recommended tactics.
- Members performing the outside survey and the Roof firefighter operating on the floor above can provide a description of wind, fire and smoke conditions at their respective locations. The direction and speed of the wind at street level is not a reliable indicator of wind conditions above the street level.
- Resources available to implement the required tactics.
- Experience has shown that conditions at a wind impacted fire will severely tax the resources of the 2nd to arrive ladder company. Firefighters from the 3rd to arrive ladder, rescue or squad company, equipped with forcible entry tools, may be assigned to force entry into the apartment below the fire apartment in order to secure the ropes of the WCD and/or provide access for the HRN engine company.

Actions that may be taken:

- Implement appropriate alternate strategy(s) as necessary.
- The IC must ensure that the Fire Sector Supervisor and/or Units operating in the fire sector acknowledge that an alternate strategy is to be implemented. Alternate strategies differ substantially from the standard direct frontal attack. IC and Fire Sector Supervisor must ensure that all members under their command maintain operational discipline and adjust their actions to the change in tactics.
- Continually evaluate the effectiveness of the alternate strategy(s) implemented.
- The IC may consider implementing a combination of an exterior stream operation, flanking and WCD deployment where exterior reports and interior conditions indicate additional alternate strategies are required.
- Each fire will be different and all members must be familiar with the capabilities and limitations of each alternate strategy.

5. OPERATIONS

- 5.1 If it is determined that the smoke and heat condition in the hallway is due to a wind impacted fire with the fire apartment door left open, operate as follows:
- a. The Ladder Officer shall ensure members exit the public hallway immediately, and notify the IC and Engine officer of conditions. Units on scene shall be notified that a wind impacted fire condition exists.
 - b. The IC shall implement the appropriate alternate strategy to gain control of the fire area to allow the forcible entry team to reach and close the fire apartment door. Control of the fire apartment door is critical.
 - c. A hoseline shall be stretched and charged in the attack stairwell. This charged hoseline will remain in the stairwell so as not to create a flow path drawing the heat and smoke into the stairwell.
 - d. The door to the stairwell must remain closed until the alternate strategy has been implemented, and the IC receives confirmation of the following:
 - A KO Curtain or Window Blanket has been deployed over the target window(s) and is secured in place.

And/or

- The stream of a High Rise Nozzle, Exterior Stream, or Flanking Strategy has controlled the fire.

Note: In most circumstances, the KO Curtain would normally be the first tactic used due to its availability and time it takes to deploy.

- e. Once confirmation is received that the alternative strategy has been successfully implemented, the following actions may be taken:
 - Approval to enter the public hallway must be given by the IC, Operations Section Chief or Fire Sector Supervisor.
 - Only the Ladder Officer and one member of the forcible entry team shall enter the public hallway to locate and gain control of the fire apartment door. The Ladder Officer shall utilize the TIC to assist in locating the fire apartment.
 - The other member of the interior team will remain at the attack stairwell door on the hallway side of the door to ensure the stairwell door remains closed limiting the flow path and to act as a beacon in case members need to evacuate the hallway. The Engine officer shall be responsible for control and coordination on the stairwell side of the door.
 - Once the Ladder Officer gains control of the fire apartment door, have the Engine Company advance the charged hoseline to the fire apartment door. The Ladder company member who remained at the stairwell door shall also advance to the fire apartment door.

-
- The Ladder Company Officer shall evaluate and communicate to the IC and/or Fire Sector Supervisor of the conditions found. The IC and/or Fire Sector Supervisor shall determine if additional alternate strategies are required or whether to enter the fire apartment.
 - Once the decision has been made by the IC and/or Fire Sector Supervisor to enter the fire apartment, the Engine Company must enter the apartment first followed by the Ladder Company. This is for the protection of operating members due to the extreme conditions and the need to cool the fire apartment immediately.
Opening the handline and using the reach and penetration of the stream ahead of the advancing firefighters will cool the fire gases and will help extinguish the fire ahead of the line.
 - Prior to entering the fire apartment, to assist the engine company in locating and extinguishing the main body of fire, the Engine Officer shall contact the roof firefighter, or other member operating in the apartment above the fire apartment, and request the following information:
 1. Description of fire apartment (e.g., L-shape, 3 bedroom apartment)
 2. Location of the main body of fire (e.g., kitchen, bedroom, living room)
 3. Most direct route to the fire area (e.g., When you enter the apartment, go in straight 6 feet and make a right down the hallway, the fire room will be the second door on the left approximately 12 feet down.
 - Once the hoseline advances towards the interior fire area as directed by the Engine Officer, the fire apartment door shall be chocked open.
- 5.2 When the door to the fire apartment is found closed on arrival, window failure has occurred, and reports are received from members operating on the floor above and the exterior that the wind **is** impacting the fire, operate as follows:
- a. The door to the fire apartment must remain closed.
 - b. The IC shall implement the appropriate alternate strategy to gain control of the fire area.
 - c. The hoseline can be advanced to that location and charged.
 - d. The door to the fire apartment must remain closed until the alternate strategy has been implemented, and the IC receives confirmation of the following:
- A KO Curtain or Window Blanket has been deployed over the target window(s) and is secured in place.
And/or
 - The stream of a High Rise Nozzle, Exterior Stream, or Flanking Strategy has controlled the fire.

Note: In most circumstances, the KO Curtain would normally be the first tactic use due to its availability and time it takes to deploy.

-
- e. The Ladder Company Officer shall evaluate and communicate to the IC and/or Fire Sector Supervisor of the conditions found. The IC and/or Fire Sector Supervisor shall determine if additional alternate strategies are required or whether to enter the fire apartment.
 - f. Once the decision has been made by the IC and/or Fire Sector Supervisor to enter the fire apartment, the Engine Company **must** enter the apartment first followed by the Ladder Company. This is for the protection of operating members due to the extreme conditions and the need to cool the fire apartment immediately. Opening the handline and using the reach and penetration of the stream ahead of the advancing firefighters will cool the fire gases and will help extinguish the fire ahead of the line.
 - g. Prior to entering the fire apartment, to assist the engine company in locating and extinguishing the main body of fire, the Engine Officer shall contact the roof firefighter, or other member operating in the apartment above the fire apartment, and request the following information:
 - 1. Description of fire apartment (e.g., L-shape, 3 bedroom apartment)
 - 2. Location of the main body of fire (e.g., kitchen, bedroom, living room)
 - 3. Most direct route to the fire area (e.g., When you enter the apartment, go in straight 6 feet and make a right down the hallway, the fire room will be the second door on the left approximately 12 feet down.
 - h. Once the hoseline advances towards the interior fire area as directed by the Engine Officer, the fire apartment door shall be chocked open.
- 5.3 When the door to the fire apartment is found closed on arrival, window failure has not occurred but size-up indicates there is a wind condition; Officers must still evaluate the potential for the wind to adversely affect fire conditions. Prior to entry into the fire apartment, the following actions shall be implemented:
- a) The hoseline can be advanced to that location and charged.
 - b) Wind Control Device in position above the fire apartment ready for immediate deployment. As a precautionary tactic, the IC may decide to deploy a Wind Control Device over an intact window of the fire room/area.
Note: Where you are unable to determine the target window from the exterior, the TIC may be of assistance. The IC shall assign a member with a TIC to scan the windows of the fire apartment from street level. Scanning of the fire apartment windows with the TIC can assist in identifying the target window for deploying of the WCD. The TIC does not see through clear glass or plastic, but a heated window or window frame may be detected from below.
 - c) High Rise Nozzle ordered to point of operation upon arrival.
 - d) Prior to opening the door of the fire apartment, the Ladder Officer shall get a report on exterior conditions from members operating outside the building and the Roof firefighter operating on the floor above.

-
- e) The Ladder Officer and one member of the forcible entry team shall enter the fire apartment to perform a search for the interior fire area location while the other member stays at the fire apartment door inside the apartment making sure the door remains controlled in the closed position, thereby limiting the flow path.
 - f) The door to the fire apartment must remain controlled in the closed position until the Ladder Officer requests the charged hoseline be advanced into the fire apartment or requires other assistance. Generally, the charged hoseline should not be advanced into the fire apartment until the main fire area/room has been located and if possible confined by closing a door. Keeping the fire apartment door controlled in the closed position until the fire room/area is confined will significantly reduce the flowpath. Taking steps to reduce the flowpath is a key tactic for member's safety when wind has the potential to adversely affect fire conditions.
 - g) Once the hoseline advances towards the interior fire area as directed by the Ladder Officer, the door shall be chocked open.

Note: The goal of the tactics outlined in this situation is to provide a margin of safety to members if window failure should occur. The immediate deployment of these resources will enable members to rapidly exit the fire apartment and control the fire apartment door.

5.4 KNOWN LIFE HAZARD

5.4.1 When faced with a known life hazard in either the public hallway or the fire apartment, the following actions shall be taken:

- a. Notify the IC and all units of the location of the known life hazard.
- b. Officers must maintain situational awareness and assess conditions while evaluating the risk vs reward. If a decision is made to attempt a rescue, it may be performed while alternate strategies are being implemented. The IC must be notified prior to any rescue attempt. In addition, the IC shall also be notified of the stairway from which operations will take place.
- c. If the open fire apartment door is found in close proximity to the known life hazard in a public hallway, attempt to close the door. Control of the fire apartment door is critical. Notify the IC if the fire apartment door has been controlled.
- d. Members operating in the stairwell shall keep the landing clear to allow for victim removal and/or emergency egress.
- e. Notify the IC when the victim is removed.

KO CURTAIN DEPLOYMENT

1. PURPOSE

- 1.1 When deployed properly, the KO Curtain will prevent wind from blowing into a fire apartment and creating a wind driven fire condition. An open fire apartment door, with wind driven fire indications, will make it impractical to advance a handline down the hallway to reach the fire occupancy. A 2 ½" handline will not provide sufficient cooling of the hallway to protect exposed members. Once the KO Curtain is in place covering the window(s) to the fire apartment, the negative effects of the wind will diminish, allowing members to advance a handline toward the fire area, as directed by the Incident Commander. Testing conducted by the FDNY and NIST (National Institute of Technology) showed an immediate 50% decrease in temperatures and significant flame reduction when the KO Curtain is deployed. However, there will be an increase in the smoke condition produced by the fire.
- 1.2 The KO Curtain shall be deployed for the following conditions:
- 1.2.1 A window in the fire apartment has failed and size-up indicates wind is blowing the fire into the apartment continuously or intermittently.
- 1.2.2 Size-up indicates that deployment of the KO Curtain prior to window failure will prevent a wind driven fire from developing.

Note: The KO Curtain will **ONLY** be deployed on orders of the Incident Commander. The 2nd arriving ladder company officer will coordinate the deployment once ordered.

2. TERMINOLOGY

- Deployment Window: Window that the KO Curtain is being deployed from.
- Target Window: Window selected to be covered by the KO Curtain.
- Receiving Window: Window on the floor below the Target Window.
- Deployment Firefighter: Member responsible for deploying the KO Curtain.
- Receiving Firefighter: Member responsible for securing bottom ropes of the KO Curtain.
- Spotter: Member located outside the building designated to communicate and direct the proper positioning of the KO Curtain.

3. SIZE-UP

3.1. Exterior Size-Up:

3.1.1 In addition to general size-up considerations, members assigned outside survey responsibilities shall note the following:

- Wind conditions
- Visible smoke and fire
- Location of any windows that have failed and are self venting
- Is fire and/or smoke venting out of the failed windows steadily or intermittently?
- Is fire visible through the failed window?
- Is the wind affecting the fire and smoke?
- Can a single KO Curtain cover the target window(s) or will additional KO Curtains or Fire Window Blankets be required?
- Presence of oversized windows or balconies which may prevent the deployment of a Fire Window Blanket or KO Curtain. These conditions may require the use of an exterior stream or wall breaching.
- Is the fire floor within reach of Aerial, Tower or Portable Ladders?
- Access for Aerial or Tower Ladders?

3.2 Floor Above Size-Up:

3.2.1 The firefighters assigned to the floor above will be in a position to provide an accurate description of the effect the wind may have when the door to the fire apartment is opened. These firefighters shall:

- Force entry to the apartment above the fire.
- Chock open the entrance door to the apartment above.
- Survey and size-up the layout of the apartment above and communicate this information to the officers in the fire apartment.
- Check for any fire venting from the fire apartment and auto-exposing the apartment above.
- A pressurized water extinguisher may be required at the place of deployment in the case of auto exposure. A handline may be required for severe auto exposure.
- If auto exposure is not a problem, open the apartment window in the room over the fire room. Evaluate the wind condition and relay this information to the officers on the fire floor and the IC.
- Prepare the KO Curtain for deployment, and remove any window gates, child guards, blinds, curtains or other obstructions.

- Do not remove or break the deployment window unless absolutely necessary. An intact window will provide protection from auto-exposure, which may occur due to shifting or gusty winds, allowing fire to intermittently vent from the fire apartment. Once the KO Curtain is deployed, members can expect that fire will vent from the target window and auto expose the deployment window via the space between the KO Curtain and the building wall.

4. TOOLS AND POSITIONS

4.1 Deployment Firefighter

Tools: KO Curtain, Hydra-ram, Halligan.

Duties: Deploy the KO Curtain from a window in the apartment on the floor above, two floors above, or if the fire is on the top floor, then from the roof.

4.2 Receiving Firefighter

Tools: Hydra-ram, Halligan, Halligan hook.

Duties: Positioned below the target window, in the apartment below the fire apartment. Secure the lower ropes of the KO Curtain and coordinate positioning over the target window.

5. DEPLOYMENT PROCEDURE

- 5.1 Depending on conditions encountered, the IC may have to deploy an available radio equipped member as a spotter located outside the building. This member must obtain the binoculars from the Battalion Chiefs vehicle and be in a position to see the target window. This location will enable the spotter to confirm that the Deployment and Receiving firefighters are in position at the correct windows. Once the KO Curtain is deployed, the spotter will be able to provide the deploying and receiving firefighters with direction to ensure the KO Curtain is properly positioned covering the target window. The spotter can observe the effects the KO Curtain has on the ventilation profile and report the results including any changes in fire conditions to the IC.
- 5.2 The Deployment firefighter must have their facepiece on and full PPE donned when deploying the KO Curtain. This will protect the Deployment firefighter from unexpected auto-exposure which will subject them to fire, smoke and superheated gases.
- 5.3 The Deployment Firefighter, located above the fire, chooses the Deployment Window which must be directly above the Target Window. If the fire is on the top floor, the Deployment firefighter will be on the roof. Some situations will require deployment from two floors above the fire apartment (e.g., duplex apartments).
- 5.4 Remove the KO Curtain from the case, place on the floor below the Deployment Window. The KO Curtain shall **NEVER** be deployed in the horizontal position. The KO Curtain is designed and shall be deployed **ONLY** in the vertical position.

- 5.5 Open the Deployment Window without removing/breaking the glass, and remove any child guards or window gates. Do not remove the glass unless absolutely necessary. This window will need to be closed if auto-exposure becomes a problem.
- 5.6 Communicate with the Receiving Firefighter assigned to the floor below at the Receiving Window, and determine if he/she is in position and ready to assist with deployment.
- 5.7 Estimate how much rope will span from the Deployment Window sill to the top of the Target Window. When the receiving and deploying firefighters are in position and ready, notify the 2nd arriving ladder company officer that the KO Curtain is in position and ready to be deployed.
- 5.8 When deploying the KO Curtain, the firefighter shall grasp the ropes, place and hold the KO Curtain outside the open window. Press the hand holding the ropes under the sill and lock the ropes with hand against the wall. Allow the KO Curtain to drop (do not throw) and cover the Target Window. Receiving member will gather KO Curtain ropes at Receiving Window.
- 5.9 Deployment firefighter and Receiving firefighter must communicate and make sure the Target Window is completely covered by the KO Curtain. If in position, the spotter may be able to assist with this step.
- 5.10 When assured that the Target window is completely covered, the Deploying and Receiving firefighters will maintain control of their respective ropes. The ropes shall not be tied off. The deployment window shall be closed to prevent auto-exposure.
- 5.11 The IC and the ladder company officer on the fire floor will be notified when the KO Curtain is in position fully covering the target window.
- 5.12 If the KO Curtain will be subject to direct flame exposure for an extended period of time, the IC should consider deploying a second KO Curtain or Fire Window Blanket to cover the first one.
- 5.13 Both the Deploying firefighter and the Receiving firefighter will remain in position until otherwise ordered by the Incident Commander.
- 5.14 Once the fire has been extinguished, it may be necessary to remove the KO Curtain to assist in ventilation of the fire apartment. The removal of the KO Curtain must be approved by the Incident Commander. The request for removal of the KO Curtain will be made by the Ladder Company Officer inside the fire apartment, after first consulting with the Engine Company Officer in charge of the hoseline inside the apartment. The Ladder Company Officer shall use the Thermal Imaging Camera to confirm all fire has been extinguished. The Engine Officer shall ensure that the nozzle team is aware of KO Curtain removal, and is prepared to extinguish any increase in fire conditions resulting from removing the KO Curtain.

FIRE WINDOW BLANKET

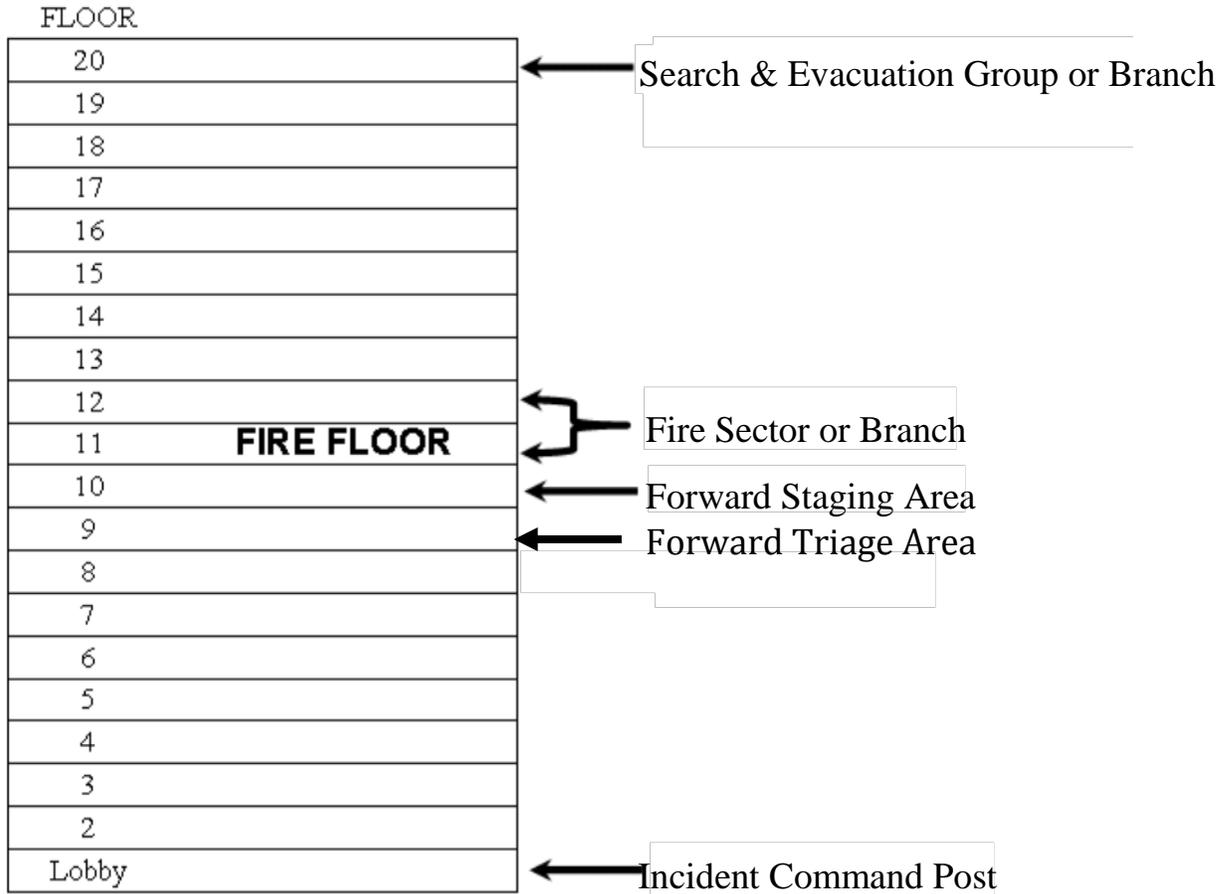
1. DEPLOYMENT

- 1.1 The blanket is kept in a vinyl carrying bag, along with an instruction sheet for its use.
- 1.2 The blanket is large enough to cover at least two windows if necessary. The bottom of the blanket is weighted to facilitate positioning.
- 1.3 Both the Rescue floor above team and the Squad floor above team must bring their Window Blankets to the floor above. If the blanket is to be deployed, they must assist in the deployment.
- 1.4 Any unit or units may be used to deploy the blanket. The assigned unit or IC shall designate a spotter to observe the deployment of the blanket from the exterior. The spotter should monitor the deployment and effect on the fire situation and report any change in conditions to the IC. The spotter should be equipped with a handi-talkie, and binoculars obtained from the battalion vehicle. The officer of the blanket deploying unit will assign members to the floor below to secure the Fire Window Blanket. These members must be in place prior to deploying the blanket. If additional resources are necessary, the officer must notify the IC.
- 1.5 Due to the length of the top supporting straps, the blanket can be lowered from two floors above, if the IC deems this necessary.

Just before the blanket is put in place, the IC must make a handi-talkie announcement to all units. All units must be instructed to report any adverse conditions caused by the blanket being put in place.

- 1.6 Incident Commanders shall be aware that if progress is not being made in the initial fire room, fire may extend and additional Window Blankets or KO Curtains may be needed in anticipation of further window failure.

HIGH RISE OFFICE FIRES



Search and Evacuation Group or Branch	A position established above the Fire Sector/Branch to control and coordinate all search and evacuation operations in that area.
Fire Sector or Branch	Defined as the fire floor and the floor above.
Forward Staging Area	An area established on a floor below the Fire Sector/Branch to provide logistical support to the Fire Sector/Branch.
Forward Triage Area	Established in an environmentally safe location on a floor below the Forward Staging Area.
Incident Command Post	Established in the lobby which will enable the Incident Commander to exert central control over the operations.

FIRST (1ST) LADDER COMPANY TO ARRIVE

◆ POSITION & DUTIES:

○ FIRE FLOOR TO FORCE ENTRY, LOCATE FIRE & SEARCH FOR VICTIMS

- Obtain as much information from the fire safety director.
 - Location of the fire.
 - Evacuation procedures that have been implemented.
 - Status of elevators.
 - Access stairs serving the fire floor.
- **PRIOR TO LEAVING THE LOBBY:**
 - Determine the elevator bank that provides the safest access to the fire area. Place the elevator to be used into fire service.
 - Obtain a floor plan. Do not remove the only copy from the command station.
 - Obtain keys necessary to gain access to the fire floor.
 - Ensure that the ICP is staffed by a Fire Department member.

○ UPON ARRIVAL ON THE FIRE FLOOR

- Determine the location of the fire on the floor and select a stairway with a standpipe that will provide the best attack on the fire.

◆ STAFFING

- Chauffeur: Conduct a preliminary inspection of the exterior of the building.
- A HT equipped member shall be assigned to operate the fire service elevator until relieved.

SECOND (2ND) LADDER COMPANY TO ARRIVE

◆ AUGMENT THE FIRST TO ARRIVE LADDER COMPANY ON THE FIRE FLOOR

THIRD (3RD) LADDER COMPANY TO ARRIVE

◆ FLOOR ABOVE THE FIRE TO CONDUCT A PRIMARY SEARCH.

◆ DETERMINE WHICH STAIRWAY IS THE BEST STAIRWAY TO BE USED BY THE OCCUPANTS FOR EVACUATION AND ADVISE THE LOBBY COMMAND POST.

FOURTH (4TH) LADDER COMPANY TO ARRIVE

◆ THE ROOF, TO DETERMINE VERTICAL VENTILATION POINTS

- Not undertake roof ventilation unless ordered by the Incident Commander.

◆ CONDUCT PRIMARY SEARCH OF THE TOP FIVE FLOORS

THIS PAGE WAS INTENTIONALLY LEFT BLANK

PART TWO

<u>TITLE</u>	<u>PAGE</u>
VENTILATION	55
VENTILATION TECHNIQUES.....	77
FORCIBLE ENTRY.....	85
SEARCH	95
OVERHAULING	119

THIS PAGE WAS INTENTIONALLY LEFT BLANK

VENTILATION

THIS PAGE WAS INTENTIONALLY LEFT BLANK

VENTILATION

Section	Table of Contents	Page
	Glossary	i
1.	Introduction	57
2.	Fire Dynamics And Ventilation	57
3.	Contributing Factors Affecting Ventilation Tactics	61
4.	Ventilation Profile Size-Up	62
5.	Ventilation Communications	63
6.	Ventilation Tactics	65
7.	Horizontal Ventilation	65
8.	Horizontal Ventilation Operations	66
9.	Vertical Ventilation	68
10.	Vertical Ventilation Operations	69
11.	Ventilation For Extinguishment	70
12.	Ventilation For Search	71
13.	Ventilation – Non-Fireproof MD's	73
14.	Ventilation – High Rise Fireproof MD's	74
15.	Low Rise Fireproof MD's	75
16.	Conclusion	75
17.	Ventilation Techniques	77

THIS PAGE WAS INTENTIONALLY LEFT BLANK

GLOSSARY

- Auto-Exposure** The extension of fire via the exterior of a building from a fire originating in the same building.
- Backdraft** Occurs when a fire burns in a closed compartment with a limited amount of ventilation. The products of combustion (smoke) will fill the compartment and create an atmosphere with insufficient oxygen to support flaming combustion. Suddenly, when a ventilation opening introduces fresh air into the hot environment, a mixing of gases will occur. An ignition source inside the compartment will initiate combustion and propagation (burning) of the gases, resulting in a turbulent explosion (deflagration) causing an increase of pressure, forcing the expanding gases out of available ventilation openings. These expanding gasses on the exterior may ignite and burn. Generally, backdrafts will occur in proximity to the main body of fire and require a sudden change in ventilation. Backdrafts can cause significant structural damage and potential collapse. See **Smoke Explosion**.
- Decay Stage** The stage of fire development within a structure characterized by either a decrease in the fuel load (fuel-limited) or available oxygen (ventilation-limited) to support combustion, resulting in lower temperatures and lower pressure in the fire area.
- Door Control** The process of ensuring the entrance door providing access to the fire area is controlled and closed as much as possible until water is applied to the main body of fire. Steps must be taken to prevent the door from locking behind the entering members. By controlling the door, we are controlling the flow path of fire conditions from the high pressure of the fire area towards the low pressure area on the other side of the door. Door control limits fire development by controlling the flow path of fresh air at the lower level of the open door towards the seat of the fire, and limits the movement of smoke and heat to unaffected areas of the structure.
- Fire Growth Potential** The potential size or intensity of a fire based on the available fuel load, room size and oxygen.

Flashover A transition in the development of a compartment fire when surfaces exposed to thermal radiation feedback from fire gases in excess of 1100°F reach their auto-ignition temperature more or less simultaneously. This causes the fire to spread rapidly throughout the space, resulting in fire involvement of the entire compartment or enclosed space. This transition can only occur if there is sufficient heat, air and fuel to support combustion.

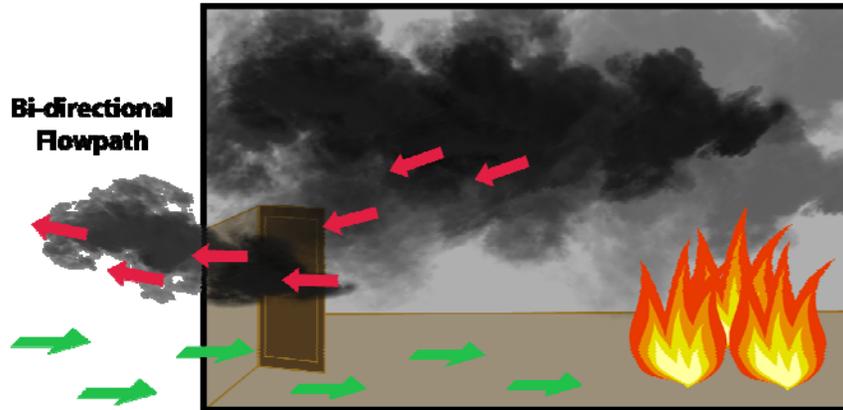
Flow Path The movement of heat and smoke from the higher pressure within the fire area towards the lower pressure areas accessible via doors, window openings and roof structures. As the heated, expanding fire gases are moving towards the low pressure areas, the thermal updraft of the fire is pulling in additional oxygen from the low pressure areas. This can be a bidirectional or unidirectional flow dependent on the location of the main body of fire in relation to the ventilation opening and the neutral plane. Based on varying building designs and available ventilation openings (doors, windows, etc.), there may be multiple flow paths within a structure. Any operations conducted in the flow path will place members at significant risk due to the increased flow of fire, convective heat and smoke toward their position.

Multiple Flow Paths



**Bidirectional
Flow Path**

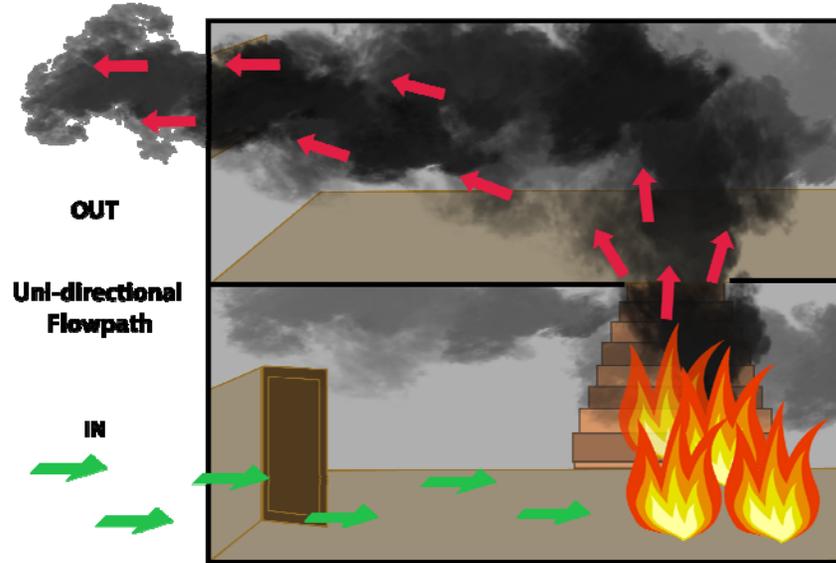
A flow path where hot gasses from the fire area (higher pressure) flow towards a ventilation point (lower pressure) AND an entrainment of fresh air in the opposite direction back to the seat of the fire.



Example of a single room compartment fire - As the fire grows and uses the available oxygen, the neutral plane drops lower in the open doorway. The doorway is a bidirectional flow path. The hot gasses and smoke exhaust out above the neutral plane and fresh air is pulled into the fire compartment below the neutral plane.

**Unidirectional
Flow Path**

A flow path where hot gasses from the fire area (higher pressure) flow towards a ventilation point OR an air entrainment back towards the seat of the fire. All gas movement is in one direction.



Example of a multi-level compartment fire: As the fire grows and uses the available oxygen, the neutral plane will be higher in this compartment due to the ventilation point above. Here we see fresh air pulling in through the doorway in one direction and hot gases exhausting out of the ventilation point on the floor above in one direction.

Flow Path Control	<p>The tactic of controlling ventilation points prior to water application will have the following benefits:</p> <ul style="list-style-type: none">• Limit additional oxygen into the space, thereby limiting fire development, heat release rate and smoke production.• Control the movement of heat and smoke conditions out of the fire area to the exterior and other areas within the building.
Fuel Limited Fire	<p>Fires in which the heat release rate and fire growth are controlled by the characteristics of the fuel because there is adequate oxygen available for combustion.</p>
Fully Developed Stage	<p>The stage of fire development which has reached its peak heat release rate within a compartment. This usually occurs after flashover, resulting in floor to ceiling burning within the compartment, creating heat conditions untenable for civilians and members.</p>
Growth Stage	<p>The stage of fire development when the heat release rate from an incipient fire has increased to the point where heat transferred from the fire and the combustion products are pyrolyzing adjacent fuel sources. The fire begins to spread across the ceiling of the fire compartment (rollover).</p>
Heat Release Rate	<p>The rate at which energy is generated by the burning of a fuel and oxygen mixture. As the heat release rate increases, the heat, smoke production and pressure within the area will increase and spread along available flow paths towards low pressure areas (open doors, windows and roof openings).</p>
Horizontal Ventilation	<p>The opening or removal of windows or doors on any floor of a fire building which will become flow paths for fire conditions.</p>
Incipient Stage	<p>The early stage of fire development where the fire's progression is limited to a fuel source and the thermal hazard is localized to the area of the burning material.</p>
Modern Content Fire	<p>Fires that involve hydrocarbon and synthetic-based contents such as foam rubber, nylon, rayon and polypropylene. Modern fires have a high heat release rate. Modern fires rapidly react to ventilation and the in-flow of additional oxygen.</p>

Neutral Plane The boundary layer in a structure fire where below it, air will be drawn into the structure, and above it, combustion gasses will be exhausted. The neutral plane can be an indicator of the stage the fire is in, and will drop down towards the floor as the fire grows in intensity.



Pyrolysis The transformation of materials into their basic compound when subjected to heat. Contents will continue to off-gas (pyrolize) and add to the flammable fuel load within the compartment as long as the material is subjected to elevated temperatures.

Rollover Occurs in the growth stage when sufficient fuel, heat and oxygen are available to allow flame spread in the upper, hot gas layer inside the compartment. When observed at the ceiling level, rollover shall be taken as an indicator that fire conditions are rapidly deteriorating and flashover may be imminent.

Note: Members encountering rollover conditions must immediately open the hoseline to cool the environment, or exit the fire area and control the door until the arrival of the hoseline.

Smoke	The combination of airborne solid particulates, liquid particulates and gases emitted when a material undergoes pyrolysis or combustion. Smoke is a heated fuel source and a toxic mixture that contains numerous poisonous gases and carcinogens such as carbon monoxide, hydrogen cyanide and phosgene.
Smoke Explosion	Occurs when a fire burns in a closed compartment with a minimum amount of ventilation. The flammable products of combustion form a mixture with sufficient oxygen and are ignited either internally or externally which can result in a turbulent explosion (deflagration) of greater or lesser degree. These expanding gasses may ignite and burn on the exterior. Generally, they occur remote from the fire area and may not necessarily be a high heat condition. They tend to initiate in a void space between floors or in a remote portion of the cockloft. Typically, a light smoke condition may be present in the compartment below the void space prior to the smoke explosion. No additional ventilation is needed to occur for a smoke explosion to occur. See Back Draft .
Situational Awareness	The on-going activity of assessing what is going on around you during the complex and dynamic environment of a fire incident. Operations will be more effective and safer by continually observing your surroundings, communicating conditions to other members and monitoring handie-talkie transmissions.
Tenability	An assessment on whether units can operate within the fire area based on the conditions encountered and the impact of these conditions to potential victims and members.
Ventilation	The controlled and coordinated removal of heat and smoke from a structure, replacing the escaping gases with fresh air. This exchange is generally bidirectional with heat and smoke exhausting at the top and air flowing in towards the fire at the bottom. The fire will pull the additional air flow into the building towards the fire which can intensify the fire conditions. This exchange can occur by opening doors, windows or roof structures. <u>Controlled, communicated and coordinated</u> ventilation will facilitate quicker extinguishment and limit smoke and fire spread.
Ventilation-Induced Flashover	A flashover initiated by the introduction of oxygen into a pre-heated, fuel-rich (smoke filled), oxygen deficient area. Modern content fires rapidly consume more of the available oxygen within the fire area creating conditions favorable to a ventilation-induced flashover.

Ventilation Profile	<p>The appearance of the fire building's ventilation points showing the flow paths of heat and smoke out of the structure as well as any air movement into the structure. This is an evaluation of fire behavior.</p> <p>Examples of ventilation profile indicators include:</p> <ul style="list-style-type: none">• Changes (increase or decrease) in volume, pressure or velocity of smoke and/or fire venting from an opening.• Smoke under pressure from an opening converting to flame. <p>Changes of ventilation profile indicators must be communicated via handie-talkie to the Ladder Co. Officer operating inside the fire area and the IC.</p>
Ventilation Tactics	<p>The coordinated and controlled opening of ventilation points in a structure to facilitate fire operations.</p>
VEIS	<p>VEIS (Vent, Entry, Isolate, Search) is the approved tactic when entering a structure through an opening (door or window) to search an area for the location of the fire or to locate possible victims. The priority upon entering the area via a window is to close the door to the room or area in order to isolate that area being searched from the fire area. When entering a fire area via a doorway entrance, the door needs to be controlled until the fire area is further isolated or a charged hoseline is advancing on the fire. By isolating the area, we are controlling the flow path of the fire, heat and smoke towards the ventilation point as well as controlling the air flow from the ventilation point towards the fire area.</p>
Ventilation for Extinguishment	<p>The controlled and coordinated ventilation tactic which should coincide with the Engine Company extinguishment of the fire.</p>
Ventilation for Search	<p>The controlled and coordinated ventilation tactic performed to facilitate the movement of a firefighter into an area to conduct a search for victims.</p>
Ventilation-Limited Fire	<p>A fire in which the heat release rate and fire growth are regulated by the available oxygen within the fire compartment.</p>
Vertical Ventilation	<p>The vertical venting of structures involving the opening of bulkhead doors, skylights, scuttles and roof cutting operations. These are methods of releasing smoke and heat from inside the fire building and will generally create unidirectional flow paths.</p>

1. INTRODUCTION

- 1.1 Originally issued on June 1, 2013, this document has evolved to include advances in research and our understanding of fire dynamics. Each fire incident to which the Department responds requires various tactics to bring the incident under control. These tactics include search, suppression and ventilation procedures. These tactics are reliant upon each other in order to achieve a successful outcome.
- 1.2 When ventilation and suppression tactics are controlled and communicated between interior and exterior members, and coordinated by the **Ladder Company Officer inside the fire area**, we dramatically increase the survivability of trapped civilians. In addition, this can increase the safety of our members and improve the effectiveness of overall operations.

2. FIRE DYNAMICS AND VENTILATION

- 2.1 Successful ventilation tactics begin with the understanding of basic fire dynamics as well as how a ventilation tactic will impact the fire's behavior.
- 2.2 Controlled, communicated and coordinated ventilation is necessary to remove heat and smoke to facilitate hoseline advancement. The exchange of air is bidirectional when there is a single vent opening on the same level as the fire. Heat and smoke will exhaust at the top and air will flow in towards the fire at the bottom. The fire will pull the additional air flow into the building towards the fire which will intensify fire conditions. This is known as a bidirectional flow path.
- 2.3 When there are multiple ventilation openings these openings can act as an inlet, outlet or bidirectional vent. In this instance, air will flow in towards the fire from one vent opening known as the inlet while heat, smoke and fire vent or exhaust from another vent opening known as the outlet, thus forming a unidirectional flow path. Recognition of a unidirectional or bidirectional ventilation opening is important in determining the flow path and can be useful in determining the inlet, outlet, number of ventilation openings and the most advantageous attack position for the hoseline.
- 2.4 Some important fire dynamic concepts to understand regarding fire development are:
 - 2.4.1 Modern content fires are largely comprised of hydrocarbons and synthetics which rapidly consume the available oxygen in the fire area as they burn.
 - 2.4.2 Modern content fires quickly become ventilation-limited fires due to their higher fuel load. An additional contributing factor is the energy efficient construction of buildings, which limits the amount of available oxygen within the fire area as well as retaining the heat of the fire.
 - 2.4.3 Modern content fires enter an early decay stage, producing heavy smoke and varying and decreasing heat conditions, due to the limited available oxygen to support flaming combustion. The fire will remain in the decay stage as long as it remains ventilation limited.

2.4.4 The necessary oxygen to support fire growth can be supplied by improper ventilation tactics or if the windows fail. If indications of an early decay stage exist upon arrival, uncontrolled and/or uncoordinated ventilation can have negative outcomes for both civilians and operating members.

2.4.5 The Traditional Fire Behavior Curve follows the below stages. (Figure 1)

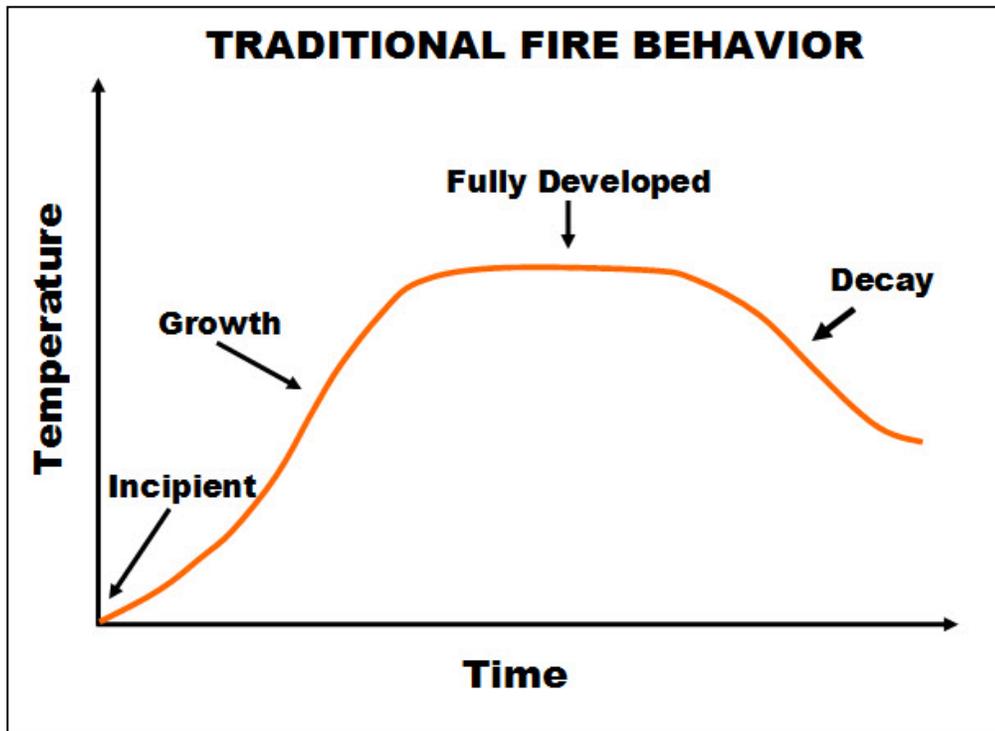
- Incipient
- Growth
- Fully developed
- Decay

2.4.6 The Modern Fire Behavior Curve diagram differs from the Traditional Fire Behavior Curve as follows: (Figure 2)

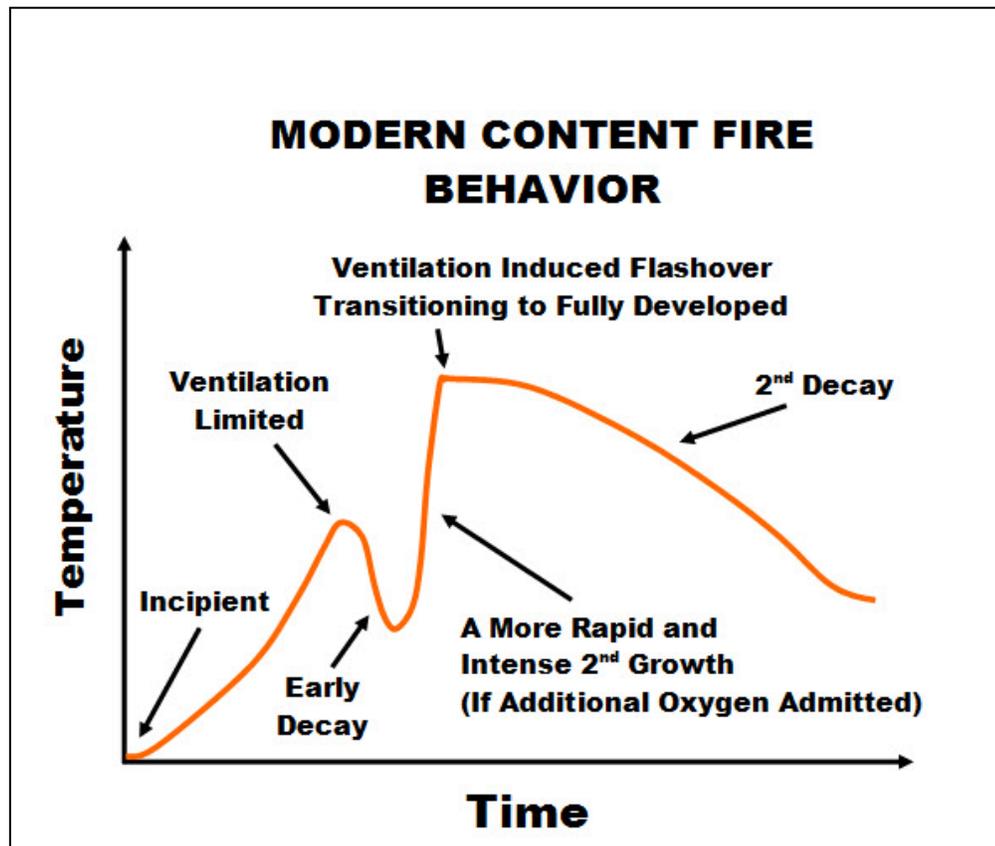
- Incipient
- A Rapid Growth stage that consumes the available oxygen very quickly.
- Due to this rapid consumption, the fire will enter into an earlier oxygen-limited Decay stage when compared to traditional fires, and will remain in the Decay stage if no additional oxygen is introduced to the fire area. When units encounter this earlier Decay stage, they should make every effort to control the ventilation of windows and maintain control of the doors to the fire area. If additional oxygen is admitted to the heated atmosphere through ventilation openings, the following can occur:
 - The fire regains its energy, increases its heat release rate and enters into a Rapid Second Growth stage, generating more heat and increased smoke production.
 - This may be followed by a ventilation-induced flashover and transition into the Fully Developed stage.
 - It ends in a Second Decay stage as the fuel load is depleted or the fire is extinguished.

2.4.7 The Coordinated Attack Fire Behavior Curve- differs from the Modern Fire Behavior Curves as follows: (Figure 3)

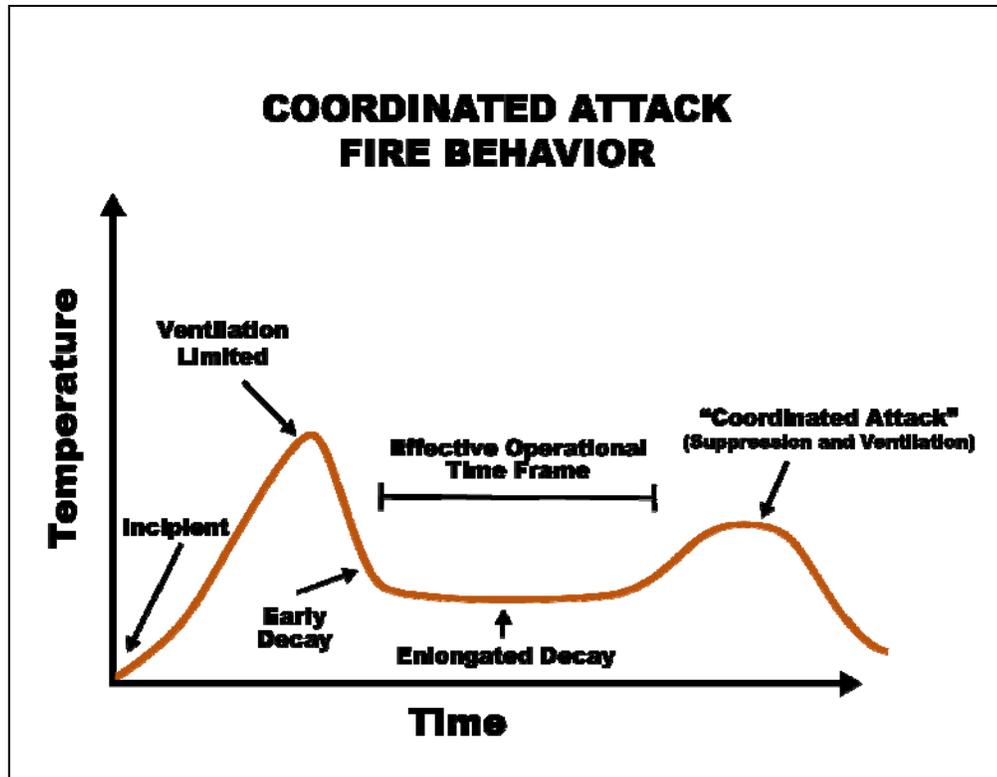
- The fire will behave in the same way up until the Early Decay stage.
- If there is no additional oxygen admitted to the heated atmosphere, the fire will stay in an Elongated Decay stage. An Elongated Decay stage where the fire is kept ventilation-limited is the stage where firefighters can effectively operate and extinguish the fire by denying the fire additional oxygen, thereby limiting fire growth and smoke production. This Elongated Decay stage is maintained by firefighters by coordinating ventilation with the application of water on the fire.
- By controlling, communicating and coordinating the fire attack, ventilation will occur, increasing the fire growth momentarily, which will be followed by suppression and extinguishment.



(Figure 1)



(Figure 2)



(Figure 3)

3. CONTRIBUTING FACTORS AFFECTING VENTILATION TACTICS

3.1 Over the years, the fire service has experienced a series of profound changes that collectively create an increased danger and complexity on the fireground. In addition to understanding the changes in fire dynamics, our ventilation tactics have also been affected by the following:

- Energy efficient building construction (such as energy efficient windows, additional insulation) coupled with modern building contents (hydrocarbon-based products versus natural fibers) expose firefighters to more rapid heat development and intense thermal conditions. The increased heat release rates of modern fires create more convective heat along the flow path from the fire area. This convective heat is absorbed by the member's personal protective equipment (PPE) at a faster rate than radiant heat, putting members at greater risk of burns.
- Due to the potential for rapid fire growth, our PPE has evolved to provide greater overall thermal protection; however, this can often make it difficult to detect deteriorating and unsafe conditions; resulting in members penetrating further into, and remaining longer in, an untenable area. It is critical for members to conduct a proper size-up of the fire conditions prior to entering an IDLH environment. PPE was not designed to allow members to go further within a fire area; it was designed to protect members in the event that conditions quickly transitioned to an untenable situation. Units need to operate in a controlled manner, continually assessing conditions and stages of the fire, and coordinate and communicate ventilation and suppression within, and between, units.

- The use of the Thermal Imaging Camera (TIC) is critical due to heavy smoke conditions and the heat release rate of modern (synthetic) fires. Units equipped with TIC's must carry and use them at all structural fires. However, as with any electronic device, it can malfunction. Units must maintain situational awareness in the fire area; it is critical to safety and survival.
- Hydraulic forcible entry tools allow quicker access to the fire area resulting in an increase in the time gap between the Ladder Company gaining access to the fire area and the extinguishment of the fire. Prior to the use of hydraulic forcible entry tools, it was common for a hoseline to be in position at the door while the Ladder Company was still forcing entry into the occupancy. Until a charged hoseline is available to advance on the fire, it is critical to control the flow path of fire conditions by maintaining control of the entrance doorway to the fire area and coordinate horizontal and vertical ventilation.
- The above factors make it critical to control, communicate and coordinate our ventilation tactics with interior operations. Proper communication will increase the situational awareness of all operating members, thereby allowing them to anticipate changing conditions.

4. VENTILATION PROFILE SIZE-UP

4.1 On each response, officers and firefighters must conduct an initial size-up which includes the type of building, occupancy and conditions on arrival as well as the known life hazard. Part of this initial size-up should also include a ventilation profile of the fire conditions. This ventilation profile should note:

- The location where smoke or fire is venting from the building.
- Evaluation of the volume, pressure and velocity of the smoke venting from the building. It is equally important to evaluate the air being pulled into the building which is an indicator of a ventilation-limited fire condition.
- When fire or smoke is not venting out of open windows.
- Fire and smoke should be venting outwards and upwards. If the smoke and fire are venting downward, horizontally or pulsing from an opening in the building, this indicates the fire conditions may be wind impacted. Any unusual ventilation profile must be immediately communicated to the Ladder Company Officer inside the fire area to be vented and the IC. Indications of a wind impacted fire require the consideration and implementation of alternate strategies.
- Any change to the fire conditions as the incident progresses, or as the result of ventilation tactics performed by members, must be communicated to the Ladder Company Officer inside the fire area to be vented and the IC.

Example: When heavy smoke venting from an opening transitions to visible fire.

- The following critical fire indicators observed during size-up may greatly impact safety and operations:

- While in the Decay stage, the fire may no longer have enough pressure to push smoke from the fire area or building. The assumption that the absence of smoke pushing from a building is a positive sign, is not accurate. Modern content fires require the control of ventilation tactics to prevent a ventilation-induced flashover.
- Heavy flames out of a window are usually an indicator of high heat and smoke conditions within a structure, including areas remote from the main body of fire. On arrival, a vented fire should not be considered a favorable condition; we must still control, communicate and coordinate all ventilation tactics.
- The more that venting flames fill an open window, the more members can anticipate severe interior conditions. Modern content fires generate a greater volume of heat and smoke that may overwhelm the ventilation point(s). The excess heat energy and smoke not being vented rapidly pre-heat the interior, causing fire conditions to move toward any other opened ventilation point.

5. VENTILATION COMMUNICATIONS

- 5.1 To provide situational awareness to all members, while operating, we need to communicate conditions encountered at an incident. Some examples are:

On Arrival Size-up: “E-234 to Brooklyn, Box 1628, 10-75, we have fire out 2 windows on the 3rd floor of a 5-story non-fireproof multiple dwelling. Numerous people on the fire escape.”

The above transmission provides information about the incident to responding units. The information about numerous people on the fire escape could indicate that the fire apartment door is open, creating a high heat and smoke condition within the hallway. The occupants from other than the fire apartment who are using the fire escape may have left the windows opened as they exited from their apartment. This potentially creates a flow path if their apartment door is also open.

Exterior Size-up: “L-19 OV to L-19, we have fire on the 13th floor, visible fire in the apartment, no fire or smoke venting out the open windows.”

This transmission may indicate that we have a wind impacted fire and these conditions could have a severe effect on interior operations if the apartment door is not controlled. This may also indicate the need for the deployment of a wind control device (in a fireproof structure) and the need for an alternate attack strategy to get water on the fire.

Interior Size-up	<p>“L-26 to Command, we have a fire in apartment 3-D, we have door control and we’re in the apartment.”</p> <p>This transmission:</p> <ul style="list-style-type: none">• Indicates the location of the fire apartment for the Engine Company, other members and the IC.• Confirms that interior conditions are tenable to begin operations and that the door is being controlled.
Fire Floor Operations	<p>“E-58 to L-26, the line is charged and ready to advance”</p> <p>This transmission:</p> <ul style="list-style-type: none">• Indicates the Engine Company has a charged hoseline at the entrance door, ready to advance. The Ladder Company Officer should direct the Engine Company to the fire area. <p>Note: If the fire could not be isolated or located, and based on the smoke and heat levels within the fire area, the interior team may need to exit the fire area. Members should then advance behind the charged hoseline.</p>
Post-Initial Vertical Ventilation Size-up	<p>“L-165 Roof to L-165, the scuttle is open with heavy smoke pushing out, vented the skylight over a rear room on the exposure 4 side, heavy fire venting from the skylight.”</p> <p>This transmission:</p> <ul style="list-style-type: none">• Indicates units probably have high heat and smoke conditions on the top floor. The location of the skylight and fire conditions can assist interior units in locating the fire.
Initial Roof Operations	<p>“L-102 Roof to L-102, we have heavy smoke pushing out 3rd floor windows in exposure 3-4 corner.”</p> <p>This transmission indicates:</p> <ul style="list-style-type: none">• The Roof FF has conducted an initial size up of the roof and ventilation points, s monitoring handie-talkie transmissions and is about to perform initial vertical ventilation.

6. VENTILATION TACTICS - GENERAL

This document outlines the basic ventilation principles for use at fire incidents. Tactics for specific building types are outlined in the various Firefighting Procedures volumes/books.

6.1 At structural fires, ventilation tactics are used to ventilate the building both horizontally and vertically. When these tactics are properly controlled, communicated and coordinated, the following can be expected:

- An increase in the survivability of trapped civilians and an increase in the safety of our members as they search for the fire and/or victims by controlling flow paths.
- Facilitation of an effective operation by controlling fire development, and limiting the spread of fire, heat and smoke conditions within the fire area and throughout the entire structure.

Note: All members are reminded that conducting ventilation remote from the immediate fire area can have a negative impact on civilians and members caught in the flow path. Uncoordinated ventilation can intensify fire conditions and has the potential to create a ventilation-induced flashover. This also applies to situations where fire is already venting out of window(s) remote from your location. Where door control was lost on the fire floor, members have been severely and fatally injured.

7. HORIZONTAL VENTILATION - GENERAL

7.1 All horizontal ventilation tactics, whether Ventilation for Extinguishment or Ventilation for Search, require communication with, and coordination by, the Ladder Company Officer operating inside the fire area to be vented.

7.2 Horizontal ventilation tactics include controlling the door and window openings until a charged hoseline is advancing **within** the fire area and extinguishing the fire. The benefits of controlling the flowpath and properly performing horizontal ventilation are:

- Reducing temperatures in the fire area, limiting fire extension and auto exposure.
- Limiting the in-flow of additional oxygen, reducing the potential for a ventilation-induced flashover.
- Improving conditions within hallways and stairwells by limiting the movement of heat and smoke from the immediate fire area.
- Maintaining tenability within the fire area, increasing the time available to locate the fire and search for victims.
- Limiting fire growth, permitting a rapid advance of the attack hoseline within the immediate fire area, allowing for quicker extinguishment.
- Reducing the danger of heat and flame passing over or around the attack hoseline.

8. HORIZONTAL VENTILATION OPERATIONS - FIRE AREA

8.1 Interior Operations: All interior and exterior horizontal ventilation tactics **must** be controlled, communicated and coordinated by the Ladder Company Officer inside the fire area to be vented. Before ordering any horizontal ventilation, this Officer must evaluate the impact that this tactic will have on interior conditions.

8.1.1 The Ladder Company Officer inside the fire area shall:

- Ensure door control at the fire area entrance and evaluate the ventilation profile at the entry point. Pay particular attention to the air being pulled into the fire area.
- Maintain situational awareness by monitoring handie-talkie transmissions.
- Evaluate information communicated from members operating on the exterior (e.g. known life hazards, ventilation profile, wind conditions, bars on windows, etc.).
- Communicate with the Engine Company Officer regarding the status of the hoseline and control of the fire.
- Communicate the location of the fire, fire conditions or difficulty finding the fire to the Engine Company Officer and the IC.
- Perform a risk assessment and operate accordingly, if water problems are encountered.
- Coordinate search operations with the advance of the hoseline.
- Remain aware of all potential ventilation points within the structure or fire area. Ventilation points that are behind your operating position may place you in a flow path; control and limit flow paths until there is a charged hoseline advancing within the fire area to extinguish the fire.
- Continually assess the volume of smoke and heat conditions in the fire area utilizing the TIC to enhance the initial size-up.

- If the officer encounters a high heat and heavy smoke condition without a charged hoseline, he/she should consider the following:
 - Direct members to immediately exit the fire area.
 - Limit additional ventilation; horizontal ventilation prior to extinguishment will not sufficiently cool or improve conditions but will allow the fire to grow, potentially placing members in an untenable environment. A charged hoseline is needed to provide the required cooling of the area and extinguishment of the fire.

8.2 Exterior Operations: All horizontal ventilation tactics performed from the exterior must be controlled, communicated and coordinated by the Ladder Company Officer operating inside the fire area to be vented.

8.2.1 Members operating on the exterior shall:

- Conduct a size-up and communicate conditions to the Ladder Company Officer (e.g. life hazard, ventilation profile, bars on windows, wind conditions, etc.) while getting into their operating position,
- Monitor handie-talkie transmissions to maintain situational awareness.
- Notify the Ladder Company Officer when they are in position to ventilate as directed; this can either be Ventilation for Search or Ventilation for Extinguishment.
- Communicate to the Ladder Company Officer any change to the ventilation profile caused by ventilation tactics or window failure.

Note: Additional responsibilities of members performing horizontal ventilation are addressed in the various Firefighting Procedures volumes/books.

8.3 Ventilation on the Floor Above:

8.3.1 Upon arrival at the doorway to the apartment on the floor(s) above, the officer shall:

- Control, communicate and coordinate any required horizontal ventilation.
- Evaluate the ventilation profile, paying particular attention to the air being pulled in.
- Determine if fire has extended to this area and request a hoseline if needed.
- If the Ladder Company Officer determines the fire has not communicated to the floor above, **limited** ventilation is justifiable if it facilitates search operations, with the understanding of potentially pulling fire to that location.
- Communicate conditions encountered to the IC (i.e. heat, smoke and fire).

9. VERTICAL VENTILATION - GENERAL

The change in the fire dynamics of modern content fires require that ALL ventilation be controlled, communicated and coordinated with operations on the fire floor. Modern content fires generate greater volumes of smoke until the fire is extinguished, or kept vent limited. This continuous smoke generation of modern fires may quickly overwhelm available exhaust ventilation points and will not provide the intended or expected removal of smoke and heat conditions from the interior. If the door to the fire area is open, or not controlled, before a charged hoseline is available to extinguish the fire, and roof ventilation is not controlled or coordinated with interior operations, the immediate vertical air flow created may draw fire conditions into the hallway and up the interior stairs, continuously filling the stairway with heat and smoke. This may place members and civilians on the fire floor and floors above in an untenable environment. In order to minimize the likelihood of this occurring, it is critical that the initial vertical ventilation be coordinated with door control of the fire area.

9.1 The benefits of coordinating vertical ventilation **with** door control of the fire area include the following:

- The vertical flow path can begin to remove the heat, smoke and fire gases from the public hall and stairwell pending the arrival of the charged hoseline.
- It will relieve the upper portions of the building of heat, smoke and fire gases, permitting a thorough examination of the hallways for potential victims. Additionally, it will reduce the potential of smoke migrating into uninvolved areas of the building.. Members will still require full PPE, use of the SCBA and TIC to effectively conduct these searches.

10. VERTICAL VENTILATION OPERATIONS - GENERAL

10.1 Interior Operations: Initial vertical ventilation tactics must be controlled, communicated and coordinated by the Ladder Company Officer operating inside the fire area to be vented.

10.1.1 The Ladder Company Officer inside the fire area shall:

- Establish door control of the fire area and perform a ventilation profile at the entry point, paying particular attention to the air being pulled in.
- Communicate with the Roof Firefighter when vertical ventilation is not to be taken, or delayed (i.e. unable to gain control of the fire apartment door and/or uncontrolled fire in the public hall or stairwell.)

10.2. Exterior Operations: Initial vertical ventilation tactics can be conducted upon reaching the roof. The Ladder Company Officer operating inside the fire area will advise the Roof Firefighter when vertical ventilation is to be withheld or delayed.

Note: Initial vertical ventilation is the venting of bulkheads, scuttles or skylights over stairwells and hallways. When skylights are vented, members must recognize that this action is non-reversible.

10.2.1 Members performing vertical ventilation shall:

- Upon arrival on the roof, conduct an initial size-up of the incident and monitor handie-talkie transmissions to improve situational awareness.
- Conduct a size-up of the roof for available vertical ventilation points, including a ventilation profile.
- Conduct a visual survey of the exterior of the building. Look for any life hazard and reassess the ventilation profile of the fire conditions.
- Communicate findings to the Ladder Company Officer (i.e. life hazard and ventilation profile.)
- **Initial Vertical ventilation shall be performed unless the Roof Firefighter is ordered to delay or withhold this action.**
- If vertical ventilation is delayed or withheld the bulkhead shall be forced open temporarily to check for trapped occupants.
- After initial vertical ventilation is completed, it shall be communicated to the Ladder Company Officer,
- Perform additional venting as needed dependent upon fire conditions.

- Any change in fire conditions caused by vertical ventilation tactics must be communicated to and by the Ladder Company Officer and the IC.

Note: These operational responsibilities regarding vertical ventilation are addressed in the applicable Firefighting Procedures volumes/books.

11. VENTILATION FOR EXTINGUISHMENT

- 11.1 Ventilation for Extinguishment is the controlled and coordinated ventilation tactic which facilitates the Engine Company's extinguishment of the fire. This tactic must coincide with the application of water on the seat of the fire.
- 11.2 This ventilation tactic requires venting the window(s) of the immediate fire area while the Engine Company is extinguishing the fire. The member on the exterior may be in position prior to hoseline placement and must coordinate their actions to prevent premature ventilation. Premature ventilation allows the fire to grow and spread through the fire area, endangering occupants and members. Once in position on the exterior, perform a size-up, communicate the ventilation profile and await permission to vent from the Ladder Company Officer.
- 11.3 To properly coordinate Ventilation for Extinguishment between the interior and exterior operating forces, all members must monitor handie-talkie transmissions to ensure proper communications prior to performing ventilation.
- 11.4 The member on the exterior waiting to perform the horizontal Ventilation for Extinguishment of the immediate fire area shall listen for the following transmissions from the Engine Company Officer:
- The notification from the Engine Officer to the Engine Chauffeur to start water. "E-162 to E-162 chauffeur, start water."
 - The notification from the Engine Officer to the IC that water is being applied to the main body of fire. "E-310 to Command, we have water on the main body of fire."

The transmissions above are indications to the exterior member to **prepare** to conduct Ventilation for Extinguishment. Before venting the window(s), the member must communicate and coordinate with the Ladder Company Officer inside the fire area to be vented. "L-3 OV to L-3, ready to vent." "L-3 to L-3 OV 10-4, vent the windows."

Note: This horizontal Ventilation for Extinguishment tactic only applies to the window(s) in the **immediate** fire area (fire compartment) and only for the member venting the immediate fire area. Any additional horizontal ventilation tactics must be communicated with and coordinated by the Ladder Company Officer operating in that area prior to performing such ventilation. This communication and coordination with interior operations will reduce the likelihood of any negative impact on interior fire conditions.

12. VENTILATION FOR SEARCH

12.1 Ventilation for Search is a horizontal ventilation tactic performed to facilitate the movement of a member into an area in order to conduct a search for a known life hazard; this has the inherent risk of pulling fire towards the ventilation/entry point. This action needs to be communicated to the Ladder Company Officer operating inside the fire area to be vented as the ventilation may also negatively impact the members operating in the interior.

12.2 When entering an IDLH, all members must comply with the provisions of Firefighting Procedures, Volume 4, Book 1, Chapter 1, Safety Team, Section 1.2 which states:

When a fire progresses past the incipient stage, the fire area is considered an IDLH atmosphere. Every member entering the IDLH atmosphere must be equipped with personal protective equipment and a self-contained breathing apparatus. No member shall enter, leave or operate in an IDLH atmosphere unless the member teams-up with at least one other member and remains within visual or voice contact with that member. Each member of the search team shall know the company identity and assigned position of the other members of the search team. Handie-talkies or other electronic communication devices are not acceptable to replace visual or voice contact. At least one of the members must be able to contact a handie-talkie equipped member of the safety team outside of the IDLH atmosphere.

12.3 The only exception to this Federally Mandated Standard for the teaming of members is when a **known life hazard** is found and immediate action could prevent the loss of life. This does not apply to standard search and rescue procedures.

12.3.1 A known life hazard is defined as follows:

- A victim can be seen by the rescuer.
- A victim can be heard by the rescuer.
- A member has information from a credible source or a person at the scene indicating the location of the life hazard.

12.4 Members of the Department must continuously perform a risk assessment when operating at incidents. It is acceptable to take significant risk for a **known life hazard** and adjust our standard operating procedures accordingly. In the absence of a known life hazard, standard search and operational procedures will be utilized to locate any possible victims. What may appear to be a routine fire operation at first can quickly transition into a major incident with little or no warning. Unapproved and uncoordinated ventilation tactics have been a factor at numerous incidents resulting in serious and fatal injuries to members as they searched for the location of the fire and possible victims.

12.5 Members conducting Ventilation for Search must consider the following:

- When ventilating windows or doors for access to the interior we are creating new flow paths for fire, heat and smoke conditions.
- The ventilation opening will increase the in-flow of air into the building providing additional oxygen for the fire, while at the same time drawing the fire, heat and smoke towards this ventilation flow point and the member performing the ventilation tactic.
- Operating into and through a flow path places members at extreme personal risk. There has been a substantial increase in serious or fatal injuries to members due to members being caught in the flow path of fire conditions.

12.6 The member(s) performing Ventilation for Search shall comply with the following:

- The Ladder Company Officer shall be notified when a search team enters from the exterior to conduct a search for a **known life hazard** or when they are entering to conduct standard search procedures.
- The Ladder Company Officer shall acknowledge the report and take appropriate action to assist and support any rescue operation. If the Ladder Company Officer and interior team have quicker access to the location of a victim or to the area requiring a search, the Ladder Company Officer may decide to disapprove the entry to search in order to limit any negative impact caused by the additional ventilation.
- Members venting for search should be cognizant of the location of the main body of fire and the position of hoselines. Officers must notify these members searching away from hoselines when the hoselines begin to advance toward their position.
- Prior to venting the window for access, the member must determine if the ventilation profile indicates that the area may be tenable for search and does not pose a high risk to the member.
- Members should also consider other factors, such as wind conditions, potential for auto-exposure and if there is a life hazard above their position.
- Once a decision has been made to enter, the member entering should choose the tactic most appropriate. This may initially entail opening the window to judge the ventilation profile; this would maintain the ability to reclose the window if conditions dictate. Prior to entry, member may clear out the window for unobstructed access and entry. Members must be cognizant that the flow path may change in either case.
- Upon completion of clearing the window, and before entering, the member should reassess the smoke and heat conditions to determine if the area is tenable. If conditions now prevent access, immediately notify the Ladder Company Officer of this situation.
- If conditions are tenable, the member should reach in and probe the immediate area for potential victims.

- After venting and entering, the priority action for the member is to isolate the area by closing a door before conducting the search (VEIS). By isolating the area, the conditions in the room should improve as the closed door will stop the flow of fire conditions and the window will provide an exhaust vent allowing a safer and more effective search.
- Search the room and locate any victim. The Company Officer and IC shall take necessary action to support the rescue effort.

Note: If a victim is found prior to isolating the room, the member shall isolate the room and proceed with the rescue effort.

Note: Once the IC receives credible information that the fire structure or fire area is unoccupied; the IC shall announce that fact via the handie-talkie.

- 12.7 Ventilation tactics, whether Ventilation for Extinguishment or Ventilation for Search, must be coordinated with interior operations and communicated to, and controlled by, the Ladder Company Officer to ensure the safest and most effective operation possible.

13. VENTILATION – NON-FIREPROOF MULTIPLE DWELLINGS - SPECIFIC

13.1 Vertical Ventilation

- The Firefighter(s) operating on the roof of a Non-fireproof Multiple Dwelling should immediately begin vertical ventilation tactics unless this firefighter receives a transmission to withhold or delay vertical ventilation. While moving into position, it is important that the Roof Firefighter listen for handie-talkie transmissions that indicate a lack of door control or a delay in fire extinguishment which is an indication that vertical ventilation may be delayed. After initial vertical ventilation is completed, it shall be communicated to the Ladder Company Officer.

13.2 Horizontal Ventilation

- The tactics for horizontal ventilation are different than vertical ventilation and always require permission from the Ladder Company Officer operating inside the fire area to be vented. Hearing transmissions from the Engine Company Officer, such as ordering the Chauffeur to start water or a transmission to the Incident Commander providing an update on the fire attack, does not alleviate the requirement to obtain permission to vent, but rather, should be a sign to the exterior member to prepare to conduct Ventilation for Extinguishment.

14. VENTILATION - HIGH RISE FIREPROOF MULTIPLE DWELLINGS - SPECIFIC

The following section covers ventilation tactics for High Rise Fireproof Multiple Dwellings. This includes fireproof apartment buildings 75 feet or more in height, including New York City housings projects.

In these occupancies, the ability to conduct ventilation is limited. In fact, horizontal ventilation for smoke removal is usually performed after the main body of fire has been controlled. This methodology is used for a number of reasons, including eliminating the possibility of wind being introduced to the fire area, which may then cause the spread of fire and smoke throughout the building. Wind impacted fires in these buildings have overwhelmed operating hoselines injuring and trapping members in the flow path. More importantly, indiscriminate ventilation can create conditions that place firefighters and civilians in serious danger by hampering search efforts. It can also create dangerous conditions directly below the vented windows due to falling glass shards that can injure civilians and hamper operating units.

Smoke and hot fire gases increase the air pressure inside the fire compartment. This higher air pressure will always travel toward areas of lower air pressure, creating a flow path for smoke and fire to travel. These lower air pressure areas are the public hallways, vertical shafts, stairwells and elevators. Lower air pressure areas also include other open apartment doors and open windows, especially on the opposite side of the public hallway from the fire apartment.

14.1 Horizontal Ventilation

- Horizontal ventilation of the fire apartment in the FDNY is limited and controlled by the first Ladder Company Officer operating inside the apartment. This officer will initiate and/or control (prevent) horizontal ventilation of the fire apartment. No other company officer or firefighter should attempt any ventilation of this apartment without the approval of this Ladder Company Officer.
- Entry and search of this apartment can be extremely hazardous based on the height of the building, weather, wind conditions, location of the apartment and by stack effect. The Ladder Company Officer may decide that the fire can best be extinguished without any horizontal exterior ventilation. The Incident Commander will control all other forms of ventilation other than that of the fire apartment.

14.2 Vertical Ventilation

- Roof ventilation operations can dramatically affect the air flow (from high pressure areas to low pressure areas) inside the building. Changes in building pressures and air flow can cause changes in the fire's growth that could have adverse effects on fire suppression.
- When the roof is remote from the fire floor, venting the stairwell may have little or no effect on smoke removal due to stack effect and decreased thermal lift.
- Vertical ventilation shall only be performed at the direction of the Incident Commander. This must be coordinated through direct communication with the Engine and Ladder Company Officers operating in the fire sector or the area.

- The Fire Sector Supervisor, usually a Battalion Chief, can coordinate roof ventilation through the Incident Commander after communicating with the Engine and Ladder Company Officer in the fire area.
- The firefighter(s) assigned to roof operations, during the ascent to the roof level, must monitor floors for any smoke accumulation that poses a threat to civilians. The location and severity of observed conditions must be communicated to the Incident Commander. Additionally, this member must remain at the roof level to ensure that bulkhead doors remain closed until the Incident Commander orders them vented.
- Firefighters on the roof will be in position to assist the Ventilation Support Group with stairwell pressurization and/or sequential ventilation (floor by floor ventilation; conducted later in the operation).
- When a firefighter operating on the roof discovers a condition that prevents the control of the bulkhead, such as a broken bulkhead window, or a missing or damaged bulkhead door, the Incident Commander and units operating must be notified.

15. Low Rise Fireproof Multiple Dwellings

- In New York City, low rise fireproof multiple dwellings are generally older buildings and may be found in proximity to high rise fireproof multiple dwellings. These buildings are less than 75 feet in height. Since their construction is fireproof, apartment fires will present fire problems similar to those in taller fireproof buildings. Because of the lower building height of these fireproof buildings and the heavy smoke conditions that usually occur in the attack stairway after the attack has begun, emphasis will generally be placed on venting the attack stair bulkhead after approval of the Incident Commander, earlier in the operation. This is done to relieve conditions in the attack stairway and/or public hallways. Sometimes these stairwells are unenclosed and result in a quicker smoke buildup on the upper floors.
- Although roof ventilation is emphasized and conducted earlier in low rise fireproof multiple dwellings, **permission must still be granted** by the Incident Commander before providing vertical ventilation via the attack stair bulkhead. However, similar to high rise fireproof multiple dwellings, the first Ladder Company Officer will initiate and control ventilation of the fire apartment.

16. CONCLUSION

Today's fireground has been scientifically proven to be vastly different from the fires of years past. The characteristics of modern furnishings, in combination with the energy efficient construction being utilized today, presents new ventilation and suppression challenges to the Department. The continuous training, education and evaluation of our tactics and procedures will allow us to meet these challenges in the most professional effective manner possible, creating a safer, more efficient operational environment.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

THIS PAGE WAS INTENTIONALLY LEFT BLANK

VENTILATION TECHNIQUES

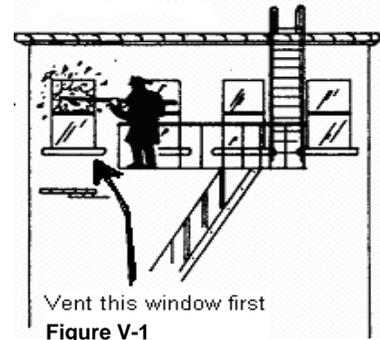
◆ VENTING FROM THE FIRE ESCAPE

When venting the windows of the fire apartment from the fire escape first check them for heat.

- A. See if they show cracks from the heat.
- B. Look for discoloration of the glass (generally brownish) from the heat.

NOTE: Energy efficient windows maintain their integrity longer than ordinary single pane windows in a fire environment and may not give any of these indications.

If above observations indicate extreme heat, the fire may momentarily vent itself or light up as you ventilate. To safely vent both windows, first break the window off the fire escape and then the window on the fire escape. If the fire escape window is vented first, fire or heat from this window may prevent venting the other window.



NOTE: Horizontal ventilation tactics must be controlled, communicated and coordinated with the interior operations. Ventilate as directed by the Ladder Company Officer.

◆ VENTING FROM ABOVE

When venting the windows of the fire apartment from directly above by use of a 6` hook and an intense fire is suspected, the possibility of fire rolling up the side of the building when air is admitted must be considered. For safety the firefighter should:

- A. Look down at the window to be removed.
- B. Measure the distance with the tool.
- C. Pull head back in the window and then swing the tool through the window below. The firefighter hand and arm will be protected by their clothing.

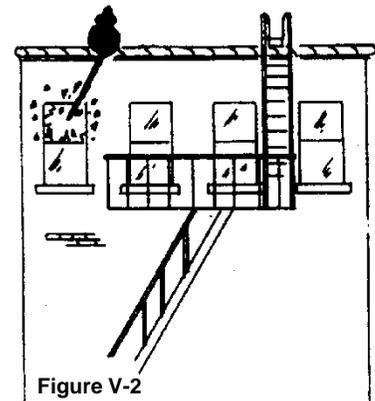


Figure V-3

All members should carry a utility cord for use in operations, e.g., venting of windows on lower floors, guide line during search, raising or lowering tools or hose, etc.

◆ **ROOF VENTILATION**

Building will have either a bulkhead with a skylight or a scuttle with a roof level skylight over the interior stairs.

○ **BULKHEAD DOOR:**

These doors are almost always self-closing. To keep the door open, either remove the upper hinge or block the door open.

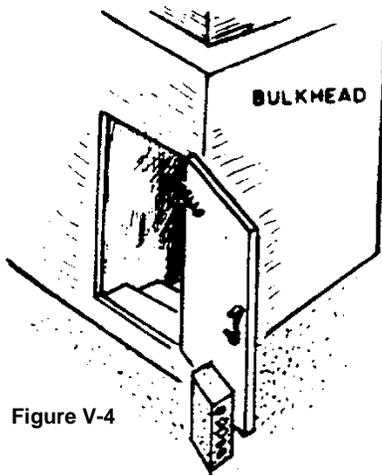


Figure V-4

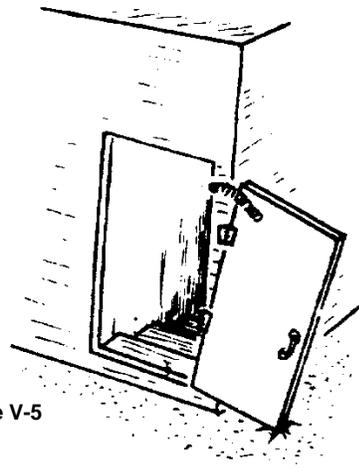


Figure V-5

To loosen bulkhead door from the upper hinge, or to remove the door entirely;

- ◆ To loosen the door from the upper hinge, open the door slightly and put the fork end of the tool between the door and the door jamb (Figure V-6). Close the door on the tool loosening hinge screws, or,
- ◆ Open the door slightly and put the adz end of the tool between the door and the door jamb. Apply pressure with the tool as shown in figure V-7.
- ◆ To remove the door entirely, free both hinges and free the self-closing device.

In the foregoing, operate from the roof side of the door and use the door as a shield against heat from the interior

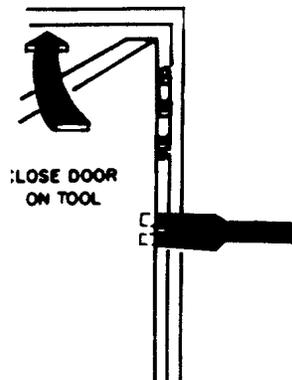


Figure V-6

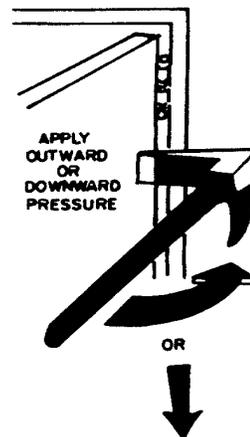
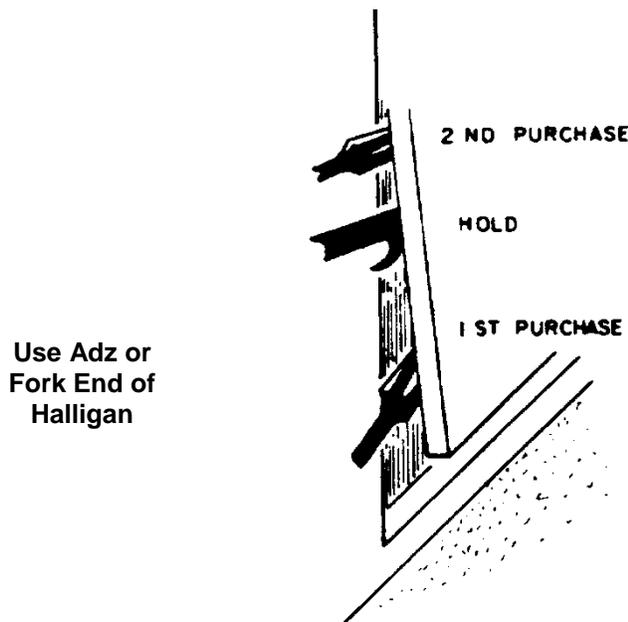


Figure V-7

Difficult bulkhead doors that are fastened on the inside:

- ◆ Even if these doors are tight against the door jamb there will usually be enough space between the bottom of the door and the sill to get a purchase.
- ◆ The bottom of the door is pulled outward.
- ◆ Alternately using the Halligan tool and the hook, the firefighter works upwards until the adz or fork end of the Halligan is near the fastening.
- ◆ Prying out will break or dislodge the fastening.
- ◆ In this operation the hook is not used for prying, but merely to hold the advantage obtained, enabling the Halligan tool to be shifted to a new position.



○ SCUTTLE COVER:

Remove scuttle cover. This may be difficult because scuttle cover may be nailed down, have several coatings of tar at the seams and/or secured by hooks, chains, etc. on the underside of the cover.

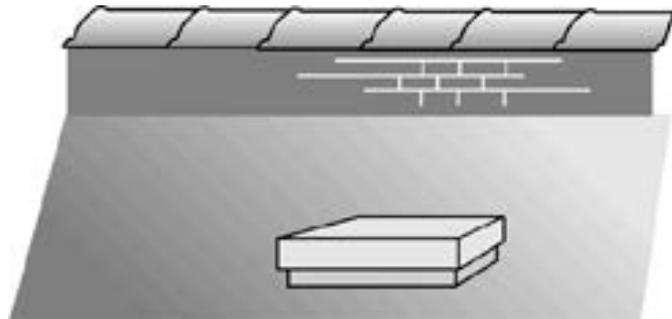


Figure V-8 Scuttle Cover

○ SKYLIGHTS:

Heavy smoke and high heat issuing from the bulkhead doorway or scuttle would obviously require further ventilation such as removal of the skylight.

The absence of these indications does not necessarily mean that skylight ventilation is not required. Opening a bulkhead door or scuttle cover will not always give a true indication of interior fire conditions; the door to the fire apartment may not be open, either because it has not been forced or because it is being held in a closed position. Evaluate other factors (heavy smoke or fire showing from several windows, etc.) in determining the amount of ventilation that will be required when the door to the fire apartment is opened.

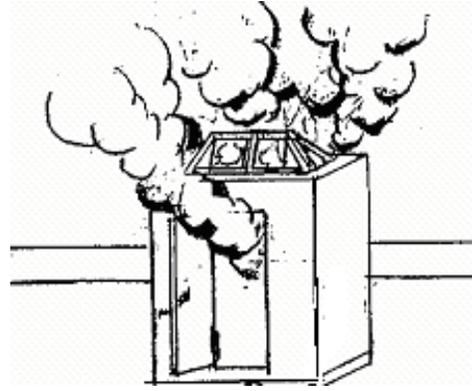


Figure V-9

Remove skylight over stair bulkhead (Figures V-9, V-10) or on roof level (Figure V-11). If fire and smoke conditions are obviously heavy, immediate venting of the skylight prior to the removal of the scuttle cover to relieve the interior would be justified.



Figure V-10 Sloping Bulkhead with Skylight

If difficulty is encountered opening the bulkhead door, vent the bulkhead skylight first. Units operating below shall be warned by H.T., prior to breaking glass. Pause after breaking the first pane, as this serves as a warning to members below and also allows roof person to determine the wind direction.

Work with the wind at your back, when possible. When protective wire screens cover skylights insert tool beneath screen to remove glass.

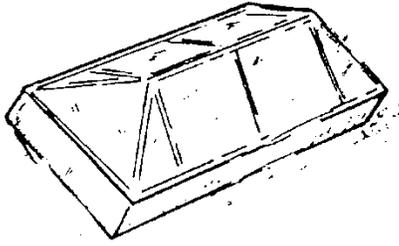


Figure V-11 Roof level skylight

NOTE: Skylights at roof level may have been removed and openings covered with roofing materials. It may be necessary to cut a hole over the stairs to vent stairway. The Incident Commander should be informed that a saw is needed to accomplish this.

After venting a skylight, to ensure an unobstructed outlet for smoke, gases and heat, probe with hook to detect possible presence of a glazed sash, draft stop or other covering and remove it.

After removing roof level skylight or scuttle cover returns can be opened into the cockloft to gain knowledge of conditions or to ventilate.

The following are two suggested methods to assist climbing onto a high bulkhead, to vent a skylight, when alone:

1) Using both, a halligan and a hook (Figure V-12).

- ◆ The Halligan is placed with the fork end down and the adz end up.
- ◆ When coping is present remove a piece and hang the hook on the bulkhead's edge.
- ◆ Using the 6ft. hook to support most of your weight, step on the adz end of the Halligan and pull yourself up.
- ◆ While climbing the hook, exert a downward pressure and do not push against the wall with your feet.
 - This lateral pressure may cause the hook to slip off the bulkhead wall.
- ◆ The intent is to enable the roof firefighter to reach the top of the bulkhead with both hands.
- ◆ Once this is achieved, he/she should be able to work them self up onto the bulkhead.

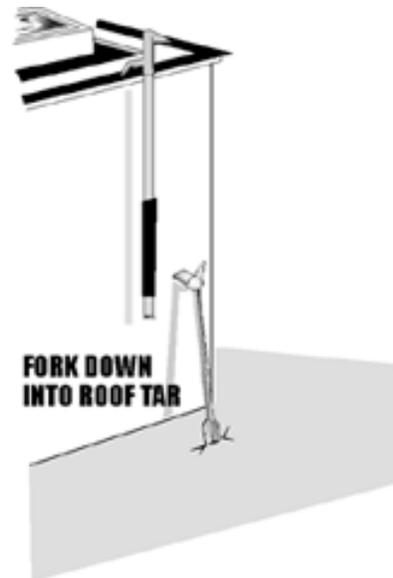
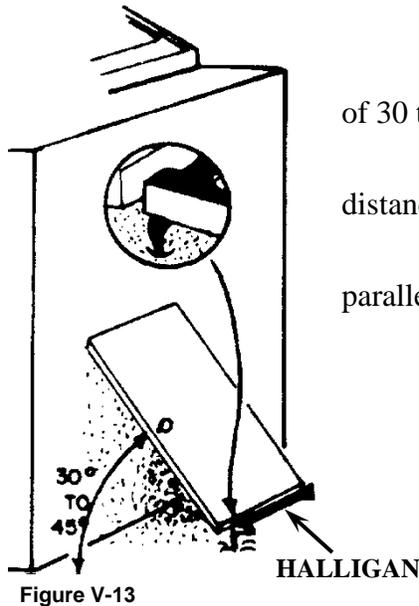


Figure V-12

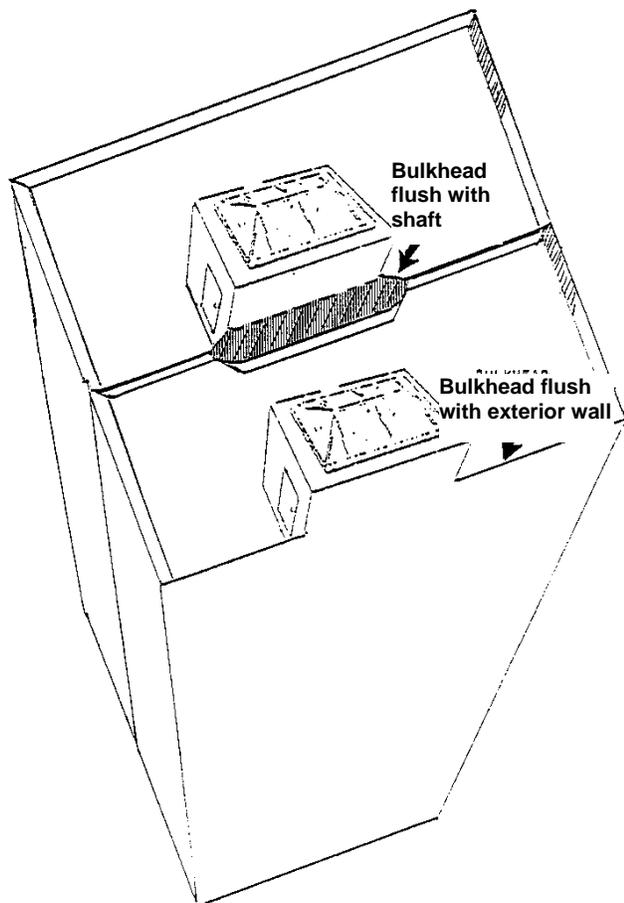
2) Using the removed bulkhead door in conjunction with the Halligan (V-13).



- ◆ Drive the hook of the Halligan into the roof.
- ◆ Then position the door against the bulkhead at an angle of 30 to 45 degrees with the roof.
- ◆ The Halligan serves as a stop and should be at a sufficient distance from the bulkhead to permit the proper angle.
- ◆ The door can be used as a ramp. The Halligan should be parallel to the bottom of the door for safety reasons.

NOTE: NEVER ATTEMPT TO CLIMB ONTO OR OFF A BULKHEAD OR SIMILAR TYPE STRUCTURE AT A SPOT NEAR OR NEXT TO AN OPEN SHAFT OR NEAR A BUILDING WALL THAT FACES ON A SHAFT, AREAWAY, COURTYARD OR STREET.

After gaining access to and venting a high bulkhead, the fire firefighter should get off the same place where he/she gained access. This allows the firefighter to descend at a location that he/she is familiar with. *Some bulkheads are erected flush with an exterior wall (i.e., one side of the bulkhead is a continuation of a building).* This reduces the selection of an egress from the bulkhead. If in doubt the firefighter may drop an object (a tool if necessary) and listen for the sound of it hitting the roof surface (Figure V-14).



○ CUTTING THE ROOF (TOP FLOOR FIRE):

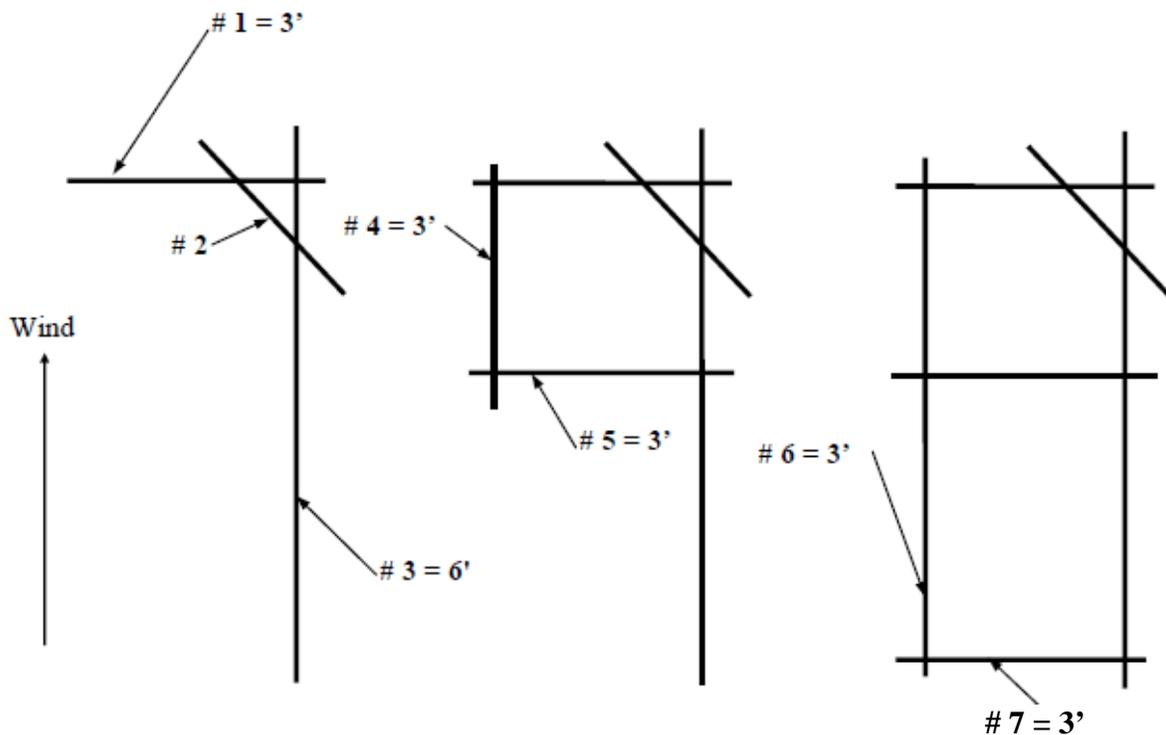
In all fires it is still of paramount importance to provide rapid initial ventilation (windows, skylights, etc.) before getting involved in the slower work of cutting the roof.

- ◆ If possible cut a hole directly over the fire, to determine this location check for:
 - Soft spots
 - Melting snow or ice
 - Steam or a dry spot on a wet roof
 - Sense of touch on the base of soil pipe or vent pipe
 - Knowledge of fire location gathered on travel to roof
 - Looking over roof edge
 - Handie-talkie communication
- ◆ Holes are made with a power saw with a carbide tip blade
- ◆ Ideally, cut should be made with the wind at your back
- ◆ Leave removed pieces of roof section next to opening to warn operating forces.
- ◆ Push down top floor ceiling to complete ventilation. Reverse the hook because BX wires may snag the hook end.
- ◆ On flat non fire-proof roofs, with the exception of Taxpayers, a 3'x6' coffin cut is recommended.
- ◆ On Taxpayer roofs a hole 8'x8' is recommended. If not possible to cut a hole this size due to a serious cockloft fire or where instability, heat or smoke conditions exists, the largest opening possible shall be made.
- ◆ On peaked roofs cutting and opening the roof is usually not considered an initial operation; the venting or removing attic windows and/or louvers is frequently sufficient for ventilation purposes. When required, cutting a hole in the roof is normally assigned to the second arriving ladder and performed from the bucket of a tower ladder with an opening made depending on the reach of the saw operator.

SEQUENCE

The size and location of the opening will depend on fire conditions. A suggested method to make an expandable opening "COFFIN CUT" is as follows:

- A. Assume wind is blowing in direction indicated. (Ideally at your back)
- B. Cut #1 approximately 3 feet.
- C. Cut #2 "knock out" corner cut for tool insertion.
- D. Cut #3 approximately 6 feet.
- E. Cut #4 to #7 approximately 3 feet.
- F. Leave removed pieces of roof section next to opening to warn operating forces.
- G. If larger opening is needed, additional opening can be made in like manner.
(Continuation of cut in desired direction)
- H. Make sure that roof is not opened before cut is completed.
- I. Push down ceiling to complete ventilation.



NOTE: When a fire is burning in a top floor apartment, it is not efficient to wait until the fire is "knocked down" before examining the cockloft. An early inspection can be made by going to a room adjacent to the fire (in the same or adjoining apartment) and opening an observation hole in that ceiling. If fire can be seen burning in the cockloft, the observation hole should not be expanded until a charged hoseline has been positioned.

It is a good practice while waiting for the charged hoseline to ventilate all windows in the apartment, because once the ceiling is opened the floor will quickly become filled with smoke. This is also the time to make sure that a roof ventilation hole is being cut directly above the fire.

Forcible Entry

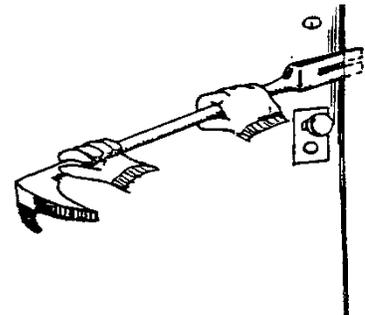
THIS PAGE WAS INTENTIONALLY LEFT BLANK

When forcible entry is required, start immediately. A door should be forced in such a manner as to preserve its integrity. If upon arrival an open apartment door is found allowing fire and smoke to extend to the public hall, close the door but ensure the door does not lock.

2. DOORS (INWARD OPENING)

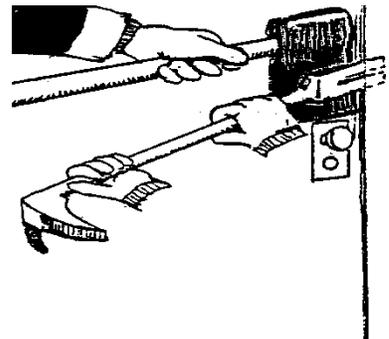
2.1 Doors found with one, two or three locks may be forced in one of several ways or a combination of ways.

- A. By placing the fork of the Halligan approximately 6" above or below the lock with the bevel side of the fork next to the door, slightly canted toward the floor or ceiling. Strike the Halligan with the axe driving it past the interior door jamb. Apply pressure on the Halligan toward the door, forcing the door open (Figure 1).



NOTES:

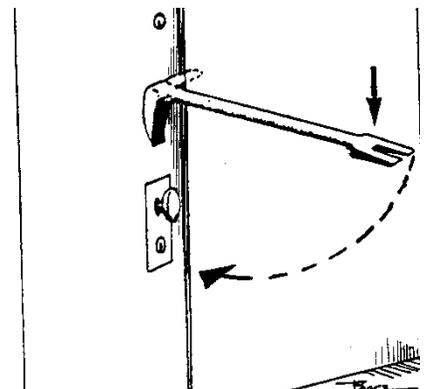
To provide additional leverage, place the axe head between the door and Halligan.



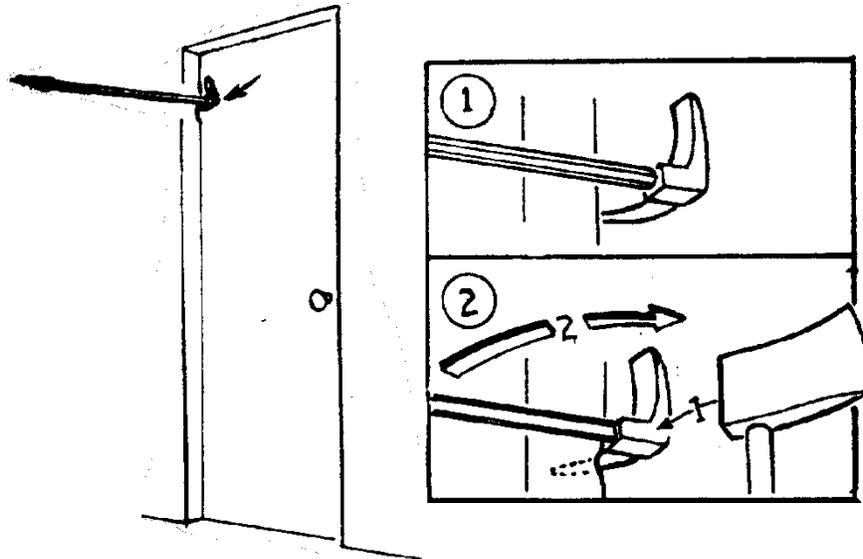
- B. Drive the hook of the Halligan completely into the door jamb 6" above or below the lock. Apply downward pressure on the Halligan.

NOTES:

When forcing doors with two locks use the above procedures placing the tool between the two locks



- C. Taking action at the hinge side of the door is another method of forcing entry. With the back of an axe, or maul, strike the solid part of the door adjacent to the upper hinge location. If the door shows signs of being effectively forced in this manner continue striking until the upper hinge is freed and then use the same method on the lower hinge.
- D. If this fails drive the fork end of the halligan tool in with the axe below the upper hinge forcing the screws from the hinge. Repeat the same process above the lower hinge. Judgment will be required since the hinges will not be visible.
- E. By using a Halligan tool (Figure 4A) another and frequently easier method is to drive the hook of the Halligan tool into the door jamb behind the lip and near the hinge (Fig. 4B). The hook is driven deep into the jamb and then the Halligan tool is moved towards the door tearing the hinge and screws from either the door or the frame. Repeat this process near the lower hinge.



Note: The upper hinge is always attacked first so that the smoke and heat will rise while you complete the forcible entry at the bottom

3. DOORS (OUTWARD OPENING)

3.1 The method used to force outward opening doors is determined by the position of the door in the frame.

- A. Flush fitting doors. These doors may be forced using either the adz or fork end of the Halligan.
 - 1) When using the fork end of the Halligan, place the concave side of the fork toward the door, tool canted slightly for initial penetration. As the tool is driven in between the jamb and door, it is brought to the perpendicular to avoid penetrating the jamb. When the tool has spread the door as far as possible, force the adz end away from the door.

- 2) Place the adz of the Halligan 6" above or below the lock and drive it into the space between the door and jamb being careful not to penetrate the door stop portion of the jamb. Pry downward and out with the fork end of the tool.

- B. Recessed doors or doors with a wall adjacent to the lock side of the door.

Place the adz of the Halligan 6" above or below the lock and drive it into the space between the door and jamb being careful not to penetrate the door stop portion of the jamb. Pry downward and out with the fork end of the tool.

4. PADLOCKS

- 4.1 Padlocks are portable or detachable locking devices having sliding and pivoting shackles that pass through a staple and are then made fast.

- A. Attack points:

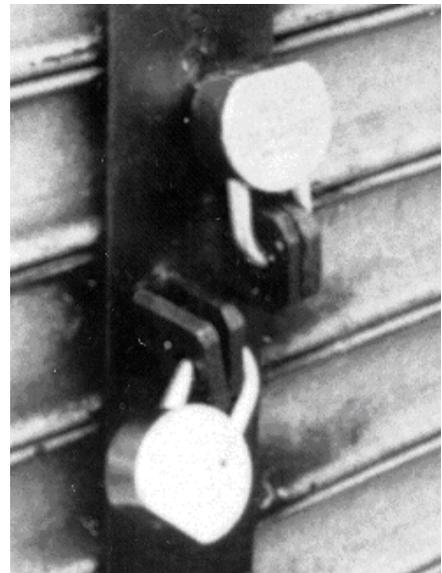
- ◆ Staple.
- ◆ Point of attachment.
- ◆ Shackle.

- B. Tools.

- 1) Halligan.
- 2) Duck bill.
- 3) Bolt cutter.
- 4) Saw - aluminum oxide blade.
- 5) Cutting torch.
- 6) Bam-bam tool.

- C. Operation.

- 1) Attack the point of least resistance.
- 2) Hook of Halligan or the duck bill can be driven through staple or shackle.
- 3) Bolt cutter to cut staple or shackle.
- 4) Case hardened locks require use of saw (aluminum oxide blade) or cutting torch. It is also possible to pull the cylinder on some of these locks with a bam-bam tool.



5. AMERICAN LOCKS SERIES 2000

5.1 A portable or detachable locking device that fits over a staple and locks by use of a movable steel pin located in the body of the lock.

A. Attack points.

- ◆ Point of attachment.
- ◆ Body of lock.

B. Tools.

- 1) Saw (aluminum oxide blade).
- 2) Cutting torch.

C. Operation.

- 1) Use either of the above tools to cut staple or other point of attachment to wall, etc.
- 2) Cut through the lock about 2/3rds of the distance up from the keyway, cutting it in two pieces. Then remove the pin from the security gate.

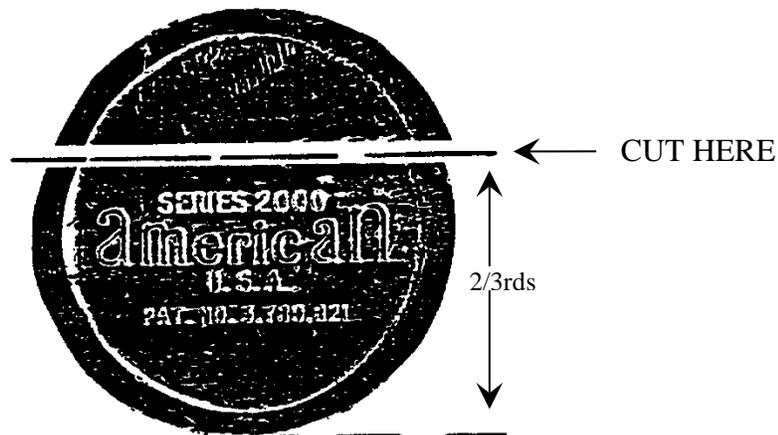


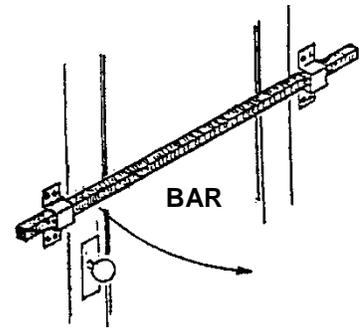
Figure FE-5 1

6. BARS AND SLIDING BOLTS

6.1. Bar

A piece of wood or steel held in place by brackets which traverses both sides of the door frame.

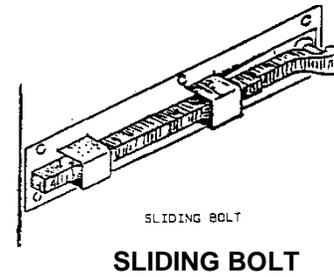
Reference #5, Figure 2.



6.2. Sliding bolt

A 1/4" to 3/4" steel bolt with a throw of 1" or more, mounted on the door and projects into the frame.

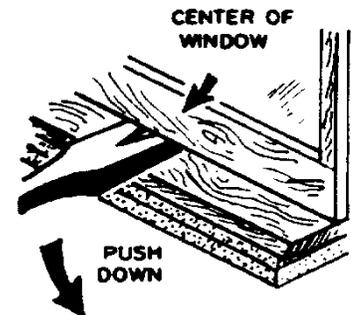
Reference #5, Figure 3.



- 6.3. Forcible entry may be made using the axe and Halligan. The bar brackets or bolt may be driven off the door frame by driving the fork end of the Halligan directly at the bar or bolt.

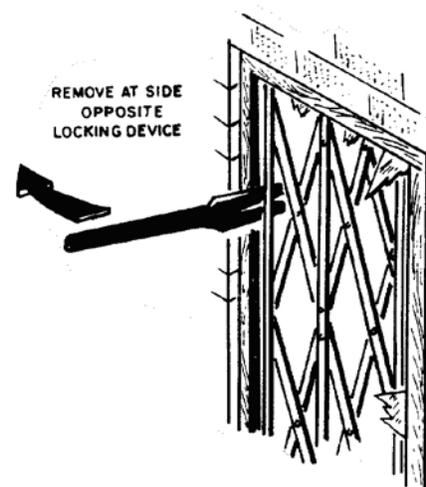
7. WINDOWS

- 7.1 By placing the fork end of the Halligan under the window at the center of the window sill and applying downward pressure on the Halligan a single window and/or window lock can be forced.



- A. Some windows found at the ground floor level or fire escape will have window gates behind the glass.

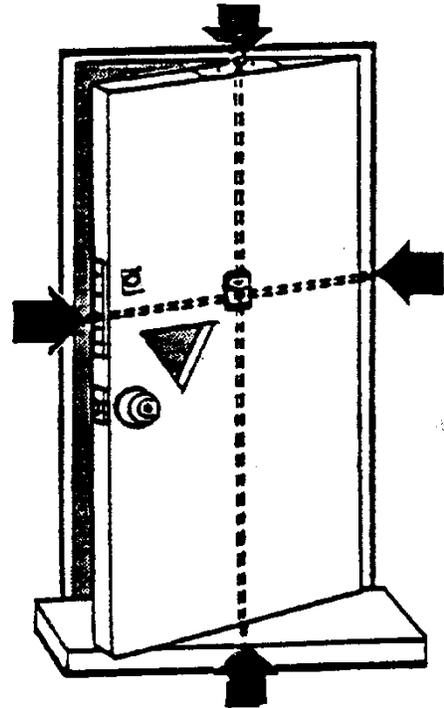
- ◆ These gates are always on the room side of the window and will first require opening or removing the window.
- ◆ Attack the window gate at the hinge side (opposite the locking device), using either the fork or adz end of the halligan.
- ◆ After taking the top & bottom hinge, slide the gate towards the locking device thus clearing about 2/3rds of the window.
- ◆ If severely exposed to heat or smoke at this side of the gate, removal may be accomplished at the lock side.



8. MULTI-LOCK DOORS

- 8.1 The lock is not necessarily centered in the door but easily recognizable by the large plate covering the lock. Four bars, one in each direction, enter the door jam when the lock is engaged.

To force the door, cut a triangle in the lower quadrant of the door on the doorknob side. This will enable you to unlock conventional locks as well. Make the cut large enough to get your arm through and back out, but small enough so that you don't cut the bar.



9. SECURITY GATES

- 9.1. There are three types, manually, mechanical and electric.

- A. **Manually operated doors** – To force entry remove the padlocks and removable eye bolts that penetrate the gate. Then lift door.
- B. **Mechanically operated doors** – The operating mechanism is a chain hoist assembly similar. This cover is mounted on hinges and is locked against the curtain guides by two padlocks. To force entry remove all padlocks from chain cover and door; then, using chain, raise the door.
- C. **Electrically operated doors** - these doors are electrically operated. The electric key switches that activate the operator will be found usually on the building wall on either side of the door.
 - 1) All electrically operated doors are equipped with an auxiliary chain hoist which can be used in the event of a power failure. The auxiliary hoist mechanism is located inside the operator housing and is not visible from the outside.
 - 2) To force entry remove the padlocks from the door. Remove the cover plate of the operator housing or remove the entire housing by use of the forcible entry tools. This will expose the working mechanism of the operator. The lever that changes the operator from electrical to mechanical will be readily visible. Pushing the lever towards the chain hoist mechanism will engage the unit and the door can be raised mechanically by the use of the chain provided.

Child Guard Gates

Child guard gates come in a variety of weights and sizes. There usually are three to four horizontal bars, which interlock and slide to the prescribed opening. The device is secured across the lower sash of the window to prevent children from falling out.

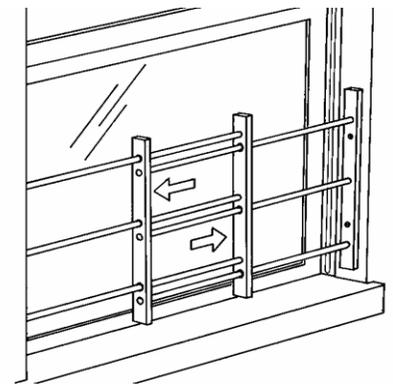
Typically, they are secured on the outside of the sash to the window frame. They also can be mounted to the inside of the window.

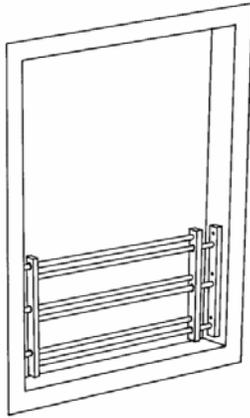
In most cases, screws are used to secure them.



Removing Child Guard Gates

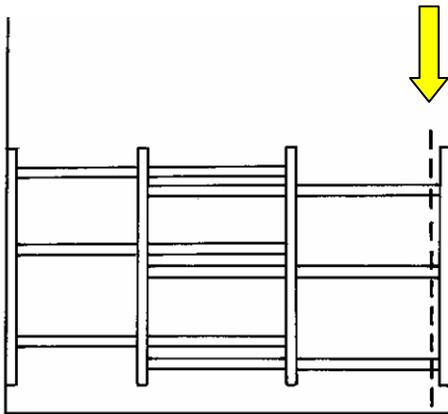
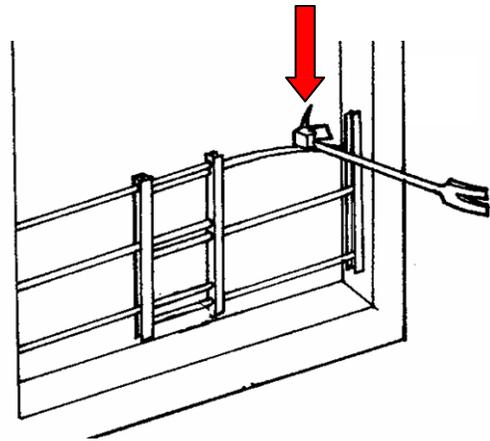
Removing them under non-fire situations rarely is a problem. Striking the vertical frame away from the mounting screw generally will be sufficient. In a fire situation, with heat and possible flames, the member may not be able to stand up and swing the tool.





If the gate is larger than the window it was designed for, the vertical frames will be too close to the side of the window frame, preventing placement of the prying tool.

Metal-frame windows will be more difficult to force than wood-frame windows. Another method of forcing them open is to strike the horizontal bar where it joins the upright that is screwed into the frame.



Cutting the horizontal bars is another option, but that calls for a different tool, such as a power saw or Sawzall. Bolt cutters may not work.

SEARCH

THIS PAGE WAS INTENTIONALLY LEFT BLANK

SEARCH

TABLE OF CONTENTS

	Glossary
1.	Introduction
2.	Fire Environment
3.	Definition of Search
4.	Size-Up
5.	Types of Search
6.	Primary Search
7.	Secondary Search
8.	Communications
9.	Search Tactics
10.	Searching Above the Fire
11.	Use of Thermal Imaging Camera
12.	Search Tips
13.	Rescue of Victims
14.	Conclusion

THIS PAGE WAS INTENTIONALLY LEFT BLANK

GLOSSARY

Flow Path	The movement of heat and smoke from the higher pressure within the fire area towards the lower pressure areas accessible via doors, window openings and roof structures. As the heated fire gases are moving towards the low pressure areas, the energy of the fire is pulling in additional oxygen from the low pressure areas. Based on varying building design and the available ventilation openings (doors, windows, etc.), there may be several flow paths within a structure. Any operations conducted in the flow path will place members at significant risk due to the increased flow of fire, heat and smoke toward their position.
Heat Release Rate (HRR)	The rate at which energy is generated by the burning of a fuel and oxygen mixture. As the heat release rate increases, the heat, smoke production and pressure within the area will increase and spread along available flow paths toward low pressure areas (open doors, windows and roof openings).
VEIS	VEIS (Vent, Entry, Isolate, Search) is the approved tactic when entering a structure through an opening (door or window) to search an area for the location of the fire or to locate possible victims. The priority upon entering the area via a window is to close the door to that room or area in order to isolate that area being searched from the fire area. When entering a fire area via a doorway entrance, the door needs to be controlled until the fire area is further isolated or a charged hoseline is advancing on the fire. By isolating the area, we are controlling the flow path of the fire, heat and smoke towards the ventilation point as well as controlling the air flow from the ventilation point towards the fire area.
Ventilation	The controlled and coordinated removal of heat and smoke from a structure, replacing the escaping gases with fresh air. This exchange is bi-directional with heat and smoke exhausting at the top and air flowing in towards the fire at the bottom. The fire will pull the additional air flow into the building towards the fire which can intensify the fire conditions. This exchange can occur by opening doors, windows or roof structures. Coordinated and controlled ventilation will facilitate quicker extinguishment and limit fire spread.
Ventilation Limited Fire	A fire in which the heat release rate and fire growth are regulated by the available oxygen within the space.
Ventilation Profile	The appearance of the fire building's ventilation points showing the flow paths of heat and smoke out of the structure as well as any air movement into the structure.
Ventilation for Extinguishment	The controlled and coordinated ventilation tactic which should coincide with the Engine Company extinguishment of the fire.
Ventilation for Search	The controlled and coordinated ventilation tactic performed to facilitate the movement of a firefighter into an area to conduct a search for victims.

1. INTRODUCTION

- 1.1 Saving lives is the primary mission of the FDNY. The best lifesaving tactic we have is a systematic search plan, coupled with rapid water on the fire. Search and rescue are the most important tasks the firefighter performs during a fire.

“When a fire progresses past the incipient stage, the fire area must be considered an IDLH atmosphere. Every member entering the IDLH must be using all personal protective equipment and a self-contained breathing apparatus. No member shall enter an IDLH atmosphere unless the member teams up with at least one other member and remains within visual or voice contact with that member.”

“Two members must team up prior to entering an IDLH (Two-In) and there must be at least two other members outside the IDLH (Two-Out) who are designated as a Safety Team. The members of the Safety Team shall be available to assist the interior team(s) if the need arises. If a member leaves a contaminated area, another member using an SCBA must accompany this member to a safe area.”

“If a known life hazard is found and immediate action could prevent the loss of life, appropriate action (rescue activity) may be taken by an individual member. This applies only for a known life hazard, not for standard search and rescue activity. If such action is taken, the Incident Commander must be immediately notified and appropriate adjustments made.”

- 1.2 This training bulletin will make members aware of the various actions involved in a systematic search and the techniques that will help make conducting a search thorough and relatively safe for members.
- 1.3 There are many different types of structures within the City of New York and in some of these structures the areas of search responsibility differ. However, the information and techniques presented in this bulletin are applicable to any type of structure or occupancy.
- 1.4 A coordinated, concentrated team effort is required of all units conducting searches to ensure a proper, prompt search and removal of all endangered occupants. Refer to the Firefighting Procedure Manuals for specific areas of responsibility.
- 1.5 The strategies of search never change in that the FDNY always strives to conduct an immediate primary search, followed by a painstakingly complete secondary search. The tactics used in performing the searches evolve with the changes in construction and fire dynamics. This bulletin will describe the concept of search and offer techniques that can be applied to the vast variety of situations and occupancies found in NYC.

2. FIRE ENVIRONMENT

- 2.1 Conducting a search in the modern fire environment has added many challenges to the fire service. The increased use and amount of synthetic contents found in all buildings is one challenge presented. Synthetic materials have a higher heat release rate (HHR) giving off heat more quickly than ordinary combustibles, leading to a more rapid and sudden change in the fire environment. Fires today develop faster, producing thick black smoke, which greatly reduces the searcher's visibility. This is why Thermal Imaging Cameras (TIC) have taken on a greater importance when conducting searches.
- 2.2 Fires involving modern synthetic contents coupled with new building construction methods that contain the heat and smoke within the fire area, may quickly become a ventilation limited fire that will react rapidly once a door is left open or other parts of the occupancy are ventilated allowing air flow into the fire area. These openings will provide enough air flow that may rapidly expand the fire condition and extension, causing conditions to become untenable in as little as 1 1/2 minutes after entry (ventilation) is made into the fire apartment or area. It is critical for Company Officers to control all ventilation tactics, including doors to and within the occupancy. The tactic of venting as we search can have severe consequences with modern synthetic contents.
- 2.3 Today's fire conditions lower the survival threshold of civilians as well as decreasing the amount of time needed to safely perform a search without an operating hoseline in place. Bunker gear, while providing better protection, is totally encapsulating allowing members to search deeper into an IDLH. For safety reasons, members need to be constantly aware of the search environment including the status, location and operation of all hoselines.

3. DEFINITION OF SEARCH

- 3.1 A search is an orderly and systematic examination of a building or area for the purpose of locating persons, or locating fire and extension of fire.

Note: This bulletin will deal primarily with search for persons, in order to save lives.

4. SIZE-UP

- 4.1 Size-up starts with the receipt of the alarm. The teleprinter or MDT dispatch message shall be checked for Critical Information Dispatch System (CIDS). The information provided by CIDS will enhance operational efficiency by alerting units to dangerous, hazardous or unusual conditions which are not necessarily apparent from the front of the building.

- 4.2 Upon arrival, take the time to orient yourself on the fireground. The need to take adequate time to perform a size-up to determine the occupancy type and the expected life hazard, before attempting a search, cannot be over emphasized. All affected areas within the fire building should be searched within the limits of safety.
- 4.3 Searching members must understand that the degree of aggressiveness incorporated into a search for life must be dependant upon several factors, some of which are:
- What is the structural stability of the building?
 - What is the ventilation profile of the fire conditions, (the location and movement of any smoke and fire into and out of a structure)?
 - Are there reports of a life hazard?
 - What is the stage of the fire development and what will be the effects of any ventilation?
 - What is the tenability of fire conditions within the occupancy?
 - What is the status of the water supply and the position of charged hoselines?
 - What are the rewards and benefits to the searchers in relation to the risk and consequences of their actions?

Members engaged in searches must continually assess these factors by monitoring handie-talkie transmissions and through personal observation.

- 4.4 Consider how the heat, smoke and fire will extend within the building. Occupant egress from the building (interior stairs, fire escapes, etc.) can be quickly impacted by the fire conditions, negating their use and endangering occupants.
- 4.5 Members must include the buildings configuration as part of their size-up. The benefits gained by observing construction features of the fire building (types of construction, window layout, presence of window bars, access and egress points from the building, is the building built on a grade, etc.) may give members an idea of the floor layout inside a residential building. This may help members determine how many apartments are on each floor and the floor plan of the apartment (ex. Railroad flats). Prior to reaching the fire floor, knowledge can be gained from conducting a survey of the floor below to determine the interior hallway layout, apartment numbering system, floor plan of the apartment, and closest means of access to a fire apartment. Information from this survey shall be communicated between the Officers and the Incident Commander (IC).
- 4.6 It is critically important to take into consideration the effects of the wind direction and velocity on fire conditions, especially when windows are open or failed. Direct or gusting wind may suddenly increase the fire conditions and fire growth within the structure.
- As part of their size-up, members of the outside team must report wind conditions and its affect on the fire and smoke conditions to their Officer and the IC. Alternate strategies and tactics shall be considered when the ventilation profile and interior conditions indicate the potential for a wind impacted fire.

- 4.7 Take into account the time of day and consider the following:
- It can be assumed there will be a large number of sleeping occupants in a multiple dwelling at night.
 - Commercial buildings may have watchmen or cleaning personnel working after normal business hours.
 - Commercial loft buildings may have been converted into residential buildings.
 - Office buildings often have cleaning and maintenance people present day and night. Computer personnel are often present 24 hours a day.
 - It cannot be assumed no one is present inside taxpayers that have roll down security doors with padlocks in place. Many times people are padlocked in to provide security at night.
- 4.8 Information about the location of the occupants and reports of any missing occupants must be obtained early in an operation. It is critical to ascertain if all occupants have evacuated or if any occupants are reported trapped or missing. Obtain information on who is missing and their last reported location including the access to their location. Ask occupants if they had anyone visiting and staying with the family. Verify if a report of a trapped victim is a person or a pet.
- 4.9 Be aware of smoke spread that can be affected by air conditioning systems and vent shafts in kitchens and bathrooms.
- 4.10 In retail establishments all areas must be searched for occupants with particular attention given to the rear and main selling area. Be aware there may be accommodations in the store for employees to rest or sleep.
- 4.11 It is important for an engine company to realize that a properly positioned hoseline will contain the fire, possibly saving civilian lives and protecting firefighters who are searching both the fire floor and the floors above.
- Note: Only in extreme cases should an engine company become involved in search and rescue without simultaneously stretching and positioning a hoseline.

5. TYPES OF SEARCH

- 5.1 Upon arrival at the fire building, members must perform search activities with two objectives:
- The location of any life hazard
 - The location of the fire
- 5.2 There are two types of searches for life:
- Primary search
 - Secondary search

6. PRIMARY SEARCH

- 6.1 A primary search is the immediate search for life. This search is rapid but thorough and systematic. The primary search will be influenced by the fire, heat and smoke conditions in a room or area, and may be prior to the application of water. It should be done quickly, with due regard for your personal safety.
- 6.2 Usually the 1st arriving ladder company is responsible for the primary search on the fire floor or fire area, and the 2nd arriving ladder company is responsible for the primary search on the floors above.
- 6.3 The 1st arriving ladder company's priorities are:
- Locate the fire area.
 - Control the door to the apartment or area, and any other ventilation points.
 - Communicate the fire location to the Engine Officer and the IC.
 - Determine if conditions are tenable to support life:
 - If entry can be made and the search conducted without the protection of the hoseline, members may attempt to locate and contain the fire area of origin, and then start the search for life from this point.
 - If untenable, move in behind the engine company advance and search from behind the hoseline.
- 6.4 The search for life in the areas adjacent to or above the fire area/floor, should start immediately upon entering the area, followed by searching for the extension of fire. Any extension should be immediately reported to the IC.
- 6.5 Depending on the type of structure, the second arriving ladder company may be assigned to assist the first arriving ladder company with the primary search on the fire floor. In these situations, the IC shall assign additional units to the floor(s) above.
- 6.6 When both of the assigned ladder companies arrive at almost the same time but out of response sequence, their responsibility for search shall be guided by their response assignment. This avoids confusion and ensures that the fire area and the floors above are covered. If units operate out of the assigned response sequence then the IC must be notified.
- 6.7 The IC shall have a primary search of elevators conducted early in an operation.

7. SECONDARY SEARCH

- 7.1 The secondary search is a thorough and painstakingly complete search for life of all areas that required a primary search. In addition, the secondary search must also include the entire outside perimeter of the building and all shafts, basements, cellars, elevators, roofs, etc. Its purpose is to ensure that no possible victims are overlooked. Time is not as important as accuracy.
- 7.2 A secondary search shall be completed before any extensive overhauling of the fire area is attempted.
- 7.3 A secondary search must be performed by a different company than the company which performed the primary search.

8. COMMUNICATIONS

- 8.1 Communication between all members and the need to monitor communications when conducting a search is imperative to improve the safety and efficiency of operations. Effective communications include the following:
- To ensure the safety of the interior team, the outside team must report exterior conditions, including the effect wind is having on the smoke and fire. The exterior size-up must be relayed to their Officer, the IC or Sector Supervisor (if implemented).
 - Officers shall communicate with the members of the outside team to determine their location and areas they are searching, and require them to maintain contact with the interior search team to ensure the outside members' safety and team integrity.
 - Members conducting searches will maintain situational awareness by monitoring handie-talkie transmissions, especially the status of the water supply and position of operating hoselines.

9. SEARCH TACTICS

9.1 The Ladder Company Officer must supervise searches by controlling both the interior and exterior search teams. This Company Officer is responsible for maintaining the search team integrity. The failure to maintain search team integrity may lead to serious injuries and fatalities during operations. The interior team search is controlled by immediate supervision via verbal communication and the use of the Thermal Imaging Camera (TIC). The exterior team is supervised through functional supervision by tracking the member's progress via handie-talkie reports.

9.2 All search teams must have a plan in order to complete an effective search. A plan will enable members to achieve the main objectives of searching for life hazards and the location of fire. Members shall always remain cognizant of their surroundings by making a mental note of point of entry and any secondary means of egress that are passed during their search.

Members can orientate themselves within the occupancy by:

- Knowing the exposure from which the member entered the building;
- Conducting a survey of the floor below;
- Knowing what floor the member is on, the number of the apartment the member is searching in, and the room the member is searching;
- Noting landmarks (radiators, large furniture, etc.) within the search areas;
- Making a mental note of the floor plan as members move through the search area.

Maintaining situational awareness will enable members to perform a thorough and systematic search, allowing them to maintain contact with other members searching and provide details of their exact location in case the need for assistance should arise.

9.3 There are several methods of performing a search:

- The method for searching the fire area or apartment is to first locate, contain and isolate the fire and then begin the search for life from this point. When entering rooms use either a left or right hand search pattern. Work along walls and perimeter furniture as you move toward the fire area. When searching for life, continue with the left or right hand search pattern probing toward the center of the floor of the room. When probing with a tool use caution to avoid injuring a victim.
- The method when searching areas adjacent to or above the fire area, is to start the search for life upon entering the area using a left or right handed search pattern.
- The search rope method should be used in commercial occupancies or when deemed necessary by the unit Officer since it will improve orientation, safety, and provide for a more coordinated search.

- 9.4 Prior to forcing an entrance door to a fire occupancy, the Ladder Company Officer shall determine:
- Is there a report of a life hazard?
 - Are interior conditions tenable to sustain life or to conduct a search for life?
 - Are all members in proper PPE?
 - What is the location and status of the charged hoseline?
 - Who is the member to remain at the door if the interior search is to be conducted without an operating hoseline in place?
 - What will be your area of refuge, if needed?
- 9.5 Gaining access to the fire area, or area to be searched, will usually be through the main door that the occupants use. If there are indications of fire on the other side of the door, do not stand in front of the door when opening it. Stay to one side, keep low and then open the door. If fire is wrapping around the door jamb as the door is being forced open, a hoseline must be charged and in place at the door before the door is opened. This may also indicate that a window has failed and that wind is forcing the fire toward the occupancy entry door. The Company Officer shall contact the exterior team for their size-up if it has not been communicated. Evaluate the interior and exterior size-up and determine if an alternate means of attack and access to the fire area is necessary.
- 9.6 The area in the vicinity of, and behind, the entrance door must be checked as soon as entry is made. People may have tried to reach a means of egress and may be unconscious near or behind the door.
- 9.7 If a door opens easily at first and then is stopped by something, reach around the door to determine if the obstruction is an unconscious person.
- 9.8 Upon entering the occupancy, do not let a door lock behind you. Set the lock or put a large sure search door marker over the latch and around both knobs (See Training Bulletin Tools 19). Upon entering any IDLH area, all searches shall be conducted with members at the floor level.
- 9.9 When unable to enter due to severe fire conditions, probe the area in the vicinity of the door with a hand or tool before closing the door. Maintain control of the door. Once the engine company has a charged hoseline and is ready to advance, move in behind the nozzle team to start the search for life.
- 9.10 Door Control: The opening or forcible entry of the entrance door to the fire area is not just a point of access or egress. But equally important, it is a ventilation point creating a flow path for fire, heat and smoke. This ventilation point allows both the heat and smoke to flow from the fire area and also provides a fresh in-flow of air at the floor level from the exterior to the interior of the fire area.

The contemporary contents of today's occupancies burn quickly and become ventilation limited. These fire conditions lack sufficient oxygen to further expand the fire. The inward flow of air from the door opening may be enough to cause a rapid expansion of fire conditions and limit the time for an effective search. It is critical to the safety of the occupants and the members conducting searches, that we control the entrance doors until a charged hoseline is in position to operate.

9.10.1 A determination must be made as to whether the door will remain open or closed while the search is being conducted. The determining factor is whether or not the engine company has a charged hoseline and is ready to advance into the fire area/occupancy.

- a. If the engine has a charged hoseline, the door to the fire area will be left open. A member of the ladder company shall chock open the door to facilitate the advance of the hoseline.
- b. If the engine does not have a charged hoseline at the door to the fire area, the door should be closed after the search team enters. Before entering, the Ladder Company Officer shall communicate the identity of the fire apartment to the IC and Engine Officer. A firefighter of the interior team must be positioned at the door inside the fire area to maintain control of the door until a charged hoseline is ready to advance through that door. The Ladder Company Officer and the other member of the interior team will search the fire area. The interior team shall leave the hydraulic forcible entry tool outside the doorway to indicate the apartment they are searching. The Ladder Company Firefighter at the door will:
 1. Maintain control of the apartment door to control the flow paths of heat and smoke.
 2. Make sure the door doesn't lock behind the interior team by setting the lock or using a large sure search door marker.
 3. Monitor conditions in the immediate entrance area that may affect the safety of the interior search team.
 4. Monitor handie-talkie transmissions to maintain situational awareness, especially reports of water problems, and wind conditions and its effect on other ventilation points, to ensure the safety of the members searching the fire area.
 5. Act as a beacon to guide the searching members back to the door, if necessary.
 6. If members are forced to evacuate, account for the interior team and close the door after all members have exited the apartment.

Note: The door should be closed after the search team enters to prevent the creation of a flow path from the fire area towards the door and eventually into the public hallway and stairwell. A wind condition created by a failed or open window may increase the negative effects of flow paths within the fire area.

The Ladder Company Officer must notify the Engine Officer and the IC of the decision to close the door.

Once the engine company reaches the apartment door with a charged hoseline, the Engine Officer must notify the Ladder Company Officer of their readiness to enter the apartment and that the apartment door will be opened. The door should not be opened until the Ladder Company Officer acknowledges and approves.

9.10.2 Attempt to locate and confine the fire to the area of origin until the hoseline is in position to reduce the number of people endangered. Once the fire area has been determined, it should be confined by:

- Closing an open door to the fire apartment, to gain control of the public hallway and stairs.
- Closing the door to a fire room to prevent a flow path for the fire toward the apartment door when the hoseline enters the apartment.

Note: The water extinguisher may enable members to get close enough to close an apartment or room door, thereby confining the fire.

9.11 Ventilate, Enter, Isolate, Search (VEIS):

This is an approved tactic whenever a member enters a window (vent opening).

Ventilate: Open or remove the window to be entered.

Enter: Member enters via the window. This open window is now a flow path for the smoke, heat and fire.

Isolate: The room entered by closing the door to eliminate the flow path.

Search: Conduct a search of the room.

When entry is to be made through a window:

- Prior to entering a window to perform a search, member shall notify their officer. All horizontal ventilation tactics, whether Ventilation for Extinguishment or Ventilation for Search, require communication with, and coordination by, the Ladder Company Officer operating inside the fire area to be vented.
- Be cautious when breaking glass since an unconscious person may be lying on the other side.
- Before entering, probe for possible victims, and then check the floor for stability.
- Before entering an apartment clear out the entire window. Removing it will provide a larger and better means of egress if conditions deteriorate.
- Immediately upon entering the room from a window, members should make a quick check/sweep of the floor in the hall outside the door for any victims before closing the door. Once this door has been closed, a more detailed search may be permitted. The completely removed window will adequately vent the room and the possibility of pulling fire toward the vented room will have been negated by the closed door.

- 9.12 When unable to enter through the window due to severe conditions, probe the floor area immediately inside the window with your hand or with a tool.
- 9.13 When a known life hazard exists and entry through a door or window to the area to be searched is not possible because of fire, it may be advisable to seek another or alternate means of entry. An example of alternate means of access is breaching a wall to enter the fire area or room from an adjoining apartment.
- 9.14 The public hallway and the entire staircase up to the bulkhead door must be examined for those civilians who unsuccessfully attempted to use the interior stairs to escape from the fire or smoke.

10. SEARCHING ABOVE THE FIRE

10.1 Gaining access to the floor above in many types of structure can be extremely difficult and can place members in a dangerous position. Initially, this may not always be attainable, but an attempt should be made while always keeping safety in mind. Company Officers must evaluate the risk of going above a fire without a protective hoseline and determine the benefits and consequences. A thorough size-up of the conditions on the fire floor shall be performed before going above the fire. When deciding whether to go above, consider the following:

- What is the location of the fire?
- Do they have control of the door to the fire area?
- Do they have a charged hoseline on the fire floor?
- Is the hoseline advancing into the fire area?
- Are there water problems?
- Is there a need for protection with a hoseline above the fire floor?

Note: When assigning an Engine Company to stretch a hoseline to the floor above the fire, the IC shall give that Engine Company's identity to the units operating on that floor.

- 10.2 Prior to proceeding above the fire, notification must be made to officers on the fire floor. Acknowledgement of this message must be received before proceeding above. This is necessary to ensure that the officers of units operating on the fire floor will know who must be notified of any situation necessitating their withdrawal from the floor above.
- 10.3 Once determined that access to the floor above can be safely attained, get up and off the stairs immediately.
- 10.4 Means of access to the floor above are:
- Interior stairs;
 - Fire escapes;
 - Via ladders (Portable, Aerial or Tower ladder).

- 10.5 Upon reaching the floor above, the officer must consider forcing a door to an apartment other than the one directly over the fire, to provide an area of refuge in the event the conditions deteriorate. If an area of refuge is to be made, ensure that the door is closed and unlocked, so as not to create an additional flow path for smoke, heat and fire.
- 10.6 When conducting a primary search above the fire, it is vital that members continually assess their location in relation to both your primary and secondary means of egress in the event that conditions deteriorate requiring an evacuation. Situational awareness is crucial to the safety of all members, especially those operating above the fire. The progress of the hoselines on the fire floor below must always be monitored and used as the indicator governing how far the searching members will continue to advance on the floor above the fire.

Note: Water problems (burst length), should be transmitted as an **Urgent** handie-talkie message. The IC shall ensure that members operating above the fire are aware of the problems on the fire floor. If there is any indication of a delay in putting water on an **uncontrolled** fire, all members operating above the fire should seek refuge by returning to the fire floor or floor below. This must be done to prevent the search team from being trapped by extending fire conditions. They may resume operations on the floor above once the water problem on the fire floor has been resolved. Searching for fire extension is not a valid reason to remain above an **uncontrolled** fire.

11. USE OF THERMAL IMAGING CAMERA

- 11.1 The Thermal Imaging Camera (TIC) is a valuable tool that can be used for many operations. TICs may be especially helpful in the low visibility environment of today's structural firefighting. TICs provide a pictorial representation of temperature differences that are unaffected by smoke. Basic knowledge of thermal imaging, understanding the functions and use combined with disciplined tactical applications are essential in utilizing the TIC to its fullest potential.
- 11.2 TICs provide a new perspective of the fireground that can be very beneficial to the safety and efficiency of operations. When the images presented are properly interpreted, operators may utilize the information to assist in making decisions regarding firefighting tactics, firefighter accountability, victim searches and directing interior operations. The company officer responsible for directing searches is best suited to carry and operate the TIC.
- 11.3 The TIC is only a tool and shall be used as an adjunct to, not a replacement of, the established firefighting search procedures and practices already in use.
- 11.4 TICs must be carried by Ladder Company Officers and used at all structural responses. At all times, the TIC shall be used in conjunction with a systematic search plan allowing Ladder Company Officers the ability to maintain a supervisory role of members involved in the search.

- 11.5 When confronted with smoke conditions negating visibility, a TIC can give the Ladder Company Officer the capability to visualize the convection and radiant heat waves being generated by the fire and can visually provide an early warning of a rapidly expanding fire.
- 11.6 All members shall refer to Training Bulletin Tools 27, Operation of the Thermal Imaging Camera, for more information on the use and limitations of the TIC.

12. SEARCH TIPS

- 12.1 Always be alert for sounds of a trapped victim (e.g., coughing, moaning, or crying).
- 12.2 Sweep beds and couches from front to back. If a person is found on a bed, give an extra sweep as there may be more than one person on the bed.
- 12.3 Check the areas between the bed and the wall, and between 2 beds pushed together.
- 12.4 Check all rooms, closets and bathrooms thoroughly.
- A locked bathroom door is usually an indication that someone is inside.
 - If a room has a padlock on it, don't assume it is unoccupied. Children are sometimes locked in when parents leave.
 - When forcing an apartment entrance door, if the night latch chain is in place, this indicates a strong possibility that victims will be present.
 - Ensure all interior walls of a closet are touched when searching the closet floor. This will ensure the search reaches the back of the closet. Many times children will hide from the fire deep inside the closets.
- 12.5 Look under beds and behind furniture for trapped victims.
- Try to avoid moving furniture, as it may hide a victim or block a doorway to an adjoining room by doing so.
 - To find out whether there is a victim under a bed, probe with an arm, tool, or insert a leg under it and sweep gently back and forth.
- 12.6 Be sure not to pass the upper levels of double and triple-bunk beds, which are well above the floor. The extremely low level of the mattress on the lower part of the bunk bed will alert you to search higher.
- 12.7 Narrow tapered legs (with wheels) will probably indicate a crib.
- 12.8 Thoroughly search all piles of clothes, draperies, or bed linens. The removal and dropping of window draperies may have covered a victim.
- 12.9 Check all dresser drawers, toy chests, refrigerators, and closets for victims. Children often seek refuge in such places.

13. RESCUE OF VICTIMS

- 13.1 Remove the most seriously exposed victim first.
- 13.2 Attempt to remove a victim via the safest route available. The preferential order of removal is:
- Interior Stairs
 - Horizontal Exits
 - Fire Escape
 - Ladders
 - Life Saving Rope
- 13.3 Most fire victims found during primary searches are usually found in these areas:
- Within the area of fire origin.
 - In a path leading from the area of fire origin towards an exit.
 - In the apartment or occupancy directly above the fire in non-fireproof multiple dwellings.
 - On the top floor of non-fireproof multiple dwellings.
 - In hallways and stairways in fireproof multiple dwellings.
- 13.4 Members must communicate that they have located a victim by transmitting signal 10-45, the location of the victim and if assistance is needed. Always remove a victim via the **safest** route available.
- 13.5 Ambulatory victims are those that can assist themselves in their own removal. They may hesitate or want to return for valuables, pets, etc. Members must be firm, authoritative and direct these victims to a place of safety before returning to complete the search. Ambulatory victims should be removed or directed from IDLH areas. The IC should be notified of any ambulatory victims that are evacuated from the IDLH area.
- 13.6 Non-ambulatory victims cannot assist in their own removal. They may be aged, infirmed, obese, small children or unconscious. Members may require assistance and should use their handie talkie or notify nearby members for assistance. Whenever any member removes a non-ambulatory victim, the victim must be removed to a non-IDLH area. When required, the rescuer shall provide medical treatment until the arrival of a CFR Engine or EMS. Keep the IC aware of the location of any victim.
- 13.7 A search is not complete just because a victim is found and removed. There may be other victims within the occupancy and all rooms must be searched. The IC needs to ensure that all areas are properly searched.

14. CONCLUSION

- 14.1 This bulletin is not to be considered all-encompassing or meant to cover every possible situation. However, the material included has been learned from many years of experience and should prove valuable to members.

- 14.2 It is of the utmost importance that all members are familiar with the types of buildings within their response area. Knowledge of building layouts and occupancies can be a firefighter's greatest asset when conducting searches.

FIGURE 1
Key Points for Searching

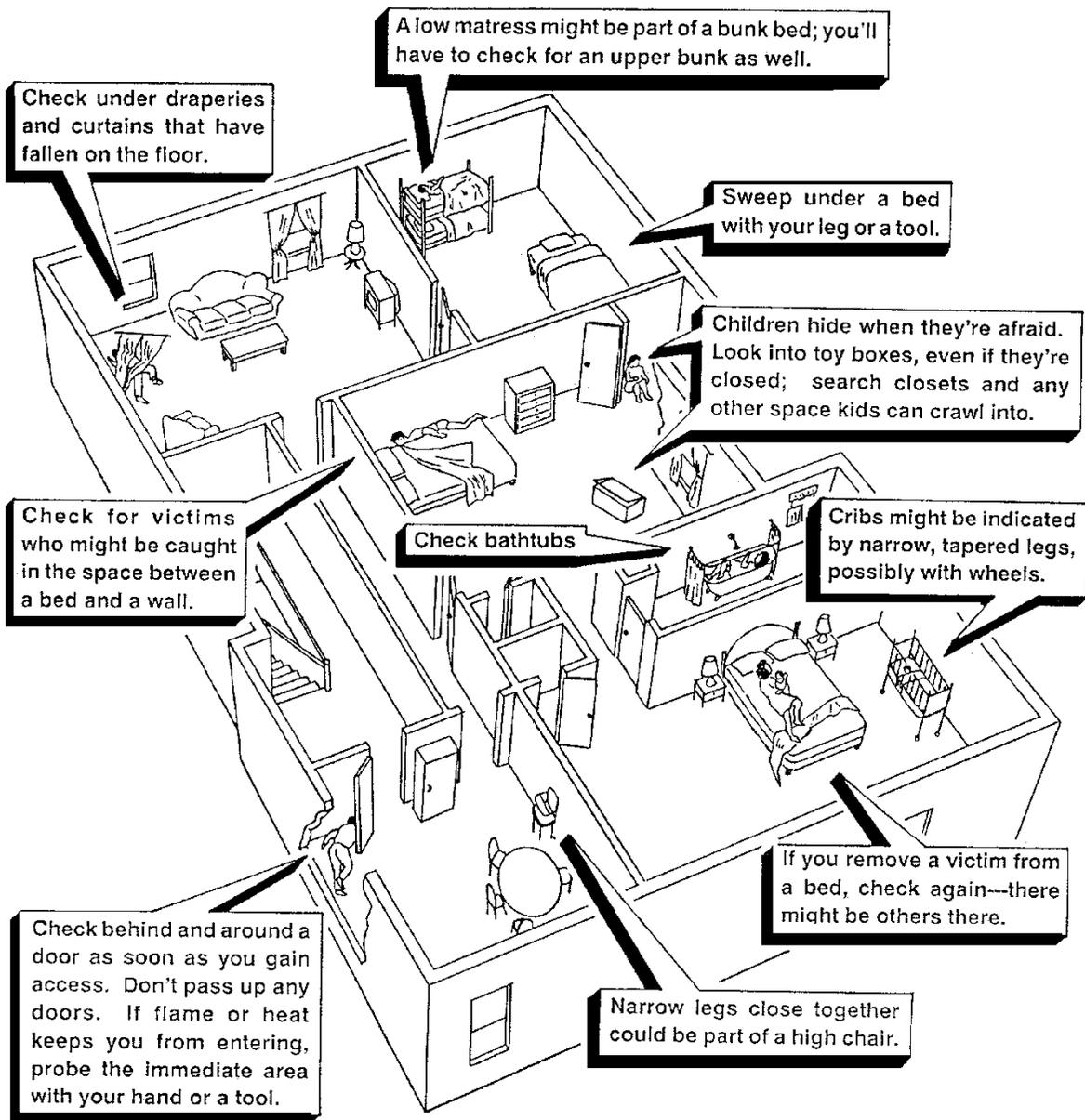
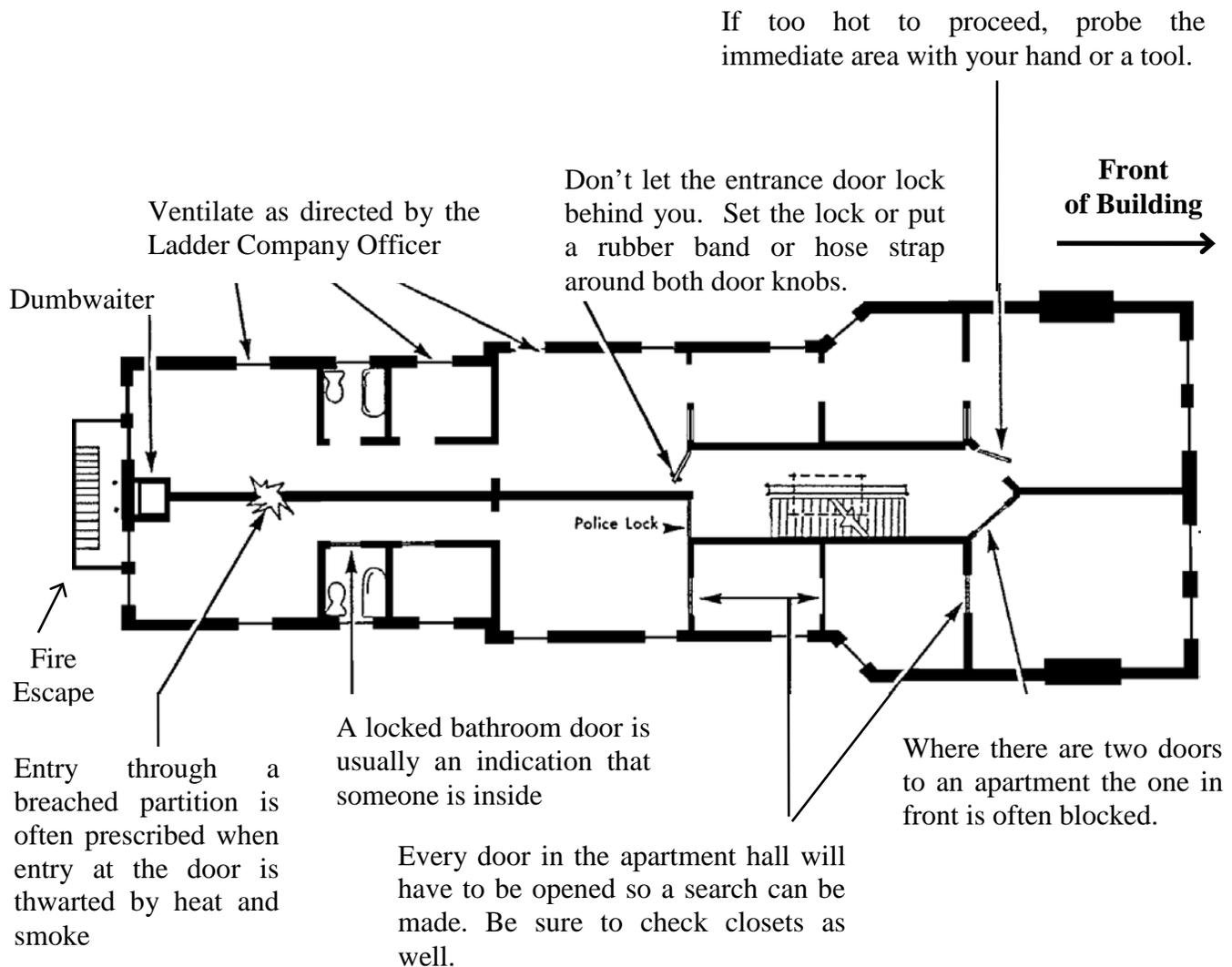


Figure 2
SEARCHING HINTS
Typical Tenement Floor Plan



Escape Routes

Proper operation at an intense fire in an Old Law Tenement generally requires that a part of the operating forces be in severely exposed positions if we are to properly perform our search and or rescue mission. The fire condition also requires the ladder chauffeur to remain in front of the building with his/her apparatus anticipating the location of other members and be prepared to position the aerial ladder to provide egress for them when necessary. This, in addition to the member's other previously assigned duties. If early extinguishment is not accomplished, these members will have to withdraw by means of interior stairs, fire escapes or ladders. When these means of escape are cut off an emergency means will have to be considered, such as breaching a wall or partition to an uninvolved area or to a safe means of egress.

In Old Law Tenements, the infrequently used procedure, of going from front to rear apartments or vice versa through the common partition may also be used as an escape route.

To accomplish this:

1. Use the halligan, hook or axe. This is the order of preference but all can do the job.
2. Start low. Punch a hole slightly below waist level.
 - This places hole under possible fire stopping between studs
 - Work is less punishing at this level
 - It is easier to push the opposite side of the wall off the studs
3. The tool is placed in a bay with the bottom anchored against the opposite side of the partition. The firefighter then pulls the tool towards themselves using short strokes to snap the lath off on their side. Best results are obtained when the opposite side is kept intact until near side is completely removed.



4. With the sole of his/her boot, the member can kick the lath off the far side of the bay
5. The member then uses the Swim Move or the Reduced Profile Maneuver and quickly moves through the opening.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

OVERHAULING

THIS PAGE WAS INTENTIONALLY LEFT BLANK

OVERHAULING

The term overhauling shall include any opening up of walls, ceilings, partitions, voids, etc. while checking for extension or to extinguish fire during the pre-control as well as during the post control phase of operations. Proper overhauling will expedite final extinguishment and minimize damage to the structure and its contents.

PRECONTROL - Search for fire and extension which takes place up to the point where the fire is under control. Pre-control overhauling begins as soon as possible after the fire has been knocked down.

POSTCONTROL - The continued operation that takes place after the fire is under control to ensure that there is complete fire extinguishment.

FIRST ARRIVING LADDER COMPANY (FIRE FLOOR)

1. After the fire has been knocked down it is the responsibility of the first ladder company to arrive to determine if the fire is extending and where it is extending. This information should be transmitted to the Incident Commander and the ladder company on the floor above.
2. The ceiling should be opened first by starting at a point where the fire was most intense and working towards a clean area of ceiling space. The ceiling light fixture area should be pulled and examined.
3. Any horizontal or vertical voids, whether pipe recesses, electrical conduits, channel rails, etc. are found once the ceilings and walls are opened must be examined. If fire has extended, this information should be transmitted to the Incident Commander and to the ladder company on the floor above.
4. Fire that is found in ceiling bays or adjacent to steel beams that cross over partitions separating other uninvolved rooms or apartments must be inspected by pulling ceilings.
5. *Boxed out protrusions:* These boxed out voids can contain pipe risers, electric conduit, chimney flues, steel columns or sealed dumbwaiter shafts which run from the ceiling to the cockloft.
6. *Steel Columns:* Steel columns and beams can be found in N.L.T. or O.L.T. Boxed out areas around a steel column create a natural void. If a boxed out protrusion on a wall contains a steel column and was involved in fire, then the entire length of this void will have to be examined. Particularly its highest point, the cockloft, will have to be inspected. Also, burning embers can easily drop down this void and start a fire on the lower floors.
7. *Closets:* Their construction on top of one another provides a vertical artery. Workmanship can be shoddy, creating openings for fire travel. They should be checked for voids.

8. *Walls:* Wall switches, receptacles and fuse boxes (circuit breakers) are locations for fire to enter and travel. Especially when burning furniture is against the wall.
9. *Floors:* The flooring in the fire area must be checked. If the flooring is charred, the ceiling below should be examined for fire extension.

NOTE: There may be no subflooring in O.L.T.'s. This may allow fire to extend rapidly up and down.

OPENING UP CONCEALED SPACES

1. THE 6' HOOK.

A. *Pulling ceilings (Figure 1)*

Beams in Old Law Tenements generally run parallel to front and rear walls. Lath is attached at right angles to the beams and runs front to rear. Each piece of lath usually covers two or more bays. The ceiling is penetrated with one firm stroke with the hook end parallel to the lath. This breaks only one lath on the upstroke instead of two or three. The hook is then turned to form a right angle to the lath and the ceiling is pulled with short, sharp strokes close to the beam. This method is fast and conserves energy. The firefighter should not stand directly below the ceiling being pulled. They should keep the work in front of them. In close quarters firefighters shall keep their heads down to prevent injury. Eye shields shall be used.

NOTE: When pulling sheet rock ceilings, be aware they may fall in large heavy sections.

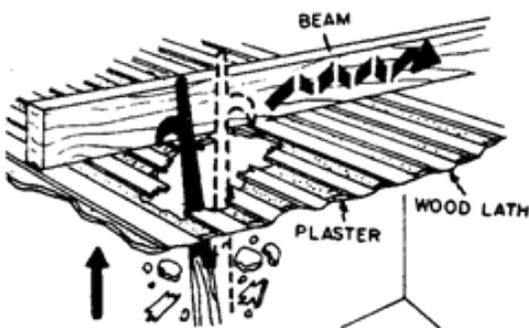


Figure 1

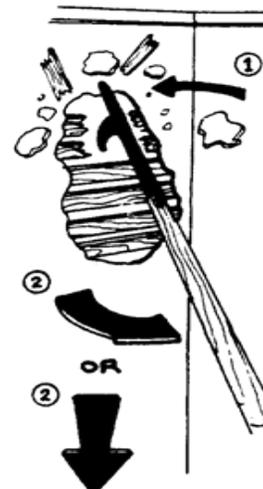


Figure 2

- B. To make a hole high in a sidewall or partition of lath and plaster (**Figure 2**). This requires a sharp blow with the hook. After penetration with the hook, the tool is used to pull down or pry out if leverage is possible.

Figure 3

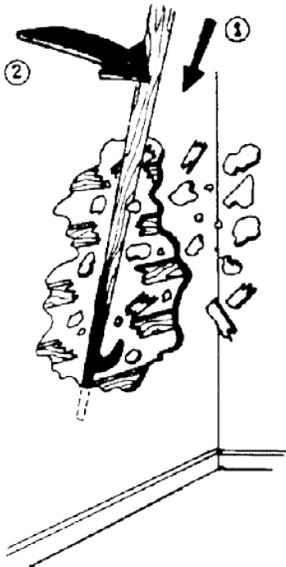


Figure 4



- C. To make a hole low in a side wall or partition (Figure 3). The hook is held like a javelin before penetrating the wall. After an opening has been made, the hook is then pushed down behind the lath and the lath is removed by pulling the handle. This should open the wall to the floor or baseboard. When prying with the hook, excessive strain which may break the wooden handle must be avoided.
- D. Use the handle of the hook, or the point to make small probing holes to check for extension or to allow water to flow out as opposed to pulling (Figure 4).

TRIMMING A WINDOW OR DOOR

The complete removal of a window frame is seldom required. They are generally set into the brickwork and extension from them cannot occur except to a space between the plaster and the side wall of the building. Similarly, extension around a door frame is usually limited to the space between the door frame and the studs forming the rough opening.

The trim around windows and doors is put on last during the construction stage and should be the first pieces removed if examination is required at these points. Removal of the trim is generally sufficient to allow an adequate examination and application of water.

Depending on the tool being used, the most efficient and safest way to remove the trim is to start at the top or bottom corner or joint and work along prying the molding out from the wall.

OPERATIONAL NOTES

All members should have a working knowledge of construction features so that they will be aware of the avenues of fire travel, exposures and the simplest manner of opening up for examination, i.e. the trim around windows and doors is put on last during the construction stage and should be the first pieces removed if examination is required at these points.



EMERGENCIES

OBJECTIVE:	<ul style="list-style-type: none">• To make members aware of the nature of the most commonly responded to emergencies.• To instruct members on how the FDNY handles those emergencies the care and maintenance of fire hydrants
CONTENTS:	<ul style="list-style-type: none">• Water Conditions• Steam Conditions• Electrical Emergencies• Natural Gas Emergencies• Oil Burner Emergencies• Vehicular Accidents• Subway Emergencies• Miscellaneous Emergencies
SOURCE:	<ul style="list-style-type: none">• FDNY All Unit Circulars• FDNY Training Bulletins
FDNY REFERENCE:	<ul style="list-style-type: none">• A.U.C. 207• TB Emergencies 2,3

THIS PAGE WAS INTENTIONALLY LEFT BLANK

EMERGENCIES

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	WATER CONDITIONS	1
2	STEAM CONDITIONS	9
3	ELECTRICAL EMERGENCIES.....	10
4	NATURAL GAS EMERGENCIES	13
5	OIL BURNER EMERGENCIES	17
6	VEHICULAR ACCIDENTS	18
7	SUBWAY EMERGENCIES	20
8	MISCELLANEOUS EMERGENCIES	47
9	CONCLUSION	50

THIS PAGE WAS INTENTIONALLY LEFT BLANK

Most of us, before we became firefighters thought that the Fire Department responded only to fires. In reality we are present at every type of emergency situation that occurs in New York City. These responses account for 21% of our turnouts- and in recent years 38% of the work we do is of an emergency nature. The percent of people saved at emergencies from injury, death, discomfort and even fire is probably higher than those aided at fires.

The Fire Department does not advertise but the public relies on us to solve any problems they feel are dangerous to themselves, their families or property. Firefighters react to this with the knowledge that often at inconvenient times, in inclement weather and without any thanks we are professionals capable of remedying any solution. To enhance this ability we continue to study those problems we may encounter.

1. WATER CONDITIONS

1.1 GENERAL OPERATIONS

- ◆ Determine the source of the leak and locate the corresponding water shut off valve. Locate water shut-off: Possible shut-off' locations include:
 - on the wall near the ceiling of the apartment directly below.
 - on riser line of apartments in basements.
 - Still no shut off; then locate where main enters building. Usually near front building wall. (Often in a corner.)
- ◆ Pipe is coldest pipe in building and may also have condensation on outside
- ◆ Listen for sound of running water.
- ◆ Feel vibration.
- ◆ Armored ground cable may be attached to main from electric meter.
- ◆ Once valve is located, shut off clockwise.
- ◆ If water has leaked into an electrical fixture, turn off power at the fuse box or circuit breaker.

1.2 WATER CONDITIONS: WATER LEAKS

- ◆ Toilet Bowl Leaking.

It is 3 a.m. and your unit is called to an apartment where water is leaking into a light fixture from the apartment above . We may have to disconnect the light fixture or pull the fuse as well as shutting off the water.

Possible action to stop leak.

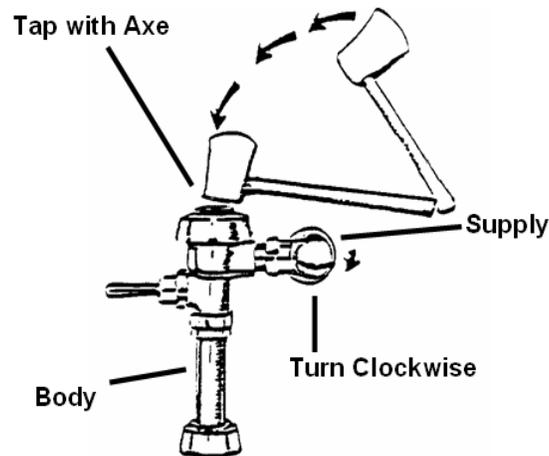
- Depends on type but generally if the ball in the water tank can be raised it will stop flow.
 - Sometimes under the tank a shut off handle is situated. Turn clockwise.
- ◆ Flushometer Stuck:

Possible action:

- Shake handle.

- Tighten large fitting which is either serrated on edge or hexagonal in shape. Often they can be sufficiently tightened by hand to stop flow. This fitting is in supply elbow.
- Tap with flat head of axe gently. This may reset valve in flushometer body.

FLUSHOMETER

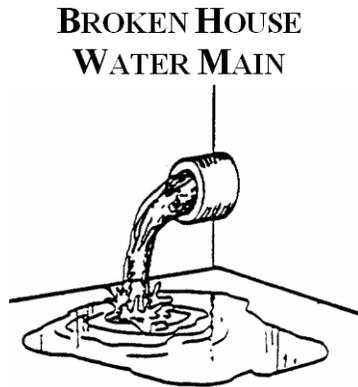


◆ Leaking Sinks.

Possible actions:

- Locate handle under sink.
- Turn clockwise.

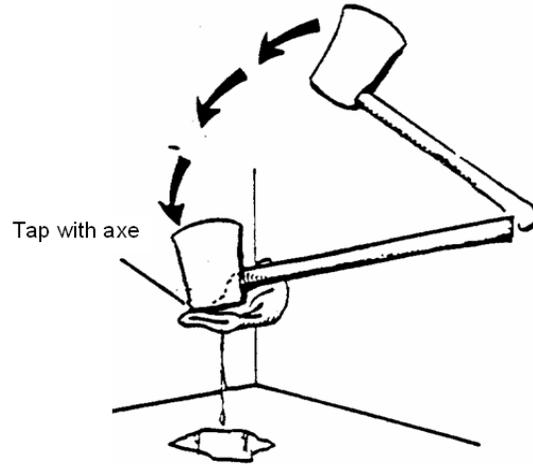
◆ Broken Pipe or Leaking Pipe.



Possible actions:

- If shut off handle is accessible turn clockwise.
 - If inaccessible and tubing used then simply crimp until flow stops.
(Use pliers, tap with axe, etc.).
 - For non malleable metal use tapered piece of wood (shaved chock, pencil, chair leg, golf tee, etc).
 - An emergency patch on a pipe can be made with a piece of rubber inner tube and held with duct tape, rubber tape, clamp or coat hanger wire, etc..
 - A screw plug can be used with a rubber gasket on pipes or water tanks.
 - The packing nut may need tightening in a clockwise direction. Do not overturn.
- ◆ House Main.
- Frequently broken by scavengers collecting mungo for resale.
 - Action must be taken to stop water flow.
 - Malleable pipe (copper, lead): Strike with maul or flat head of axe until sufficiently closed to stop water flow.

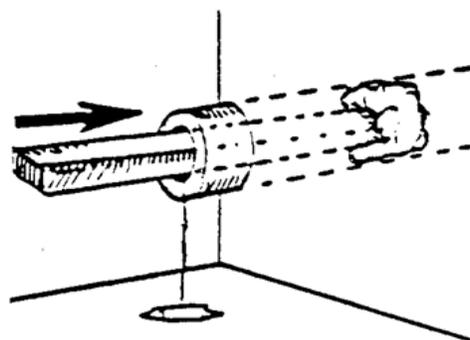
FLATTENED WATER MAIN



- Not Malleable: Insert rounded end of stick, chock, pencil, chairleg, etc. to be used as a plug.

NOTE: It is sometimes helpful to use cloth on end of wood to aid in sealing.

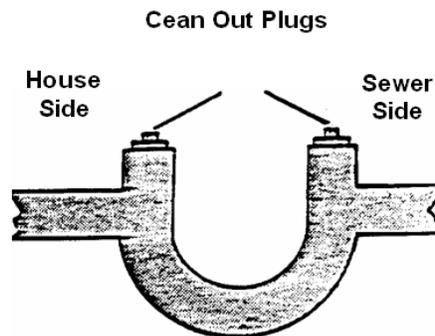
PLUGGED WATER MAIN



1.3 WATER CONDITIONS: FLOODED BASEMENTS

- ◆ Occupied building.
 - May cause problems with oil burner in building or in an adjoining building. Children may be playing in area and could possibly be drowned.
 - Actions to be taken:
 - If location of drain is known then clear surrounding area of debris and if possible channel flow towards drain. Look near shower or basement sink for drain if location of drain is unknown.
 - Remove the toilet bowl. This action will provide drainage. A screen or wire basket will keep out debris.
- ◆ Vacant building.
 - Same actions as occupied building
 - Break into cast iron waste pipe at most convenient location with Halligan and axe to permit water to escape. This location can be at ceiling level depending on water depth.
 - Remove clean - out plug of waste pipe.
 - Open the street trap on the sewer side.

WASTE PIPE

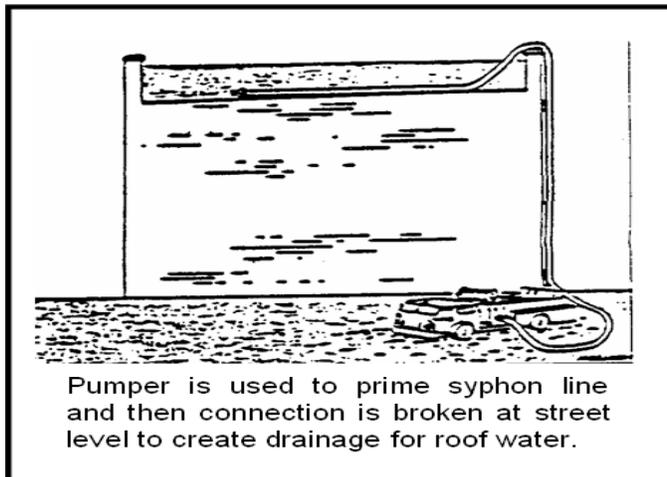


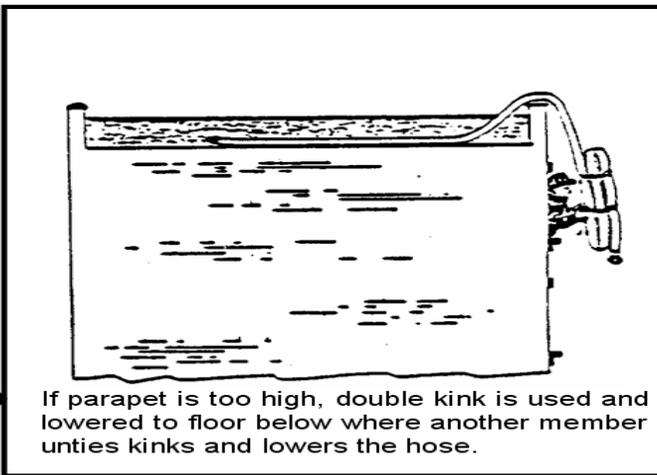
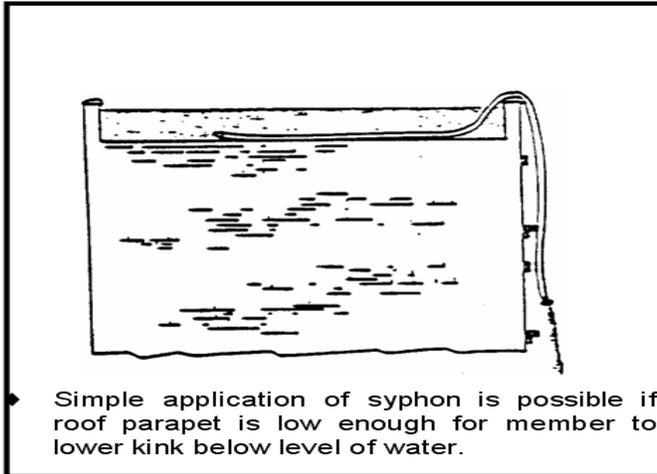
CAUTION

Avoid areas of basements where electrical power may be on.

1.4 WATER CONDITION: Flooded Roofs

- ◆ Actions to be taken:
 - DO NOT CLEAR ANY BLOCKAGE WITH HANDS!!! Member's arm can be drawn into drain. Deaths have resulted. Actual suction pressure can be quite high.
 - Clear blockage with 6' hook or applicable tool from drain or scupper.
 - Using hose.
 - Stretch entire length under water and allow to fill.
 - Kink one end.
 - Drape edge over parapet extending below roof level.
 - Release kink.
 - Bring booster line to roof.
 - Charge line and open nozzle.
 - Place under water.
 - Shut down pumps and disconnect line at street.
 - Allow to drain.



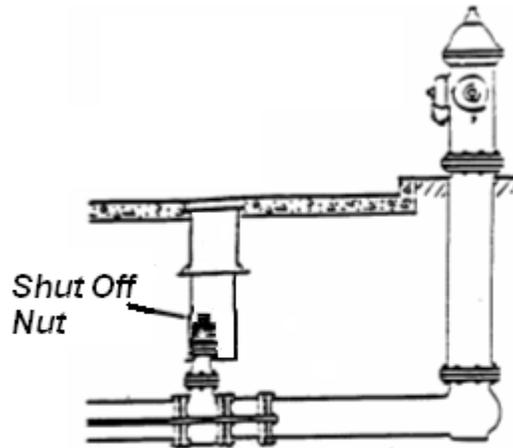


Alternate possibility: remove a brick at a low point on a parapet wall which will serve as a scupper.

Each sq. ft. over 12" deep weighs 62 pounds. Use as few members as practical on the roof.

1.5 WATER CONDITION: OPEN HYDRANT

HYDRANT STREET SHUT OFF



**Turn Hydrant Wrench
Counterclockwise
17 turns to shut**

◆ Hydrant shut down.

Action : Operating Nut

- Turn operating nut counter clockwise.
- Avoid contact with other metal objects when operating hydrants that are close to trouble in underground electrical services, or, when possible, avoid using hydrants close to trouble in underground electric services.

◆ Street shut down.

Action:

- Remove plate (sometimes difficult).
- After cover removed, you may have to direct some water to clear chamber of mud and debris.
- Place wrench on fitting (this is not always easily done) and turn counter clockwise 17 times.

NOTES:

1. To facilitate operation water may have to be diverted by board, garbage can cover, etc.
2. Not until about 12 full turns is there a noticeable decrease in flow.
3. Nut is usually found off center on the street side of the chamber.

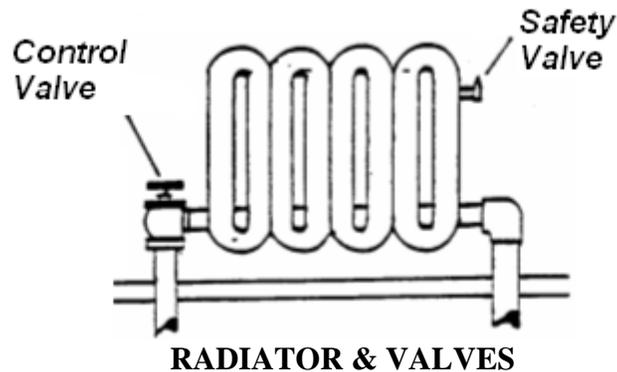
2. STEAM CONDITIONS

2.1 Radiator

Safety Valve blown off

Action:

- ◆ Shut down flow at the valve handle by turning clockwise
- ◆ Replace safety valve or plug with a wooden plug wrapped in cloth, tapping it in until secure.



2.2 Flow valve blown off.

This is usually due to numerous operations of on and off flow. Generally it will be nearby and undamaged.

Action:

- ◆ Make certain flow handle is in open position (this is important).
- ◆ Replace fitting to open piping by turning nut on in clockwise direction.
- ◆ After restoration of flow valve it may be turned off or on as necessary. The use of a compound or sealant on threads may be beneficial in obtaining a seal. Crayon, string, cotton thread or wax may be used.

NOTES:

1. Wear gloves.
2. Place towel over main valve to divert steam flow while resetting valve.
3. It may be necessary to shut steam off at boiler.

3. ELECTRICAL EMERGENCIES

3.1 OVERHEAD ELECTRICAL SERVICE EMERGENCIES

When live electrical wires fall, they constitute a hazard to the public as well as responding firefighters. It is essential for the Officer of the responding unit to make a careful assessment of the risk to both civilians and members.

All Fire Department units are to treat downed wires as live wires until an on scene utility company representative confirms that the wires have been de-energized. There is currently no safe way for FDNY personnel to move energized power lines, even if it presents a condition imminently dangerous to life.

Members shall not take any actions relating to removing electrical wires from people and/or vehicles until wires are de-energized by the utility company.

Do not attempt to remove occupants from vehicles in contact with wires until wires are de-energized by the utility company.

Do not attempt to move wires with any hook or rope.

3.2 WIRES DOWN IN THE STREET

3.2.1 Immediately upon confirming that live electrical wires are down and are creating a situation that places life in danger:

3.2.1.1 The first arriving unit must contact the Fire Department Dispatcher via Department radio indicating that life is in danger. Specify the location (address, pole number) of the downed wires, and request forthwith power removal and priority response by utility company.

3.2.1.2 Request response of Battalion Chief if not already assigned.

3.2.1.3 Responding Battalion Chief shall also contact the Utility Company Electrical Operations Center directly by cell phone indicating that life is in danger and request priority response. These telephone numbers are found on the Con Edison notification cards distributed to all Chiefs Officers.

3.2.2 In situations involving live electrical wires, which are down but do not present an imminent life hazard, the Department can only guard against the hazards of fallen wires by isolating the area, notifying the utility company, and standing by until a utility company crew responds. It is the utility company that will correct the problem.

In either of the situations listed above, the following actions shall be taken:

Immediate notification to the dispatcher/utility for priority utility company response.

Isolate the area.

Keep apparatus away. Overhead wires are supported by poles, which could possibly topple in a domino effect, thereby endangering members if they are within the area of possible pole collapse.

Check nearby buildings for heat at fuse box/electrical service entrance box. Utilize thermal imaging cameras as hand contact may result in electrocution if the box is energized.

Caution civilians trapped in vehicles with an electrical line over it to remain in their vehicle until the wires are de-energized by the utility company.

Stretch line with fog nozzle. Use distance as a safety factor. Keep at least 25 feet away from any downed wire while operating this handline.

The following are additional guidelines for the safety of all members:

Fallen or hanging wires are not to be moved by members.

Avoid metal gratings, manholes, fences, puddles, wet grass, etc.

Highly energized wires often whip and snap while producing sparks.

The ground immediately near a fallen wire may be energized (voltage gradient) causing injury or death to anyone approaching the downed wire.

Do not place weighted objects on downed wires. This may cause the wire to make substantial contact with the ground and produce arcing and whipping as well as produce a voltage gradient in the immediate area.

Do not open the house service. Heated wires may generate carbon monoxide gas in the service box, which can explode when the opening of a breaker creates a spark.

3.3 POWER STATION / SUBSTATION EMERGENCY:

◆ ACTIONS TO BE TAKEN:

Place a priority call to the Fire Department dispatcher for power removal. Be sure to request that ALL electrical equipment at the station be deactivated and request the immediate on site response of a utility company representative. All electrical equipment at the station/substation is to be considered energized until verification of power removal is made by the on site utility company personnel.

- Unless human life is in jeopardy, do not enter substation until arrival of power company representative.
- Do not under any circumstances bring metal ladders or metal tools inside of gate of generating station.
- Do not enter fenced off areas without power company representative.
- No ladders, metal or wood, should be supported by metal superstructures.

NOTE: The metal overhead piping in a substation or rectified station are "bus bars" and carry high voltage and/or amperage. These may arc up to 18 feet.

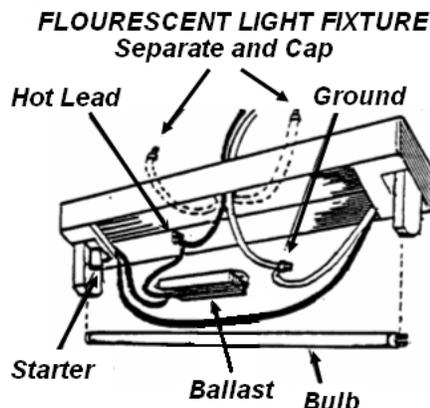
3.4 OVERHEATED BALLAST:

◆ Fluorescents:

- How to identify.
- Smoke emanating from fixture.
- Smell
- Flickering light.
- Partial or complete darkening of bulb.
- Presence of heat.

◆ Actions to be taken:

- Shut off power.
- Remove bulb.
- Remove cover panel.
- Disconnect wires to ballast (black box) and remove same.
- Isolate black and white power wires and cover exposed ends with caps or tape. Keep apart.
- Check for any fire or smoldering in ceiling.
- Overheated fluorescent ballasts may leak PCB-contaminated oil. SCBA must be used while performing the above operations.



4. NATURAL GAS EMERGENCIES

4.1 General precautions:

Gas leaks are a common emergency in New York City. When called to a gas leak take the following precautions:

Confirm the nature of the “gas” leak: is it natural gas, propane, or gasoline?

- ◆ Extinguish all sources of ignition.
- ◆ Ventilate the area if necessary. Be aware that if the gas/air mixture in the room is too rich to burn, it will pass through its’ flammable/explosive range as you ventilate.
- ◆ Shut off the gas supply
- ◆ If the gas leak is at an appliance, the gas feed to the appliance should be shut off. If that is not possible or the leak is elsewhere, then the gas supply to the apartment or building must be shut down.

4.2 Priority Order of Gas Valve Closure :

4.2.1. Appliance Valve

Usually located behind or alongside the natural gas appliance and connected by hard piping or flexible metal tubing. The appliance may have to be moved to access it. Be careful not to damage plumbing on appliances connected with rigid pipe.

Most natural gas shutoffs are of the ¼ turn variety and can easily be shut off using the fork end of a Halligan tool (Figure 1) ,vice grips or pliers to turn the wing cock valve ¼ turn counter-clockwise. Exercise caution when using the Halligan tool to shut the valve as too much force could result in a new gas leak at the valve location.

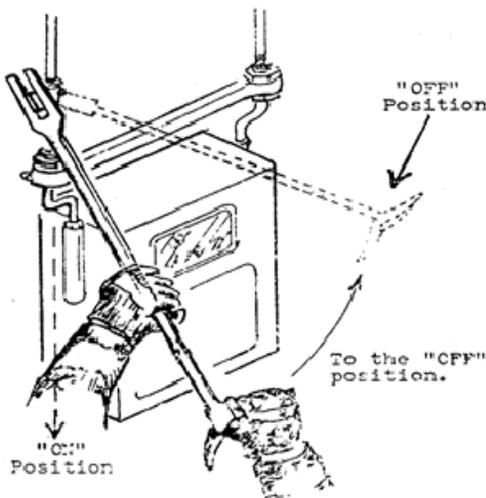


Figure 1

Note: When the key operating nut is parallel to the piping, it is in the open position. When it is perpendicular to the piping, it is in the closed position. (Figure 2)

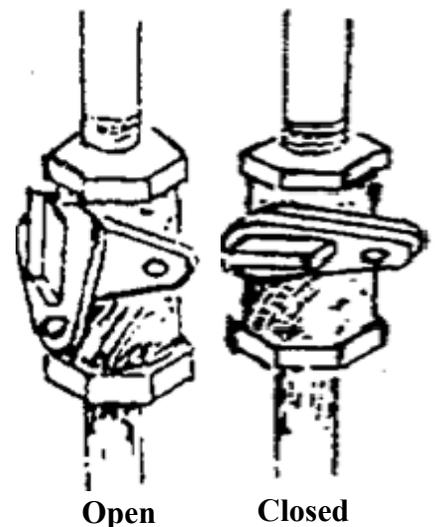


Figure 2

4.2.2 Interior Gas Riser Valve

If the appliance valve is defective or the leak is on the supply side of the appliance valve, check for the presence of an Interior Gas Riser Valve in the basement/cellar near the ceiling. This is a ¼ turn valve similar to the appliance valve and will disrupt less service than closing a Master Meter Valve would.

4.2.3 Individual Meter Valve

Each occupancy may have its own meter and natural gas supply can be controlled using the ¼ turn valve at this meter. This will shut the gas supply to the affected occupancy.

4.2.4 Master Meter Valve

A Master Meter Valve may control the flow of natural gas to just a few appliances (i.e. in a private dwelling), or to many appliances (i.e., in an apartment house). When possible, avoid shutting the Master Meter Valve if it supplies many occupancies/appliances. A Master Meter may have a second Master Meter adjacent to it. This second meter is used in the event of a malfunction in the primary Master Meter in use.

4.2.5 Head of Service Valve

Building Service Valve: This valve is found just inside of the building where the natural gas service enters and will usually be a ¼ turn valve. When the meter or meters are located outside, the valve will be before the meter(s).

Exterior Gas Riser Valve: Exterior Gas Riser Valves are ¼ turn valves located on the natural gas riser outside of the building, before any exterior meters. All external meter installations will have a riser valve installed prior to the meter. Each meter also has its own shut-off valve (meter valve).

4.2.6 Curb Valve/Service Valve

Although the FDNY is authorized to shut curb valves/service valves, it should only be done as a last resort and in consultation with the Utility Company. Many valves are old and require skill to shut to avoid breaking the valve.

The curb valve/service valve is usually found on the sidewalk side of the curb and shuts the natural gas supply to the entire building. It is generally recessed in from the curb, but may be in the street. It is usually covered with a 4" X 4" square or round, brittle concrete or steel cover which may be sitting on top of a plastic or wooden plate. To shut the valve, remove or break the cover and plate. (See Figure 3 and Figure 4)



Figure 3

To operate the valve break the concrete covers remove the pieces and the wooden shelf, and use the gas key which has been supplied to the various units.

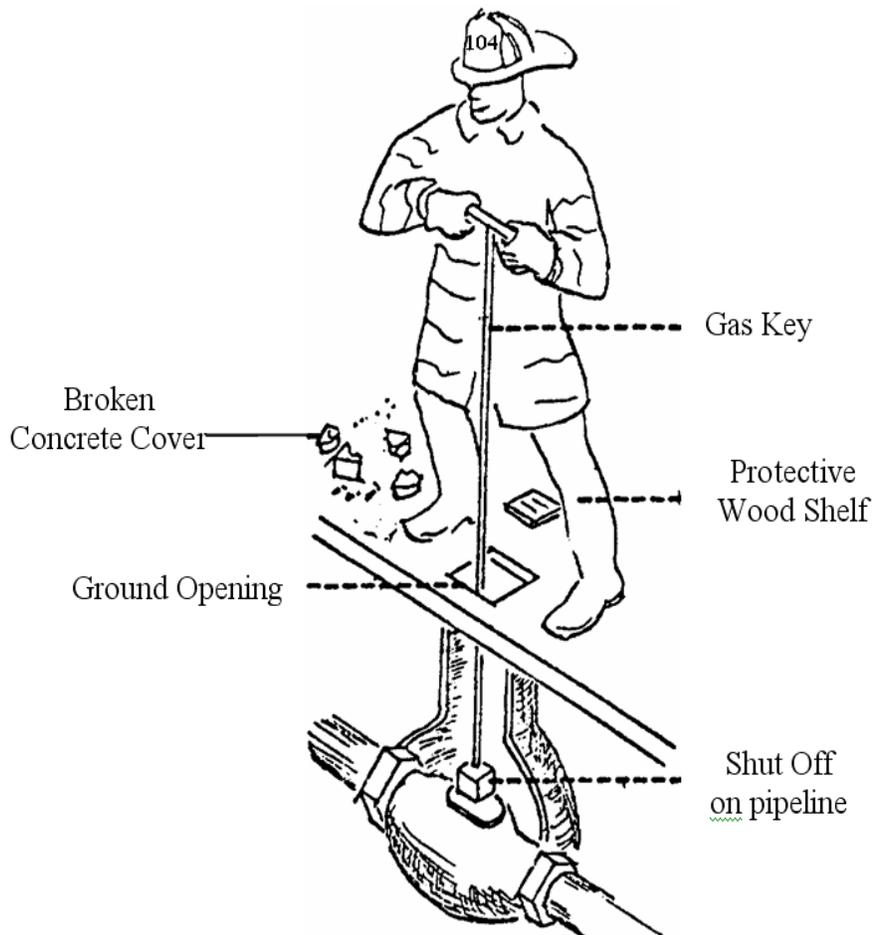


Figure 4

IMPORTANT: When Fire Department personnel shut off a utility, or find a utility shut, they are not to turn the utility back on! The utility company must be notified to restore service.

4.3 Gas Leak Kitchen Stove:

- ◆ Check that stove is not on.
- ◆ If stove off then locate butterfly on piping or tubing at rear. Turn until butterfly is perpendicular to flow of gas pipe (¼ turn.)

Occupant needs utility company check stove and restore gas.

NOTE: A liquid detergent brushed on area of suspected leak will bubble if gas is leaking.

4.4 Gas Leak In Ceiling Around Light Fixture:

- ◆ Causes:
 - Usually occurs as the result of the occupant removing the plug in the old gas supply line when installing a new fixture.
 - It can also occur because repairmen only used wax as a plug when gas line use was discontinued, and this wax either melts or deteriorates over a long period of time causing a leak.

- ◆ Possible actions:

- Make certain area is ventilated.
- If he has removed cap then replace same. If he has sawed into pipe then shut off at service to apartment which may be in the apartment or in basement.

NOTE: Service entrance is where gas, electric and water enter building.

- Occupant requires Brooklyn Union Gas or Con Ed to restore gas. Under no circumstances should units restore service as there may be open pilots or burners on elsewhere.

WARNING:

Gas piping is of small diameter and there is a possibility of it being energized through faulty electrical connections. i.e., Someone may be inadvertently using pipe as a ground.

4.5 Gas Boiler Residential

Identification metallic odor caused by overheating when aquastat or low water cut-off is not functioning. Sides of boiler can be cherry red. Boiler needs water. DO NOT ADD. The boiler must cool down first.

- Locate gas shutoff at either boiler or at service entrance. Turn perpendicular to piping (1/4 turn)
- Occupant needs Brooklyn Union Gas or Con Ed to restore gas

5. OIL BURNER EMERGENCIES:

Often on arrival you have a heavy odor or visible smoke on scene which is usually caused by delayed ignition.

Actions to be taken:

5.1 Methods of disconnecting electric power:

- ◆ Shut off electric power by use of oil burner remote control. Oil burner remote control is generally painted red and generally located at the following locations:
 - In a private dwelling at the top of interior cellar stairs.
 - In an old law tenement, brownstone or frame building at the top of the interior cellar stairs.
- NOTE:** At above locations listen for sound of burner going off as switch may be for lights.
- In a new law tenement or apartment house outside of the oil burner room.

NOTES:

1. Be alert to other locations for switch especially if there is a commercial occupancy on street floor.
2. It is helpful to turn on lights if possible.

- ◆ Fuse box.

- Remove fuse.
- Pull knife switch.
- Switch off circuit breaker.

NOTE: Box is usually marked "oil burner." Power line can also be traced from oil burner or switch.

- Ignition component at boiler: Remove cover from component and place non-conductor between contact points. (Small piece of wood, plastic, rubber, cardboard, etc.

5.2 Fuel shut off:

- ◆ At tank (all tanks have shut off).
- ◆ At oil burner (with 275 gallon tanks).
- ◆ On preheat or #6 oil, turn gas off to preheater (1/4 turn) and also the electric.

- ◆ On boilers with larger than 275 gallon tanks there may be a shut off on the feed line near the filter.

Caution: There is a very real danger of the flexible, thin wall gas line tubing to the preheater melting or being disconnected. The gas/air mixture ignited by the heat of the oil burner can result in an explosion in which members have been injured.

6. VEHICULAR ACCIDENTS:

Actions to be taken.

- 6.1 Rope off and clear area.
 - 6.2 Chock vehicle.
 - 6.3 Keep apparatus out of immediate area.
 - 6.4 Stretch and charge a line into position to protect a trapped victim.
 - 6.5 If gasoline is leaking then battery should be disconnected, ground cable first. At times, hoods, batteries and trunks are destroyed for no viable reason. Try to locate key.
 - ◆ Hydrogen is evolved when electric storage batteries are being charged. When a firefighter attempts to disconnect a battery with a large metal tool he can accidentally short the two terminals. The resulting sparks can ignite the hydrogen in the battery causing it to blow apart.
 - ◆ Shorting terminals is not the only way to produce a spark. Connecting or disconnecting terminals can also create sparks. Turning off all current drawing devices in the vehicle before disconnecting the battery will eliminate sparking. It would also be safer to disconnect the grounded terminal first and to use a tool small enough to avoid accidental contact across the battery terminals.
- Note:** Some cars have two batteries (Diesels) and some have battery in trunk.
- 6.6 Prevent movement of vehicle if victim is trapped.
 - 6.7 Do not forcefully pull victim free as it may aggravate the injury. An examination for bleeding and fractures should be made.
 - 6.8 Prevent smoking at scene if gasoline is leaking or oxygen being used.
 - 6.9 Request police for traffic and crowd control and EMS if services are required.
 - 6.10 Special units can be called for their use of emergency equipment (Saws, Hurst Type Tool, etc.).

Catalytic converters can reach 2000° F, well above the ignition temperature of leaves, grass, etc.. This must be considered when working near overturned vehicles or using air bags. These high temperatures can cause severe burns and/or damage air bags.

Note: If vehicle is to be towed, use a chain. A cable will store kinetic energy and if cable snaps serious injuries can occur. If a link snaps there is no violent whipping action.

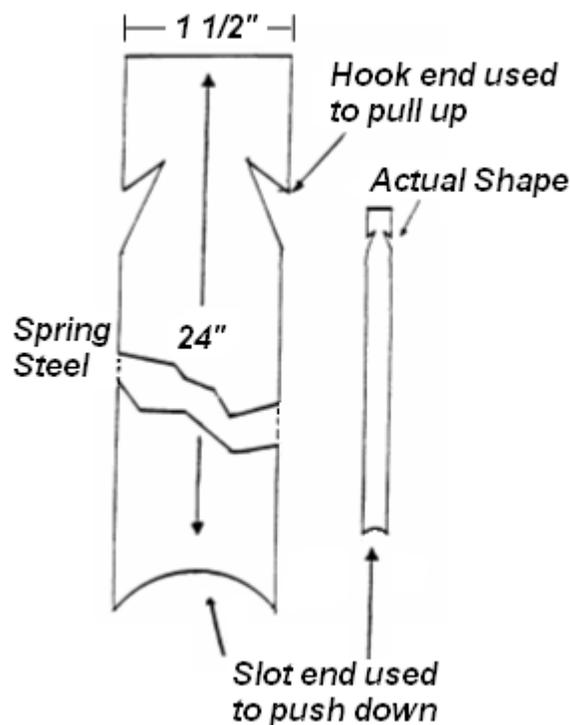
6.11 If necessary to open car door consider the following:

- ◆ Try to obtain key.
- ◆ Use coat hanger to raise lock button or door handle.
- ◆ Use a "slim jim" (slim jim to be used only in emergency and is used as follows:)
 - Insert tool between glass and door panel.
 - Depending on make of car we either pull up with hook end or push down with slot end on activating arm or rod to release lock.

NOTES:

1. Aim for lock area
2. This tool requires practice and knowledge of the location of locks on different cars. When used properly it saves much unnecessary damage. Some cars can be opened quicker than with a key.

SLIM JIM



7. SUBWAY EMERGENCIES:

This Department on many occasions will be called upon to operate in the track areas of numerous subway and railroad systems that serve all areas of the City. Fires and emergencies will occur on the elevated portions, in open cuts, in tunnels or stations. There are general hazard prevalent in all systems, and some hazards peculiar to the particular system.

Fire Department personnel will never be permitted to operate on track areas unless assured that the power is off. This rule may be ignored only if life is in imminent peril and direct and immediate action is required to save life. In the latter instance every possible precaution should be taken to minimize the risk.

Types of Incidents:

- ◆ Fire in Station
- ◆ Fire on Track
- ◆ Fire in Car
- ◆ Emergencies – Medical
- ◆ Fire Related (Smoke-Panic)

Unit Operations

- ◆ When conditions do not require power removal, reconnaissance may be conducted by an Officers and a firefighter operating as a team and only from platforms or catwalks. Tracks shall not be entered or crossed.
- ◆ Engine Companies shall not connect to a hydrant until the fire is located.
- ◆ Many operations will require more than one engine company due to long stretches. All efforts will be concentrated on stretching and placing in operation the initial line before back up lines are ordered.
- ◆ Whenever possible, small railroad tie involving ties of an elevated railroad shall be handled by handlines operated from the street below.
- ◆ Most fires in a station are of a minor nature, e.g. rubbish fire in trash receptacle, papers on railroad ties, or overheated ballast at station lights. These fires will usually be controlled by a can.
- ◆ When a fire is located under the platform, members will not be permitted in track area unless:
 - Power is removed.
 - Confirmation of power removal by F.D. Dispatcher.
 - Members are posted at each end of platform to act as safety people.
 - An alternate area of refuge is assured in case of train movement.

7.1 Handie-Talkie Subway Relay

Handi-Talkie Relay: In underground areas, handi-talkie communication with the surface will be adversely affected. A relay system shall be set up to overcome this. Handi-talkie communications are poor from level to level. Communications in a straight line are from fair to poor. Some subway stations have multiple levels underground, which will require additional handi-talkies. The objective is to keep radios within range of each other to be able to communicate to grade level. An engine and truck can set up a relay with 2 to 6 members. The members who are part of the communications relay must maintain their position throughout the operation until relieved by the Incident Commander.

Truck Chauffeur	Bottom of subway entrance stairs. If the token clerk booth is within 50 yards of stairs to street, contact train dispatcher through the clerk. (There is a telephone in the token clerk's booth. Try to obtain additional information for the Company Officer and Incident Commander). The LCC should relay the token booth phone number to the Truck Officer in case it is necessary to call the booth from a blue light telephone.
Outside Vent FF	The foot of the stairs leading to the platform if it is within 50 yards of the Chauffeur.
Roof FF	Approximately 50 yards from the stairs on the platform for relay.
Engine Officer	Approximately 100 yards (line of sight) from Roof FF on the platform.
Truck Officer	To location of the fire.

Additional HT equipped members every 100 yards, if necessary.

7.2 Colored Light Globes in Subway Entrances

- ◆ New York City Transit Authority has installed colored light globes in the post lights at street entrances. The colored globes indicate entrance availability.
- ◆ There are two globe colors being used in these entrances:
 - GREEN Post Light: The stairway is open 24 hours a day. There will either be a token booth clerk on duty or the station will have high entry/exit turnstiles (HEET see photo 1& 1a) with an adjacent gate secured with an FDNY 1620 lock.
 - RED Post Light: Token booth clerk may NOT be on duty and the stairway may be closed some time during a 24 hour day.
 - If given a choice, the first point of access to a subway should be through an entrance with a green globe, if possible.
 - A new replacement globe installed is a spilt type-the top half color denotes the type of access and the bottom half is clear for better lighting of the subway entrance.

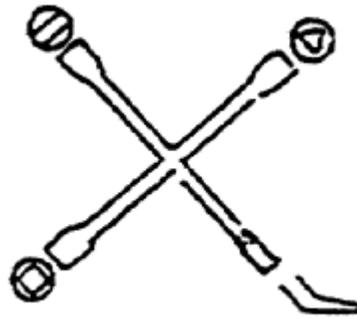


GATE ADJACENT TO HEET

Photo 1

Photo 1a

7.3 Subway Emergency Exit Key:



All companies are issued Subway Emergency Keys. There are three different key shapes and a pry bar on this tool. All the Subway lines (IND, BMT, IRT) emergency exits can be opened with this one key. The pry bar end is used to lift the emergency exit door, and to scrape out debris between the door and the door buck. However, some emergency exit locks are now appearing with other than the standard shapes. If this is the case, a pair of vise-grips or pliers will have to be used to open the emergency door.

7.4 SAFETY CONSIDERATIONS

- 7.4.1 Officers shall insure that members use extreme caution, whenever operating in the track area. There are many potential dangers located throughout the subway system, that pose many tripping, slipping, and falling hazards, such as grates in the track roadbed, grease, oil, water, steeldust, protruding items, and varied debris. Strict enforcement of this item and those that follow will be the responsibility of all Supervising Officers.
- 7.4.2 Contact with the third rail or the third rail cover must be avoided even when power is confirmed to be off. Unexpected restoration of power must be anticipated. Members crossing the third rail must not step on the third rail cover, but rather, over it.
- 7.4.3 Always operate as if power is on and avoid contact or proximity to the third rail and the third rail contact shoes. Even with power off there are elements within the undercarriage electrical system that possess enough voltage to cause a shock. Contact with any undercarriage electrical components must be avoided.
- 7.4.4 Whenever members are committed to a track area, firefighters shall be assigned in pairs to act as warning guards. The Officer in Charge shall assure that they are posted at the perimeter of an operation. Their primary function will be to warn all operating members of unexpected train traffic.
- 7.4.5 A member directed to halt traffic shall use a light. The light is to be held chest high and moved in a wide horizontal motion of at least four feet. Train Operators are accustomed to seeing trackwalkers (inspectors) carrying lights. If this horizontal motion is not used, the firefighter might be mistaken for a walker and the train will not stop. Members must use extreme caution; stopping a moving train with a light is not assured. They shall ensure themselves a position of safety and warn any endangered members to stand clear.
- 7.4.6 All officers shall maintain strict control of the actions of all members of their command. Limit the amount of personnel committed to the track area to the minimum needed to accomplish the goal. Rarely does an entire unit need to be on the tracks.
- 7.4.7 A pre-selected area of safety shall be a constant thought of all members for use in an emergency situation.
- 7.4.8 Every member shall be equipped with a flashlight. Operating in a subway without one will place his/her life and the lives of others in jeopardy.
- 7.4.9 A very dangerous condition exists when operations occur in proximity to a tunnel entrance or exit. Visibility will be extremely poor and must be counteracted by additional observers and extreme caution.

The possibility of no clearance between a moving train and the sidewall is very pronounced in some tunnel and railroad cut areas. The pre-selected area of safety, minimum staffing and alert observers are essential in this instance. All items of clothing must be fastened securely to prevent the possibility of loose clothing being caught on a moving train.

Never assume power is off when railroad personnel are seen working on a 3rd rail. They are trained and equipped to operate while tracks are "live".

Note: It is the constant awareness, preparedness, and paying attention to basics that have kept firefighters alive.

7.5 CONSTRUCTION AND CHARACTERISTICS

- The following is a list of features found in the NYC Transit System:

7.5.1 BLUE LIGHT

Near the blue light there is a power removal box, a telephone, and fire extinguisher. The power removal box is operated by a pull down lever located inside the box. If we find people on the tracks and we are forced to remove power, it is imperative that the telephone near the blue light be used to inform the Desk Superintendent that power is to be removed and the reason why (e.g. FD on scene, people on tracks and in danger of electrocution). To operate the telephone at these locations, remove the handset from inside the box and depress the button on the handset, keeping it depressed at all times during the conversation. Releasing the button will terminate the call. Dial the four-digit Subway Control Center number listed on the inside of the door cover (see Figure # 1). If unable to make contact with the Control Center using the primary number, release the handset button terminating the call, then depress the button on the handset and proceed to dial one of the two alternate numbers. This communication shall be made in order to insure that the power is not restored. If the Desk Superintendent does not receive an immediate call from the person who operated the power removal box, power will immediately be restored on all tracks.



SUBWAY CONTROL CENTER
4311 (BMT)
If busy dial
4211 (IND)
or
4111 (IRT)

Figure #1

The Power Removal Box may not necessarily be located under the blue light, but it will be in proximity to it or across the tracks from it. This will require us to cross live third rails and be subject to moving trains. The correct way to cross a third rail is walk over it and not step on the third rail cover; it may fail from a person's weight if stepped on. In those cases where the power removal box is across the tracks, consider sending a member in another direction that does not require crossing the tracks. Remember that the only reason for operating on track areas without the assurance that power off is when life is in imminent peril and direct and immediate action is required to save life. While awaiting the arrival of a hand line, there should be a dry chemical extinguisher available to us at the blue light, but this may be missing due to vandals.

Whenever NYC Transit personnel determine that a Power Removal Box or the Telephone is out of service, they will be covered with a bag to identify them as being out of service. This bag will be white, with red lettering, and it will state "Out Of Service. If a member encounters an out of service Power Removal Box, the member should use the associated Telephone to contact the Rail Control Center (RCC) to request the removal of power. The member must identify him/herself, state the reason that the power must be removed, and remain on the phone until they receive confirmation that power has been removed. All members are reminded that the use of a Power Removal Box to remove power should only be used as a last resort, when there is an imminent life hazard. The power limits associated with the activation of a Power Removal Box can be very extensive and may result in many trains and passengers being needlessly stranded, requiring assistance, evacuation, and thereby compounding the incident.

The activation of a Power Removal Box, or the use of the associated telephone, does not alleviate the Officer in Command of the responsibility of requesting and confirming the removal of power via Department Radio, with the Borough Communications Office.

The blue light telephone as a communication link to a token booth.

- A. The blue light telephone and token booth telephone are part of a Centrex system, very similar to the FDNY telephone system. In the Transit Authority, they dial the last four digits to contact another telephone number in the same exchange (an exchange is the first three digits of the telephone number).
- B. If the token booth telephone is on a different exchange than the blue light telephone, you have to replace the three-digit exchange with the two-digit access code before dialing the four-digit number. These access codes are usually listed inside the blue light telephone box.

To Call Exchange	Dial Access Code
714	21
243	22
927	26
694	27
544	62
430	63
334	65
424	67
Example: 424-2145 becomes 67-2145	

- C. If the Truck Officer did not obtain the token booth telephone number prior to proceeding to the location of the fire or emergency, the Officer can use any blue light telephone to contact the Desk Superintendent. He shall request the Desk Superintendent to relay the blue light telephone number to the FDNY Borough Dispatcher, who shall relay the number to the Chief Officer at the scene. The Chief Officer can then have the token booth telephone used to call the blue light telephone to establish contact with the Truck Officer. To use a token booth telephone, which is a conventional telephone, request the token booth clerk to pass the telephone through the pass through window. The Chief Officer can call the blue light telephone with his cellular telephone from the street, but the token booth phone is the preferred method. The blue light telephone does not ring, there is a buzzer mounted on the wall above the telephone that will intermittently activate.

Truck Chauffeur (LCC) Bottom of subway entrance stairs. If booth is within 50 yards of stairs to street, contact the train dispatcher through the token booth clerk. Relay any additional information to the Officer and Chief. Verify that the officer has the token booth telephone number.

The LCC will relay to the Chief Officer, the 7-digit blue light telephone number (that the Officer is calling from), and a report on conditions, when the LCC receives them from the Officer.

Truck Officer Before proceeding to the fire location; ascertain the token booth telephone number. If there is an accessible blue light telephone in the area of the fire or emergency, call the token booth and contact the LCC.

The Officer will give the LCC the phone number of the blue light telephone that he is calling from and a report on conditions. The LCC will relay this number and the report to the Chief Officer.

7.5.2 CONTACT SHOES

Contact shoes are pieces of metal that conduct electricity from the third rail to car motors. They stick out from the sides of the car near the wheels. There are contact shoes on both sides of the cars. If any contact shoe is on the third rail, all contact shoes of car will be energized.

7.5.3 CUT OUTS

Some benchwalls are provided with cut outs (safety niches) which are indented spaces in the wall of the tunnel. They provide room for a person to stand while a train passes by. When using a cutout, Firefighters are required to use the reduced-profile maneuver for their masks. The main problem with these areas of refuge is that track gangs sometimes use these spaces to store tools and equipment. When passing cutouts on a catwalk, observe to see if it is clear. If a train should come by unexpectedly, go back to the cutout you just passed, if it is clear.

7.5.4 NO CLEARANCE SIGNS

Along the walls of tunnels we will find "no clearance" signs. They are identified by diagonal red and white stripes painted on a wall. It may appear that there is clearance at this location but train overhang on turns and contact shoes will hit you if you are standing there

7.5.5 STEEL DUST

Some subway tunnels have been in existence since the turn of the 20th century. Wheels and brake shoes on subway cars are made of steel. When brakes are applied on a train there is metal to metal contact producing steel dust. Over many years this dust mixes with oil from the passing trains. This dust forms on the walls, benchwalls, track-bed, and under carriage of the trains. Members are cautioned to use their eye shields even for a "Can" job as this dust is everywhere, and the minute particles of steel in the dust have been known to blind people.

7.5.6 SUBWAY EMERGENCY EXITS

Emergency exits are stairways that lead up to the street from the track area. On the surface, they are located on sidewalks and in ventilating towers near the river. There are counter balance weights that will assist people to open the door. There is a bar across the door similar to a panic bar. When a person depresses the bar, the counter balance weight activates and the door opens. A prism-shaped sign or a cluster of 5 white lights identifies emergency exits in subway tunnels.

The MTA Transit is installing intrusion alarms on all of their subway emergency exits. All units inspecting an emergency exit, or responding to an incident at an emergency exit, shall notify the Fire Department Borough Communications Office, and request that the MTA Transit Control Center is advised that Fire Department units are entering the emergency exit. The unit entering the exit shall communicate the exit number and the exit location to the Borough Communications Office, for transmittal to the Transit Control Center.

7.6 EMERGENCY EVACUATION DEVICE

The Emergency Evacuation Device (EED) was designed by the New York City Transit Authority's Office of System Safety. EEDs are provided for FDNY use and are located throughout the Transit Authority's subway system.

7.6.1 DESCRIPTION

A. The EED is a yellow, 7-foot long device with steps on the front (Figure 1) and a flat surface on the backside (Figure 2). A non-skid surface is applied to both sides. Each unit weighs approximately 42 pounds.

B. These devices are constructed of fiberglass reinforced plastic and are electrically non-conductive for use within the confines of the subway environment.

C. When positioned against the side or end doors of a subway car the EED will reach the roadbed at approximately a 70° angle (safe for ascent / descent) and the steps will provide a horizontal stepping surface (Figure 3). A notch cut in the beams on one end of the ladder helps to anchor the EED in position against the car and or platform.

7.6.2 LOCATION

A. At underground and grade level stations, the EED is located at the first Blue Light location south of the southbound platform (typically within 50 feet of the platform end).

B. At elevated stations, the EED will be located in the area of the full time token booth.

C. An EED is located at the base of the emergency exit, at both ends of each under river tunnel.

D. Keys to remove EEDs from their mounting brackets are available at every token booth.

E. In Staten Island, EEDs are located near Tower B, at the Saint George Rail Terminal and near the crew quarters at the Tottenville Train Yard.

7.6.3 ACCESS

Metal mounting brackets are provided at each location and are secured with a corrosion resistant padlock. If a key can not be obtained, the locks can be forced using conventional forcible entry methods.

7.6.4 OPERATIONS

The Emergency Evacuation Device can be used in the following three ways.

A. When passengers are being evacuated to the roadbed, the EED is positioned with the cut out against the edge of the car floor with the step side up. The ladder provides a safe angle for most ambulatory passengers to descend, however personnel must be assigned to both the top and the bottom of the ladder, to provide assistance and stability to the passengers.(Figure 3).

B. The EED can also be used as an evacuation stair to access the platform level from the roadbed.

C. When a rescue train is used, the EED can be positioned step side down, to form a bridge between two adjacent cars. The flat surface provides a stable platform to walk passengers from one car to another. Personnel must be stationed in each car to provide assistance and stability to the passengers.



Figure 1



Figure 3



Figure 2

7.7 NOLAN ATS-1 EMERGENCY RAIL CART

The Nolan ATS-1 Emergency Rail Cart is a lightweight aluminum cart that can be used to transport tools, equipment and patients on tracks used by the NYC Transit, Amtrak, Long Island Railroad, Staten Island Rapid Transit, Metro North, and PATH transit systems.

The rail cart consists of 2 base sections, each weighing 48 lbs, 2 handles to push or pull the rail cart along the tracks, 1 connector plate, cargo net with tie-downs, 2 red cam buckle straps and 2 yellow ratchet straps for securing rail cart to apparatus. All components are packaged together on a modified hand truck for storage in quarters and transportation to incident (**Photo 1**).



Photo 1

7.7.1 STORAGE AND TRANSPORTATION

Company Commanders shall ensure rail carts are stored in a visible location on the apparatus floor which is easily accessible for rapid response and when needed, to enable special called units to locate the rail cart. Rail carts shall only be secured to the apparatus when special called for an operation or training.

When rail carts are transported to an incident, the following procedures shall be followed:

- Make sure the components are secured to hand truck.
- Place entire package on back step of apparatus (**Photo 2**).
- Secure with two yellow ratchet straps provided (**Photos 3-4**).
- Tighten straps with ratchet.

Note: Proper usage of the yellow ratchet straps is essential to getting the rail cart to location safely. Straps must be initially positioned to allow for free use of ratcheting mechanism. This will enable member to properly tighten the straps securing the unit to the apparatus.



Upper strap to grab handles.

Lower strap to lower tow loops.

Photo 2



Photo 3



Photo 4

Hook upper strap with carabiners on grab handles. Hook lower strap with carabiners on lower tow loops (**Photo 3**).

To tighten yellow straps, pull release lever on ratchet handle and tighten ratchet. To lock ratchet, pull release lever and bring ratchet handle to nested position (**Photo 4**).

Any engine company may be special called to transport a rail cart from the quarters where it is stored to the scene of an incident. Laminated instruction cards outlining rail cart transportation and use are attached to the rail cart hand truck.

7.7.2 ASSEMBLY OF RAIL CART

Place each half of rail cart on track with the wheels on the rail cart positioned close to the operator, with the operators facing each other (**Photo 5**).

Insert handles into sockets on each half of rail cart sections, then secure with hitch pin clips (**Photo 6**).



Photo 5



Photo 6

Using handles for leverage, have each member place one foot onto rail cart and raise front to an approximate 45° angle, so that each connection point joins to one another (**Photo 7**). Raise one section slightly higher than the other until pin seats into slot (**Photos 7-8**).



Photo 7



Photo 8

Slowly lower halves until they join together and lie flat onto tracks and the rail cart is in position for use (**Photo 9-10**).

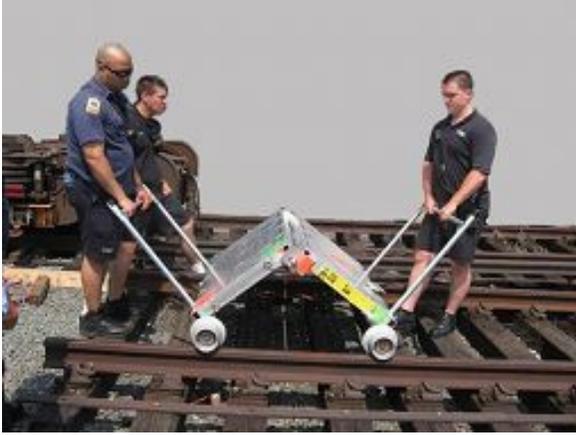
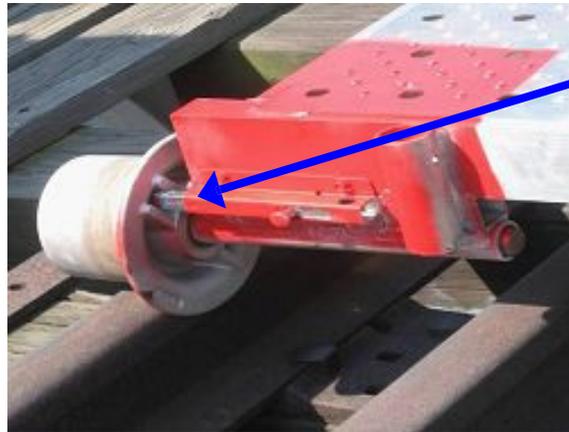


Photo 9



Photo 10

One wheel is provided with a wheel lock (slide bolt). A red square is painted on the surface corner of the rail cart to denote the location of the wheel lock (**Photo 11**). Once assembled, the member can use the wheel lock to secure rail cart from rolling.



Note sliding bolt and wheel receptacle.

Photo 11

Two rail carts can be connected together using the connector plate (**Photo 12-13**).

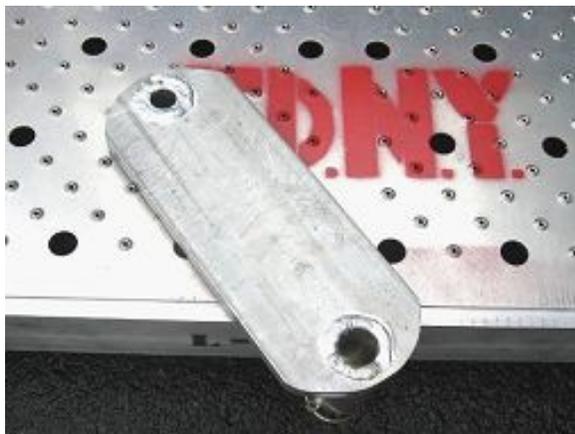


Photo 12



Photo 13

Tools, equipment or non-ambulatory victims may be secured to the rail cart using supplied elastic cargo net, red cam buckle straps, or utility rope utilizing clips positioned around the rail carts edge (**Photos 14 – 17**).



Photo 14

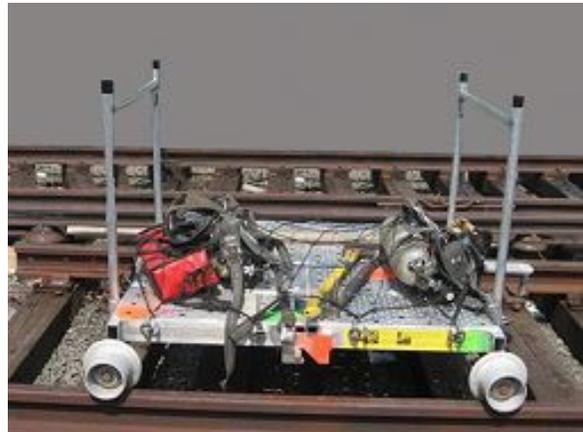


Photo 15



Photo 16

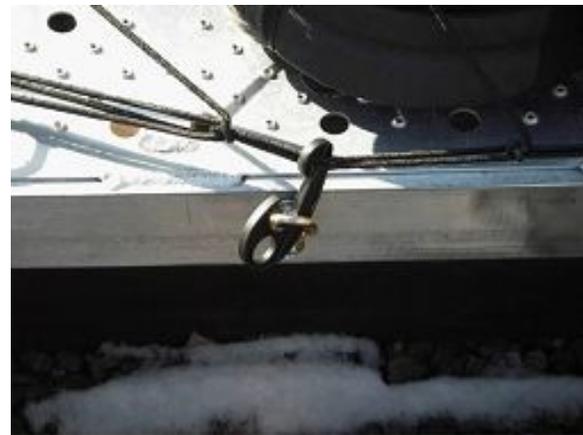


Photo 17

7.7.3 DEPLOYMENT

The response policy for the Nolan rail carts is as follows:

- Upon transmission of Signal 7-5 (All Hands) "Doubtful" or greater alarm for a Railroad Incident at NYC Transit, Amtrak, Long Island Railroad, Staten Island Rapid Transit, Metro North, and PATH transit systems.
- When requested by the Incident Commander.

Upon arrival at the incident, the officer shall report to the Command Post and inform the IC of the availability of the rail cart. Members shall remove the rail cart from the apparatus and prepare for ground transport. When ordered to deploy the rail cart, the officer shall determine the best access point and order the members to transport the rail cart to the scene using the hand truck. Every effort should be made to keep the rail cart packaged together. When necessary, individual components from the hand truck can be separated, and then carried to the designated area.

Deployment of rail carts needs to be part of a carefully developed plan. For example, setting up a rail cart prematurely on tracks being used for the evacuation of ambulatory civilians may hinder operations. Likewise, rail carts cannot be moved both ways on the same tracks simultaneously. The operational plan needs to consider how many rail carts and what equipment needs to be transported to the incident scene. When all rail carts have been moved to the scene, they can then be used in reverse order to remove non-ambulatory victims.

Avoid allowing equipment to extend beyond the sides of the cart to prevent contact with tunnel walls or the third rail. Likewise, stretchers and stokes baskets should extend over the front and rear of the cart, instead of the sides.

When there is a heavy load or when used on a steep grade, the cart should be pushed by or pulled by two (2) or more members. Utility ropes and/or straps may be used to increase control.

A connector plate is supplied to join two carts together. Joining carts together with connector plate might be useful at large incidents.

7.7.4 REMOUNTING RAIL CART ONTO HAND TRUCK

Rail cart sections are color coded for mounting back onto hand truck. Hand truck has a specially designed “step plate” to accommodate the cart sections.

Place rail cart sections on hand truck as per color coding (**Photo 18**):

- A. First, match orange marking on diamond plate of cart section to orange marking painted on hand truck – make sure diamond plate is facing the hand truck and marked side-beam (orange and green) is facing up.
- B. Place second cart section onto the hand truck with diamond plated in and the painted side-beam facing up. Correct placement will have all color coding matched up – orange on cart section to orange on hand truck and cart section (orange and green) to cart section (orange and green).
- C. To ensure proper nesting of two cart sections onto the hand truck, the wheel of the inner section (green marking) must be lifted while the outer section is seated.
- D. Secure to hand truck with red cam buckle straps (**Photo 19**).



Photo 18



Photo 19

E. Place handles between hand truck and cart sections (**Photo 20**).

F. Tie handles to cart, using slack from red retraining straps (**Photo 21**).



Photo 20



Photo 21

7.7.5 TRAINING

Company Commanders shall ensure that all members are familiar with the storage and operation of rail carts.

Two rail carts will be available at the Bureau of Training, for use at the subway training module.

Additional instructions on how to assemble the rail cart can be found on laminated instructional guides attached to rail carts.

7.7.6 SAFETY

Operating on rail tracks is inherently dangerous. Use of rail carts, while necessary, has the potential to increase this danger.

The wheel lock must be engaged when the cart is left unattended. This is especially important when a cart is operated on a grade, is loaded with patients, or carrying equipment.

Note: All safety precautions, as stated in Department bulletins and in operating guides for individual transit systems, must be followed. Particular attention must be paid to AUC 207, section 7.

7.7.7 MAINTENANCE AND REPAIR

Company Commanders shall establish schedules to ensure that the carts are inspected periodically. Each cart section and hand truck shall be marked with Unit designation to ensure proper identification.

Carts shall be decontaminated as per established procedures.

7.8 SOUND POWERED TELEPHONES

7.8.1 INTRODUCTION

7.8.1.1 Sound powered telephones (SPT) provide a hard wired means of voice communication without the need for a power source. Sound powered telephones contain electro-mechanical transducers that convert voice directly into electrical energy. This signal is sent down a two-wire line and converted back into voice at the other end. Sound powered telephones are a more sophisticated mechanical version of two tin cans connected by a string and are capable of transmitting clear voice communications over distances up to five miles.

7.8.1.2 FDNY sound powered telephone equipment is used primarily in New York City Transit (NYCT) stations and under-river tunnels, in conjunction with hard-wired systems installed there.

7.8.1.3 Sound powered telephones can be used as a stand-alone system in tunnels, high-rise buildings, or anywhere that such use is deemed beneficial by the Incident Commander. Sound powered telephones are not effected by temperature or humidity, surrounding concrete or steel structures, and do not present the user with a shock hazard.

7.8.1.4 Sound powered telephones have been issued to the following units:

- All Battalions
- High-Rise Units 1 and 2 (E-3, E-39)
- Field Communications Unit

7.8.2. EQUIPMENT

7.8.2.1 Sound powered telephone equipment consists of a waterproof SPT box (Photo 1) and wire reels. The waterproof SPT box contains:

- 2 - Headsets
- 2 - 1620 keys attached to headsets. 1620 keys are used to gain access to SPT connectors in the NYCT System.
- 2 - Amplifiers
- “Y” Connector

- 2 - Jumper cords
- T-handle subway key
- Screwdriver (to change amplifier battery)
- 4 - Glow sticks
- Laminated instruction sheet



Photo 1

7.8.2.2 **Headsets** - A headset consists of a microphone and two ear cups, connected by a strap that is worn around the back of the user's head. This allows for a helmet to be worn when operating with sound powered telephones (Photo 2). A headset has a male connector. Headsets have less interference and background noise than handsets, and allow for hands-free use which enables the user to perform tasks (e.g., record messages, hold a flashlight). A 1620 key is attached to each headset to gain access to SPT jacks in the NYCT System.



Photo 2



Photo 3

7.8.2.3 **Handsets** - A handset resembles and functions like a standard telephone handset. A handset has a male connector (Photo 3).

7.8.2.4 **Wire Reel** - A SPT wire reel consists of a 400 foot-long wire wound around the reel inside a plastic case, with a 3 foot-long fixed wire coming out of the side of the reel. Both ends of the wire reel have female connectors. The headset is connected to the fixed wire. Wire reels shall be stored with the end of the long wire looped around the handle, to prevent it from becoming entangled inside the case (Photo 4).



Photo 4



Photo 5

7.8.2.5 Components are assembled using male and female connectors. A male connector has a protruding plastic edge which shields two pins, and a locking collar (Photo 5). Female connectors have a 2 pin receptacle and exterior threads (Photo 6). Care must be taken to line up and attach connectors properly. Once a connection is made, the locking collar on the male connector must be threaded onto the female connector and tightened.

A. **Jumper Cord** - A jumper cord (Photo 7) is a small wire with two male connectors. A jumper cord is used between two female connectors.



Photo 6



Photo 7

B. **Y Connector** - A Y connector is a short section that is used to split the sound powered telephone system to allow additional communication points (Photo 8). A Y connector has one male and two female connections. Examples include using a Y connector and wire reels to communicate to 2 separate areas of a subway station or 2 separate tunnels (Photo 9). A Y connector can also be used to insert a headset or handset in line or at the end of the system.



Photo 8



Photo 9

7.8.2.6 **Amplifiers** - increase the volume of verbal transmissions, but are not required to be used. Each amplifier has 2 cords; an 8” long cord with a female connector that attaches to the headset, and a 42” long cord has a male connector that attaches to the SPT system (Photo 10).

- A. There are 2 controls on the amplifier; a talk level knob that controls the volume and shall be placed at the highest setting when in use, and a PTA (Push to Amplify) button. The PTA button must be pressed and held whenever the user wants to transmit a message. **Once the message is completed, the PTA button must be released, or the reply will not be heard.**
- B. There is a clip attached to the back of the amplifier that may be attached to a handie-talkie strap.



Photo 10

7.8.3 USING SOUND POWERED TELEPHONE EQUIPMENT

- 7.8.3.1 Once the start and end points of communications are determined, one or more wire reels are deployed. The wire from the bottom of the reel is pulled out a few feet and secured at the starting point. This wire plays out as a member carries the reel towards the end point of communications. If the wire does not play out easily, pull wire from the reel while walking. If the distance requires more than one reel to be used, jumper cords are used to connect the short wire of one reel to the long wire of the next reel.
- 7.8.3.2 Once wire is stretched to the end point, listening devices and amplifiers are connected to each end.
- 7.8.3.3 Specific members shall be dedicated to maintain the SPT communications link. Each shall be paired with another member who monitors HT communications.
- 7.8.3.4 Unlike conventional telephones, sound powered phones do not emit a ringing or buzzing sound when communications are initiated. A member monitoring a sound powered phone must constantly listen to the headset/handset in case another member is transmitting a message.
- 7.8.3.5 When transmitting messages, speak loudly and clearly, keeping the mouthpiece close to your face. As with HT transmissions, use the term “K” to indicate the end of your transmission.
- 7.8.3.6 A member using a headset in a standby position (awaiting a transmission) should cover the mouthpiece with his or her hand. This will reduce the background noise which might be transmitted through the wire.

7.8.4. SOUND POWERED TELEPHONES IN NEW YORK CITY TRANSIT FACILITIES

7.8.4.1 General Information

- A. NYCT has installed two types of hard-wired SPT systems:
- Street to Station - Coverage includes a particular station and the street above.
 - Street to Tunnel - Coverage includes a particular under river tunnel or tubes (both directions) and a location on both sides of the tunnel, typically the nearest emergency exit.
- B. There is usually no connection from one SPT system to another (e.g., from an under river tunnel system to a nearby station).
- C. Headsets are preferred for use throughout the NYCT system, due to the high noise levels that may be encountered.

- D. All SPT connectors within the NYCT are located in locked metal boxes that are adjacent to standpipe Siamese or outlets. Boxes containing SPT jacks require a 1620 key to open.

7.8.4.2 Street to Station SPT Systems

- A. **Street Level** - At the street level of a subway station, SPT connectors are found near the standpipe Siamese, with a sign that reads *Street to Station Communications* (**Photo 11**). Depending on the size of the station, there may be more than one Siamese. The standpipe Siamese with the SPT connectors are not always found closest to the subway entrances. They may be located a few hundred feet away from the station, in either direction of train travel. These connections may also be found in the middle of larger roadways, such as Queens Blvd., Houston Street and the Grand Concourse.



Photo 11

- B. **Platform or Mezzanine Level** – SPTs on the platform or mezzanine level are located in red metal boxes inside the stainless steel standpipe cabinets (**Photo 12**). Standpipe cabinets are identified by a sign located above the standpipe outlet, showing a white hose on a red background. Combination standpipe/SPT boxes may be located on columns or on a station wall. If there is no SPT outlet located in the standpipe outlet box, look in the surrounding area for a small individual cabinet (**Photo 13**).



Photo 12



Photo 13

7.8.4.3 Street to Tunnel Systems

- A. Street to Tunnel SPT systems usually include a specific pair of tubes. For example, members in the Brooklyn-bound Clark Street tubes could speak to others in the Manhattan-bound Clark Street tube, but they cannot speak to members operating in a completely different tunnel or tube.
- B. SPT connectors are typically located at the street level Siamese connections closest to the emergency exits on both sides of the under river tubes. In the under river tubes, SPT connectors are found at standpipe outlets; approximately 200 feet apart. The Transit Authority usually identifies associated standpipe outlets by number. Members operating in a tube should notify the IC of the standpipe outlet number, in order to identify the incident location (Figure 1).
- C. Sound powered phones are installed in 13 of the 14 under river tunnels. The exception is the Joralemon Street Tunnel, which runs from the Bowling Green Station in lower Manhattan to the Borough Hall Station in Brooklyn.
- D. Some tunnels do not have the typical configuration described above. Members must become familiar with unique characteristics of tunnels in their response areas. For information on specific tunnels, consult FFP Under River Rail Operations, Addendum 1.

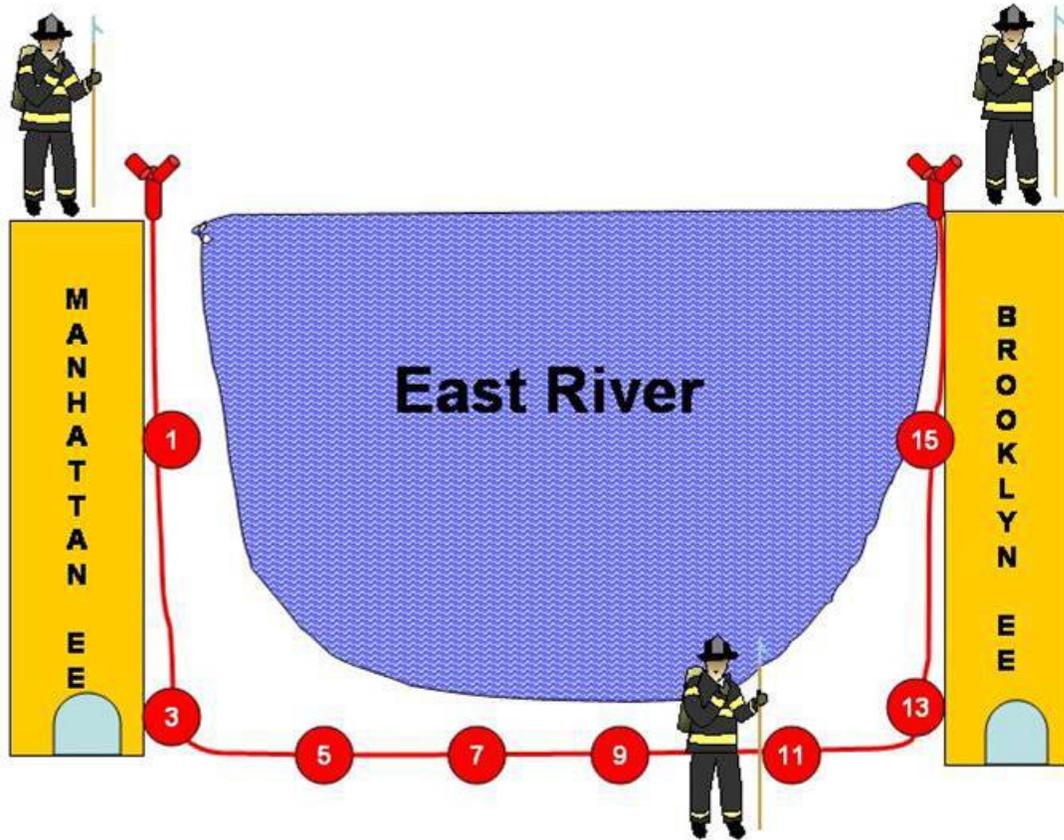


Figure 1

7.8.5. MAINTENANCE AND TROUBLESHOOTING

7.8.5.1 Required maintenance for SPT is to change the 9-volt battery in the amplifier semi-annually.

- A. To change the battery, remove the amplifier wire by loosening the locking collar, then pull the wire connection straight out. Next, remove the two screws that secure the cover and slide the cover off. Remove the rubber bumper and rubber band from battery. Ensure that the new battery is tightly connected. To reassemble, reverse the procedure ensuring that the rubber band, black rubber pad, and the orange gasket around the wire connector are in place.

7.8.5.2 If the amplifier is not working at any time, check to see if the battery has slipped from the connectors by removing the amplifier cover. If the amplifier does not work after troubleshooting, contact Research and Development for repair and replacement of equipment and/or technical information.

8. MISCELLANEOUS EMERGENCIES:

8.1 GASOLINE LEAK AUTOMOTIVE

Caution: No open lights or smoking, sparks etc. Keep area clear of people.

◆ Leaking fuel line.

Actions to be taken:

- Wash down if necessary.
- To stop leak :
 - Crimp fuel line.
 - Plug with pencil, golf tee, shaved stick or chock, etc.

◆ Leaking gas tank.

Actions to be taken:

- Plug hole with small piece of tapered wood.
- Rub piece of chalk over pinhole leaks.
- Use commercial product such as "Loctite".
- Use half of rubber ball (tennis, spalding) propped with stick forming airtight seal with suction side towards leak.
- Cut straps of gas tank, lower to ground and prop so that leak is above fuel level.

NOTE: Often the reason for hole is that someone found it easier to steal gas by punching hole with ice pick in preference to using siphon.

8.2 FISH HOOK REMOVAL

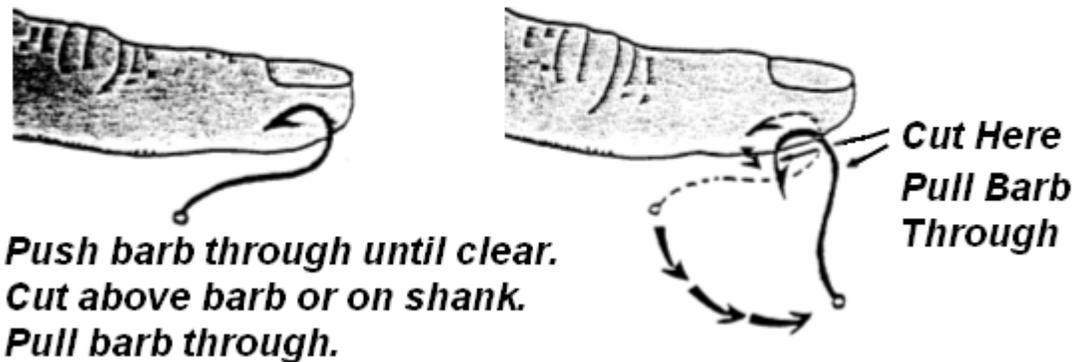
Fish hook embedded in finger.

Action to be taken:

- ◆ If barb is not embedded, then back the hook out.
- ◆ If barb is embedded then have physician remove it.

NOTE: If medical aid is not available then push hook through until barb protrudes. Cut the hook either at the barb or shank and remove it.

FISH HOOK REMOVAL



8.3 RING REMOVAL:

Actions to be taken:

- ◆ Use a soapy water as lubricant for ring removal.
- ◆ Finger may be cooled which will decrease swelling and allow removal.
- ◆ Use or call for ring cutter which will safely cut ring off finger in short period of time - less than a minute.

NOTE: Sometimes it is preferable to use regular cutting pliers because ring cutter will not cut stainless steel.

8.4 BURGLAR ALARM RINGING:

- ◆ Many times due to a fire, a burglar alarm may be constantly ringing. This constant noise during overhaul could possibly make members tense and set up a situation where injuries occur.
- ◆ Burglar alarms may be silenced by either of the below methods.
 - Locate alarm and insert wad of paper, chock, match book cover, etc. between clapper and bell.
 - Disconnect power.
 - Locate alarm.
 - Follow wire into occupancy.
 - Locate alarm box with batteries.
 - Use screw driver or dime to remove cover.
 - Disconnect wires from battery terminals.
 - Replace cover.

NOTE: If wires are connected to house electric: pull plug, pull fuse, or turn off power

8.5 OIL SLICK IN ROADWAY:

- ◆ Oil slick can cause accident and may be most common after an accident.
- ◆ Operation:
 - Check immediate area for sand or dirt. Use shovels to spread same onto slick. This will absorb oil or at least provide a friction cover to prevent slipping. The use of water on slick will only exacerbate the problem.
 - If no sand available call for sanitation sand truck.

8.6 SULFUR CANDLES:

- ◆ Sulfur candles are used to discourage vermin. The fumes produced are highly irritating.
- ◆ Operations:
 - Use mask.
 - Use as few members as possible preferably (officer and one firefighter).
 - Vent as you search.
 - When candle is found, either extinguish or remove to outer air.
 - Wait outside apartment for sufficient time to establish fact that no other candles remain.

NOTE: Candles are usually found on the floor in a saucer of water.

8.7 ICE RESCUE:

Cautions:

- ◆ A ladder will spread out and diminish the weight on a specific area of ice to allow greater safety and enhance the possibility of removing someone from ice or icy water.

Actions:

- ◆ Ladder extended with rope tied on shoreward rung. Rope will serve as an extension.
- ◆ Rescuer crawls out on ladder to assist victim if necessary.
 - If ice breaks ladder will angle upwards and can be drawn back to safety.
 - Hook can be extended to victim. (Hook of necessary length.)

- Other devices to use are buoys, ropes, sticks, poles or even a human chain lying prone on the ice.
- Be prepared to give Rescue Breathing and treat for shock.

9. CONCLUSION

This chapter has covered some of the most common emergencies (outside fire emergencies) that the FDNY is called to respond to. As mentioned earlier, fire calls account for roughly 20 to 25% of FDNY responses. Recognizing this, it's critical that firefighters are proficient at providing assistance at other types of incidents in addition to fires. To operate proficiently actions taken should always be based on sound principles regarding effectiveness and safety. Without regards for such, even the smallest incident can escalate quickly to disastrous consequences.



ELEVATOR EMERGENCIES

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with FDNY guidelines for operating at elevator emergencies• To familiarize members with FDNY guidelines for use of elevators during fire operations.
CONTENTS:	<ul style="list-style-type: none">• Elevator Removal Procedures• Elevator Operations During Fires• Types of Elevator Doors
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Training Bulletin Emergencies 1

18

ELEVATOR OPERATIONS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	INTRODUCTION	1
2	LOCATING THE ELEVATOR CAR.....	1
3	PRIMARY REMOVAL PROCEDURES.....	2
4	SECONDARY REMOVAL PROCEDURES	4
5	EMERGENCY REMOVAL PROCEDURES	8
6	ELEVATOR PIT OPERATIONS.....	12
7	FIRE SERVICE.....	13
8	ELEVATOR OPERATION DURING FIRE OPERATIONS.....	18
9	ELEVATOR TERMS AND DEFINITIONS.....	22

The function of the Fire Department at elevator operations is limited to the safe removal of persons trapped in the elevator car or hoistway. Repairs to and reactivation of elevators are not carried out by members of this department. Contact shall be made with responsible building management personnel for any information and assistance that will aid the operation. However the first units at the scene should start operations at once without awaiting arrival of the management personnel.

1. INTRODUCTION:

1.1 In performing the function of removal at an elevator operation the urgency of actions, and those actions taken are determined by whether the operation is considered an INCIDENT or an EMERGENCY.

1.2 INCIDENTS and EMERGENCIES:

◆ INCIDENT:

A stuck elevator with trapped passengers not in immediate danger and no evidence of injury.

Note: Conditions must be constantly monitored, an INCIDENT may escalate to an EMERGENCY.

◆ EMERGENCY:

A situation where one or more of the following exist:

- Fire endangering passengers in a stuck elevator.
- Passenger of stuck elevator injured.
- Passenger of stuck elevator in panic

Note: In the event there is evidence of injuries to trapped persons, the officer in command shall request the response of medical assistance.

The sequence of initial actions is actually the same- however, at an EMERGENCY, additional removal techniques are acceptable in lieu of waiting for the assistance of an elevator mechanic. All elevator operations begin with locating the elevator car and then initiating PRIMARY removal procedures. If the PRIMARY procedures don't effect removal then SECONDARY procedures are attempted. If efforts are still unsuccessful AND an EMERGENCY situation exists then EMERGENCY removal procedures are employed. Each of these procedures is explained in upcoming sections of this chapter.

2. LOCATING THE ELEVATOR CAR

Locate the car using the following.

- ◆ Lobby control panel - check floor indicator.

- ◆ Communicate with passengers- they may be able to give their approximate location.

Methods of communicating with passengers:

- Elevator car telephone.
- Elevator car intercom.
- Call or yell up hoistway, or speak through car and hoistway doors.

Note: If emergency bell is ringing instruct the car passengers to deactivate the alarm and emergency stop button. A ringing bell can cause anxiety, confusion and hamper communications.

- ◆ Open the hoistway door at first floor with elevator key and look up shaft. Key devices are usually required at the lower levels and may be present at all levels.

Note: If the hoistway door has a glass panel check the shaft before opening the door. Using a flash light, look for the governor ropes and the counterweight. Movement of either one of these is an indication that the car is in motion, do not open the hoistway door. The governor rope is generally located on either side near one of the far corners of the shaft.

- ◆ Counterweight location: The location of the counterweight can be used to approximate the position of the car. For example, in a 6 story building where the elevator serves the basement, if the counterweight is on the 1st floor, the stalled car would be at the 5th. The counterweight can be located by viewing through the wire glass door panel or by opening a hoistway door.
- ◆ Enter a car in the same bank and open top hatch if no damage will be done to the elevator car.
- ◆ Use the floor selector in the machinery room, it indicates the exact location of elevator car.

3. PRIMARY REMOVAL PROCEDURES

- 3.1 Problems with elevators often arise from defective or non-functioning electrical or mechanical devices and equipment.

Electrical problems are the most frequent cause of elevator malfunction.

- ◆ Common causes of electrical problems:
 - Car or hoistway door contacts open.
 - Blown fuses.
 - Shorting of electrical cables.

- ◆ When an electrical problem occurs the following can be expected:
 - Elevator cars will be suspended on the hoistway cables.
 - Elevator brake will be applied in the hold position.
 - ◆ Mechanical problems, though not as common, may also be encountered.
- 3.2 Primary removal procedures are simple approaches performed without turning off the elevator power. There are two types of primary removal procedures- the order in which they are tried is not important.

◆ Checking Electrical Contacts.

The first type of primary removal procedures is to check whether simple electrical contacts might have been broken.

IMPORTANT: If the passengers have activated the Emergency Stop Button, they must be instructed to deactivate it- otherwise these procedures will not work.

- Have a passenger press Door Open Button. If the car is level with the landing this may open both the car and hoistway door.
- Press lobby call button.
- Instruct passengers to insure the car door is fully closed. Have a person push the door towards the closed position.
- Have members physically close all hoistway doors on the shaft. Air movement in shaft may have opened an interlock cutting power to the car. Check the hoistway doors in the vicinity of the stuck car first.

◆ Activate Fire Service.

The second type of primary removal procedure is activating Fire Service if available. Fire Service will over ride the Emergency Stop Button.

- Activation of fire service - Inserting FD 1620 key into key switch located adjacent to elevator door at lobby, and switching from NORMAL to FIRE SERVICE will recall all elevators to the lobby. The stuck elevator may return to the main lobby or sky lobby and open its doors.
- Fire Service should be deactivated when the car responds by returning to the lobby or if it's clear that the car isn't responding.

If Primary Removal Procedures fail summon an elevator mechanic. The telephone number of the mechanic is required to be posted in the machinery room near the elevator power switch. Consider the possibility of an elevator mechanic on duty in a nearby building. Secondary Removal Procedures may be initiated prior to the arrival of the mechanic.

4. SECONDARY REMOVAL PROCEDURES

If the simple methods involved in primary removal are not effective then secondary removal methods are to be used.

4.1 Precautions:

- ◆ Power Removal: whenever Secondary or Emergency Removal Procedures are used, power removal is essential. The shut-off is located in the elevator machinery room, which may be located at the top of the shaft, at the bottom of the shaft or two levels above the highest floor serviced by the elevator.
- ◆ Two members are to be dispatched to the elevator machinery room to shut off the power to the stalled car. These members are to:
 - a) Determine which shaft the stalled car is in.
 - b) Shut off power to the stalled car when directed. Each elevator is controlled by its own power switch. Elevator power switch boxes and motors are required to be labeled in a manner which relates motor to switch. (Ex. Switch #1, Motor #1). If any doubt exists, open as many elevator power switches as required to insure a safe operation. Allow passengers to exit a serviceable car before removing power.
 - c) Remain at the power switch throughout the operation to insure the power is not restored.
 - d) Upon completion of the operation DO NOT restore power to the stalled car.

Notes:

- 1) The ventilation opening located above the elevator shaft is known as the smoke hole. Members should avoid stepping on the cover or grating over this opening because if improperly sealed (or removed and replaced with flimsy material) a member could fall the entire height of the shaft.
- 2) Members should be equipped with a handie-talkie and forcible entry tools. Communication between members in machinery room and on landing is necessary.
- 3) Building maintenance personnel may be able to provide members with keys to the elevator machinery room.

- ◆ Members are not to enter the shaft or remove passengers from the car until assured power has been removed.
- ◆ When passengers are removed from a car between floors they should be taken **UP AND OUT** of the car if practical. This eliminates the possibility of a passenger falling down the shaft after exiting the elevator. If they are removed to the lower landing, the shaft opening must be protected.
- ◆ Members operating in the shaft are to be secured by a life saving rope.
- ◆ Members shall not normally be permitted to enter the shaft below the elevator car. During a rescue necessitating members entering the shaft below the car, the power switch must be turned off.
- ◆ The elevator shall never be jacked up or moved in an upward direction. This action may free the car safeties causing the car to move either upward or downward depending on the live load in the car.
- ◆ No adjustment to or prying of the elevator machinery brake shall be attempted. The brake will be in a safe position and should not be tampered with.
- ◆ In older elevator installations if the condition of the elevator brake is doubtful additional protection can be provided by placing a heavy timber, iron bar or tool between the spokes of the hoisting drum after power is removed. In most newer installations this procedure can be dangerous and impractical. Electrical components are usually in a close proximity to the drum and most drums are constructed in a manner which prevents getting an effective purchase.
- ◆ If conditions indicate that the elevator is unstable, additional precautions must be taken to prevent the movement of the car in either direction. Consider securing the car to structural members of the building using utility ropes, chains or shoring.

4.2 Secondary Removal Operations

- ◆ All efforts must be made to remove passengers via elevator car and hoistway door using an elevator tool or key.
- ◆ Passengers of the stuck car can assist in their removal. Direct the passenger of the car to attempt to open the car door by physically exerting pressure toward the open position. If they succeed in opening the car door instruct them to lift the locking arm on sliding hoistway type doors, or to depress or lift the roller on hinge type hoistway doors.
- ◆ If the elevator has a two speed system, commonly found in buildings over 10 stories, sometimes the system can be reset by shutting and then restoring power. If the car is to restart it will do so within 10 seconds. If Emergency

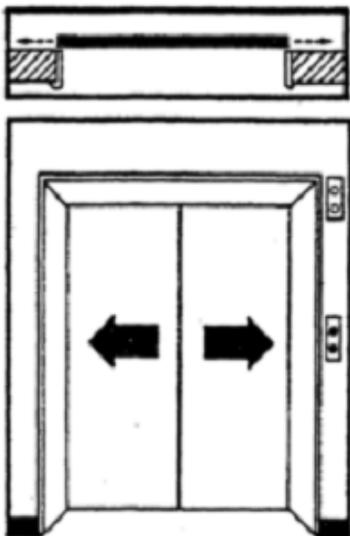
Stop Button has been activated have passengers deactivate it (this should have already been done prior to attempting PRIMARY procedures).

Note: This is the only circumstance in which the elevator power may be restored by members of this department. If this procedure fails, power must be shut off and members are not to restore power at completion of operations.

- ◆ If stuck car is in a multi car hoistway "POLING" can be used to remove the passengers:
 - Have member work from an adjacent car which is nearest the leading edge side of hoistway door of the stuck car.
 - Adjacent car should be positioned to give access to upper portion of the hoistway door to be opened.
 - Have one member remain on the landing at the hoistway door of the stuck car.
 - Member in the adjacent car inserts pole or hook between the striking post and the hoistway door and trips the lock by either depressing the roller or pushing on the locking arm.
 - Hinge type door - Depress the roller.
 - Sliding type door - push up on locking arm.
 - Member on the landing near hoistway door of the stuck car opens hoistway door when the lock is disengaged.
 - Elevator car door is then opened

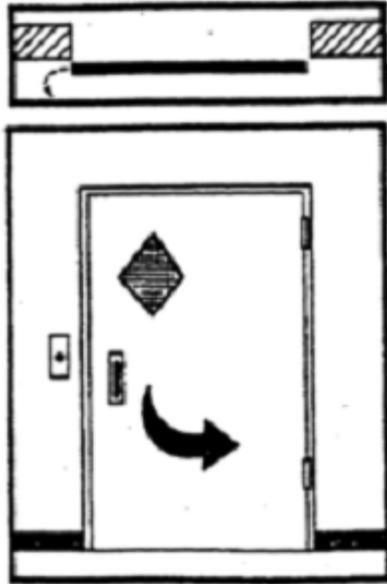
4.3 Types of Elevator Hoistway Doors:

- ◆ Center Opening Doors:



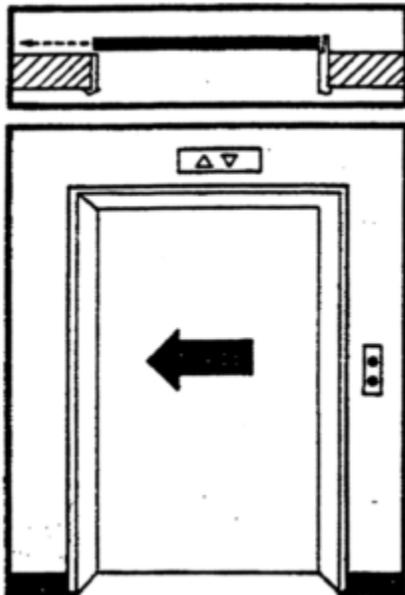
1. Consist of two panels on the same plane. In opening, the panels move away from each other.
2. Locks are above the point where panels meet.
3. Most frequently found doors.

◆ Swing Doors:



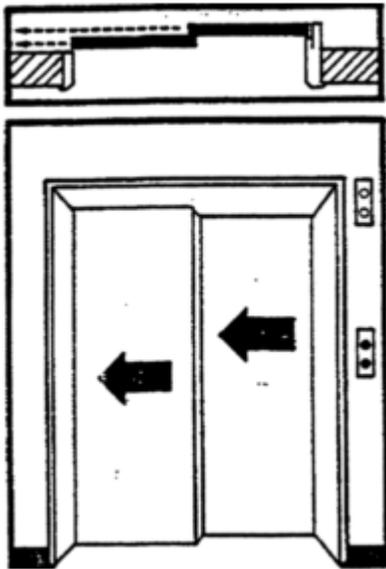
1. Rarely installed in new installations for public use.
2. Mostly found in older buildings- especially small office buildings, apartment houses, and some schools.
3. Door opens outward from hoistway (outward opening door).
4. Lock is above the handle usually near the top of the door.

◆ Single Slide Doors:



1. Single panel that slides horizontally to one side of the door opening
2. To determine which way the door slides consider building features to both sides of the door. Usually the leading edge of the door slides away from the controls.
3. Lock is located above the door panel on the leading edge side of the door.

◆ Two Speed Elevator Doors:



1. Two speed doors consist of two panels, one behind the other.
2. Both panels move horizontally in the same direction and reach the open position at the same time.
3. Front panel is known as the high speed panel.
4. The lock is above the jamb side of the high speed panel

5. EMERGENCY REMOVAL PROCEDURES

This section outlines procedures which may only be used during an EMERGENCY (as defined in this chapter), or when directly advised by an elevator mechanic. Primary and secondary procedures are usually quicker and more efficient than the methods outlined in this section. The decision of what method to use will be based on the size-up of the officer in command.

Power to the stuck elevator must be off when you use Emergency Removal Procedures. This should have been done before trying Secondary Removal Procedures.

An elevator car will have a top hatch or a side exit - sometimes both. One of these may provide a route by which you can remove trapped passengers.

5.1 Top Hatch Removal:

Although the law prohibits welding or bolting top hatches shut on elevators, it does happen and it can make this procedure very time consuming.

- ◆ Open a hoistway door or access panel (required in single car blind hoistways) on floor above the stuck car.
- ◆ Provide adequate lighting.

- ◆ Lower a portable ladder to the elevator roof. Use straight ladder if possible. If an extension ladder is used tie the halyard around the rungs of both sections of the ladder. This will prevent the lower section from dropping on to the car roof.
- ◆ Climb down to the car roof. Maximum of two firefighters are to be permitted on the roof of the car at one time.
- ◆ All members working in the shaft are to be secured with a life saving rope.
- ◆ Open the top hatch.
 - This may require the use of a wrench or screw driver.
 - Forcible entry tools may be required.
- ◆ A small portable ladder is lowered into the elevator
- ◆ One member equipped with a handie talkie enters car. Member in the car must determine the order of removal. Secure each person with a life saving rope.
- ◆ Members are to remain in physical contact with trapped persons while they are being removed.

5.2 Side Exit Removal.:

Useful under conditions of partial power loss in multi-car hoistways. It may not be useful where a structural beam blocks a side exit or the rescue car can't be brought level with the stuck car.

- ◆ Members must work from a car that is in the same bank and is adjacent to the stuck car. This will become the rescue car.
- ◆ Bring rescue car even with stuck elevator. If mechanic is present, use his operating key to bring the car level with stuck car.
- ◆ Remove power to rescue car. Power to the stuck car was previously removed.
- ◆ Open side exit in rescue car. A key or forcible entry is required to open panel from inside the car.
- ◆ Open side exit of stuck car. It is openable by hand from the shaft side.
- ◆ Planks of sufficient lengths (6' or longer) should be used as a bridge between cars.
- ◆ Member equipped with a handie talkie and secured with life saving rope crosses planks to the stuck car.

- ◆ Member determines the order of removal. Secure each passenger with a life saving rope and assist them to the rescue car.
- ◆ After passengers are removed restore power to the rescue car.

5.3 Forcible Entry:

Forcible entry of hoistway and elevator car doors should only be attempted under the direct advisement of an elevator mechanic or as a **last resort** during EMERGENCY REMOVAL PROCEDURES. The deformation of the doors and locks may add to the problem and delay the rescue. Upon completion of forcible entry operations have maintenance personnel secure the hoistway door or have police or security warn people of the danger.

Choose one of the following procedures based on the type of hoistway door.

- ◆ Hinged door:
 - Knock out glass panel if present. If not, breach hoistway shaft above hoistway door.
 - Push down roller, located near side opposite hinges, on shaft wall.
 - Open hoistway door.
 - Push open elevator car door.
- ◆ Slide type door:
 - Maxi Force Air Bag System- this is the preferred forcible entry method because it is less likely than the others to push the door off its hangers or out of its track.
 - 1) Take a small purchase with a forcible entry tool.
 - 2) Place bag between the leading edge of the door and jamb as high as possible to apply a more direct force on the linkage and the locking mechanism.
 - 3) Position the bag to permit the center of the air bag to be as close as possible to the door edge. This increases the spreading capability of the air bag. It may be necessary to have a passenger in the car push open the car door to permit the air bag to obtain a good purchase.
 - 4) Inflate air bag until hoistway door opens.
 - 5) If necessary push open elevator car door.

- Rabbit Tool
 - 1) Use forcible entry tool to gain a purchase for the jaws of the rabbit tool.
 - 2) Insert the jaws of the Rabbit Tool between the jamb and the leading edge of the hoistway door, as high as possible.
 - 3) Ensure that the tool is flush with the hoistway door.
 - 4) Operate tool to open door taking care not to cause the door to come off its track.
 - 5) If necessary push open elevator car door.

- Forcible entry tools
 - 1) Go to landing directly above door to be opened.
 - 2) Use a forcible entry tool to lift hoistway door out of its guide.
 - 3) Tilt bottom of the hoistway door slightly into the shaft, just enough to allow the passing of a hook into the shaft.

Note: Care must be taken not to tilt the door too much. It may dislodge from hanger and drop into the shaft.

 - 4) Use a hook to reach down to the lock arm mechanism and pull it up.
 - 5) If necessary push open elevator car door.

◆ Blind hoistway.

- Determine the side of hoistway the car door faces.
- Breach hoistway wall on that side.
- Push open elevator door.

6. ELEVATOR PIT OPERATIONS

6.1 The Elevator Pit is the lowest portion of the elevator shaft. There are two types of Elevator Pits:

◆ Jump Pits:

- Usually 4' to 6' from lowest landing level to base of pit.
- Elevator descends to within a couple of feet of the bottom of the shaft.
- Pit is entered by opening the lowest hoistway door and using a portable ladder.

◆ Walk In Pit:

- Usually 6' to 10' from lowest landing to base of pit.
- Car descends to the floor level above bottom of shaft. A high buffer and lower limit switch prevent the car from entering the pit.
- Access to the pit is via a door located at the bottom of the shaft.
 - Door is not required to have an interlock switch.
 - Door is opened by a regular key. Emergency elevator keys are not usable.

6.2 Operations in Elevator Pits

◆ Jump Pit.

- Shut off elevator power switch.
- Open the lowest hoistway door on shaft.
- Use portable ladder to enter shaft.
- For additional safety, trip lower limit switch and secure it in an open position.

◆ Walk In Pit.

- Shut off elevator power switch.
- Enter via pit door.
- If there is a fire in the pit, be cautious of the buffers (a device designed to stop a descending elevator beyond the normal limits of travel), they may be filled with combustible or inflammable liquid.
- In an EXTREME EMERGENCY (immediate action necessary to save life) entry to a Walk in Pit before the elevator power switch is off may be made using the following precautions:

- Open a hoistway door on shaft to be entered. The interlock will prevent car from moving.
- Use caution around mechanical and electrical components.
- Turn off power as soon as possible.

7. FIRE SERVICE

All Fire Department personnel should be familiar with the operating procedure and limitations of Fire Service. This section describes Fire Service components and operational procedures.

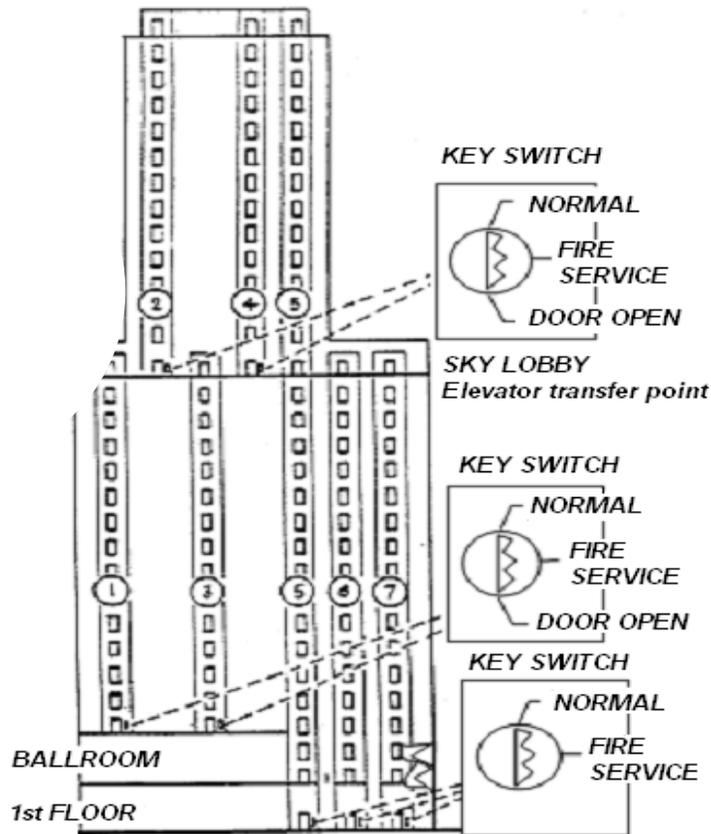
7.1 Fire Service Controls.

◆ Lobby Keyed Switch.

- A switch at the street floor or terminal floor for each bank of elevators. Terminal floor is the lowest landing above the street floor of any elevator that does not serve the street lobby floor, also known as a Sky Lobby. (Fig. 1)
- The key switch is required to be within 4 feet of the lobby call button.
- The key switch is operated by use of the Fire Department 1620 key, or by city wide standard elevator 2642 key.
- Switch Configurations:
 - Three position key - Normal, Fire Service and door open.(Fig. 2A)
 - Two position key - Normal and Fire Service with a door open button. Door open button is required to be located in the same faceplate as the key switch. Button is only operable when key switch is in the Fire Service position. (Fig. 2B)

Note: In both situations the cylinder face is approximately 1 1/2" in diameter and colored red. Switch faceplate is required to be inscribed "for fire department use only" or similar terminology.

- The Normal and Fire Service position in the keyed switch permit the removal of the key. The key is not removable in the door open position.



**Figure 1
Elevator
Configuration**

Fire Service Lobby Switch Plate

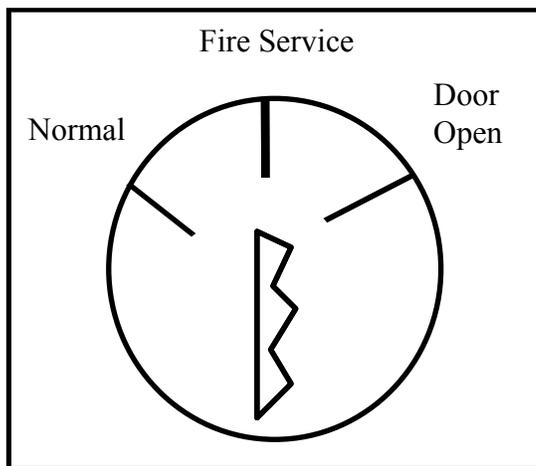


Figure 2A

Often abbreviated as:
OFF (Normal)
ON (FireService)
DO (Door Open)

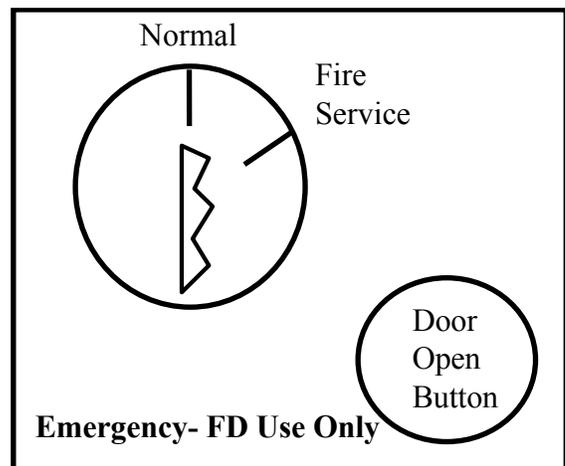


Figure 2B

◆ Elevator Car Keyed Switch.

- Fire Service keyed switch is provided inside each Fire Service elevator car.
- This switch is identified by red lettering "FOR FIRE DEPARTMENT USE ONLY" and has two positions. Normal and Fire Service.

Note: Elevators approved for installation after March 1991 are required to be equipped with a three position switch:

HOLD



Fig 2 Elevator Car Key Switch

The Hold Position has the following features:

- Permits the firefighter to remove the 1620 key from the switch.
 - Allows the firefighter to leave the car without the danger of an individual, without a key, moving the car to another location.
 - A firefighter with a 1620 key can move the car by changing the switch position from HOLD to FIRE SERVICE.
THIS ACTION SHALL NOT BE TAKEN WITHOUT FIRST INFORMING THE FIREFIGHTERS OPERATING ON THAT FLOOR.
 - Elevator cars equipped with a two position switch are not required to be retro-fitted with a three position switch
- To operate the car, the switch must be placed in the Fire Service position while the car is at the landing where the lobby keyed switch is located.
 - The lobby keyed switch must be in the Fire Service position prior to placing the car keyed switch to Fire Service.
 - Once the car switch is in the Fire Service position it can not be overridden by the lobby keyed switch.
 - The 1620 key is not removable from the elevator car keyed switch when it is in the Fire Service position.

7.2 Operation of Fire Service.

◆ Phase I - Recall Phase.

The recall of ALL elevators in the bank to the street or terminal floor. This recall is done automatically (via sensors and/or detectors associated with certain building systems) or manually. Manual recall is accomplished by the use of the 1620 key at the keyed switches located in the elevator lobby at the street floor or terminal floor.

◆ Results of Initiating Phase I Recall.:

- By placing the keyed switch in the Fire Service position, all elevators in that bank will be returned to the street lobby or terminal floor.
- An elevator traveling away from the street floor or from its lowest landing floor will reverse direction at the next landing without opening its doors, and return non-stop to the street lobby or terminal floor.
- Doors opened at any floor will immediately close and the elevator shall return non-stop to the street or terminal floor.
- Door reopening devices for power operated doors, which may be affected by smoke, heat or flame so as to prevent door closure, shall be rendered inoperative except for those mechanically activated by a safety edge.
- "Emergency Stop" buttons will be rendered inoperative.
- When the elevator car reaches its terminal floor, one of the following will occur:
 - All car and hoistway doors open. The doors remain open for at least 8 seconds and no more than one minute and then close.
 - All car and hoistway doors open. The Fire Service elevator car and hoistway doors remain open with the car lights remaining on. Non Fire Service elevator car and hoistway doors close between 8 seconds and one minute after opening.
 - All elevator car and hoistway doors open and remain open. The car lights in the Fire Service elevator cars remain on and the lights in the Non Fire Service cars go off.

Caution: Do not return the switch to the "normal" position at this time.

- ◆ Phase II - Operational Phase: The actual operation of the elevator car by use of the controls located within the car.

- Place the 1620 key in the car Fire Service switch and turn to the Fire Service position.
- Press the car "Door Close" button and select a floor. It is not important which floor button is pressed first. In some elevator cars there may be two floor selection panels. The one to use for Fire Service is the one nearest to or the one with the Fire Service keyed switch.
- As soon as the car begins to move, press the "Call Cancel" button to verify the operation of the "Call Cancel" button.
 - If the car stops at the next available landing in response to the "Call Cancel" button, select the desired floor on the "Floor Selection" panel.
 - If the car does not stop at the next available floor in response to the "Call Cancel" button, look to abandon the elevator. Immediately select the next available safe floor. If the car does not stop at the next available floor, attempt to stop the car by forcing the car doors open, thus interrupting the interlock relay switch. Notify the officer in command and initiate emergency evacuation procedures.
- If more than one floor selection is made, the elevator car will stop at the nearest floor selection in the direction of travel.
- If the car is operating normally when you reach the selected floor, press the "Door Open" button. You must keep your finger on this constant pressure button until the door is fully open, otherwise the door will close on its own. This is a built in safety feature.
- If the doors open on heat and smoke, the simple removal of the finger from the "Door Open" button should enable the doors to close.
 - If they fail to close automatically, press the "Door Close" button and manually assist the closing.
 - If the car doors still fail to close, don Mask facepiece, evacuate the elevator and proceed to the nearest safe stairway.
- When the elevator doors have fully opened, the elevator car will remain at the selected floor, with the doors open.
- The elevator car shall not be returned to the lobby street floor until the officer has determined that the unit has arrived at the proper location.
 - Due to internal building security, it is often necessary to force your way out of an elevator landing area on upper floors. Units may have to force their way from the elevator lobby to a fire stair or fire tower, either for reasons of safety or in order to

operate. Someone should stay with the elevator, to see that it is not moved from the floor, until safe access to the fire stair or fire tower is assured

- To move from any floor, the "Door Close" button must be pushed, and another floor selected.
- An elevator can be placed on Fire Service or taken off of Fire Service only when the car is at the landing where the lobby keyed switch is located.
- Once a Fire Service car has been placed in Phase II operation, it will continue in Phase II operation, regardless of the Position of the lobby keyed switch. This feature may be utilized to restore other cars in the elevator bank to normal operation, while the Fire Department continues to use the Fire Service car or cars.
- When an elevator car has been placed on Fire Service, it shall be operated by a member equipped with a handie talkie and forcible entry tools.

8. ELEVATOR OPERATIONS DURING FIRE OPERATIONS

8.1 General Procedures.

- ◆ Account for all elevators serving the fire floor, checking them for victims.
- ◆ When it is confirmed that the fire is on the 7th floor or below units should avoid the use of elevators. It is safer to utilize the stairway to reach the fire floor.
- ◆ Do not use an elevator in a bank which services the fire floor if a lower bank of elevators reaches within five floors of the fire floor.
- ◆ When it is necessary to use an elevator in a bank which serves the fire floor:
 - If Fire Service is available, use a car with the Fire Service feature.
 - Select a floor at least two floors below the fire floor or two floors below the lower level of an access stair in the fire area, whichever is lowest.
- ◆ A service elevator shall not be used until it is declared safe for use by the officer in command of the fire. Be aware that in many high rise office buildings the service elevators have been converted for Fire Service. Use of such an elevator must be avoided until declared safe by the officer in command.

- ◆ Before entering the elevator car, all members shall have donned their mask. The facepiece shall be maintained in the standby position.
- ◆ There must be a member equipped with a handie-talkie in each car whenever the elevator is in use.
- ◆ Not more than six members are to be permitted in any elevator car. This precaution is required to prevent overloading.
- ◆ Forcible entry tools must be carried aboard each elevator car.
 - In the event the car does not stop at the selected floor, a tool may be used to pry the elevator car door open disengaging the car door interlock.
 - In the event the car should become disabled a tool may be needed to extricate the members.
 - Tools may be required if elevator gives access into a secured area.
- ◆ Elevator should be stopped every five floors (precautionary stops) to confirm that the elevator will respond to the selected floor. At each stop a new selection must be made.
- ◆ Before leaving the lobby and at each precautionary stop direct a flashlight up between the elevator car and the hoistway shaft to determine if there is any accumulation of smoke in the elevator shaft.
- ◆ The relationship of the elevator to the stairway should be noted. This can be accomplished by inspecting the "YOU ARE HERE" sign which is required to be posted at each floor near the call button. This should be done at the first and last precautionary stop. Floor configurations may change.
- ◆ Determine as soon as possible if the location of the fire could affect the elevator operation.
- ◆ Members must be careful during any emergency stop. They should prepare themselves for the jolt of a fast moving elevator car stopping abruptly.
- ◆ If you are in a smoke filled hallway, remember, elevator doors will swing toward you and apartment doors will swing away from you. If the electric interlock malfunctions it might be possible to open the elevator door and not have the car on that floor.

Some elevator doors are of the sliding type. If forced by mistake due to smoke conditions, they may pop inward and be mistaken for an apartment door.

8.2 Affects of Fire on Elevator Components:

Mechanical or electrical systems can become affected by heat or water causing erratic behavior of the elevator car.

- ◆ Elevator car may move leaving a hoistway door in open position. To minimize the possible dangers with such the following precautions should be taken:
 - During fire operations do not straddle elevator doors to hold the car. Use Fire Service if available or folded lengths of hose to hold car.
 - If the elevator moves leaving the door open, close the hoistway door manually if possible.
- ◆ Hoistway door can become warped by heat. This can render the elevator in the particular shaft out of service due to the opening of interlocks. To prevent any complications involved with this, members if possible, should avoid using elevator cars that service the fire floor.
- ◆ Interlocks of hoistway door can malfunction. This may allow a member to open a swing type door with no elevator car at landing. With this in mind, members should always feel for a floor before moving through a door way.

NOTE: Any situation where the elevator operates erratically, members must exit the car at the nearest safe floor. Place the car out of service, either via the car controls or by blocking the car door. Notify the Officer in Command immediately.

8.3 Firefighters trapped in stalled elevator cars during fire operations:

- ◆ If elevator car door opens on fire floor (heat, smoke), attempt to close the door either by pushing the Door Close Button or by forcing the door closed. Then select a lower floor.
- ◆ If car fails to move:

Check Emergency Stop Button, it may have accidentally been activated. Deactivate it by pulling it out, or if switch type, moving switch to off position.

- Open Top Emergency Exit to relieve smoke in car.
- Keep low in car.
- If necessary don Mask facepiece. Remember it is important to conserve air.
- Communicate situation to officer in command.

- If necessary use side emergency exit for rope slide to the safety of lower floor. Have power removed to the adjacent car if this is to be attempted.
- In an EXTREME EMERGENCY, Fire Department hose can be used to slide down to the floor below. If more than one length of hose is used, first tie the lengths together, then couple them.
- Members can be lowered to the hoistway door interlock and exit at the floor landing below the fire.
- Hose line on the floor below can be used to spray a fog stream between the car and the hoistway door. A 30 degree fog pattern should be used to cool and protect trapped persons during the rescue operation.

8.4 Fire Service During Fire Operations:

- ◆ Assure the elevators serving the affected areas have been placed on Fire Service.
- ◆ When Fire Service is available use the elevator cars so equipped.
- ◆ First arriving units should, if possible, initially avoid a Fire Service elevator which is capable of stopping at all floors. Many of the converted "Service" freight elevators are so arranged, and therefore are capable of being affected by fire on any floor. Only after the officer in command has determined that the fire is not adjacent to the shaft should these elevators be utilized. (Experience indicates that many fires in high-rise office buildings have been found in the service elevator lobby, in piles of collected rubbish. Heat and flames have affected the doors and control wiring of nearby service elevators).
- ◆ Members shall never take a Fire Service elevator which services all floors to go above the fire. When assigned to go above the fire via an elevator, choose an elevator which has a blind shaft on the fire floor. Remember a "Fire Service" elevator is not necessarily a "safe" elevator. It can still be affected by heat, smoke or water entering the shaft. If there is no blind shaft elevator to go above the fire, stairs shall be used.

Note: Use a fire tower or a stairway other than the attack stair.

- ◆ There are situations in which units will encounter "exceptions to the rules". Time must be taken to become familiar with particular elevators before leaving the lobby. Utilize stairs whenever possible, and try to limit elevator use to those in banks that cannot be affected by the fire.
- ◆ If Fire Service elevators have not been installed in the building, Fire Department operations shall be conducted using elevators that have been placed in the "Manual Mode" if possible. When using elevators in the "Manual Mode" all the applicable sections of this procedural guide shall apply.

9. ELEVATOR TERMS AND DEFINITIONS

Alarm button (switch) - Button (switch) in elevator car which activates the alarm bell.

Car Door - Elevator car door.

Car Door Contact - An electrical device used to prevent the operation of the car unless the car door is in the closed position.

Car Safeties - Stop car in the event of an emergency. Controlled by car governor.

Counterweights - Used to counterbalance the weight of the elevator car.

Elevator Car Selector - Panel inside car containing emergency stop button, alarm button, door open button, floor selection buttons and Fire Service key switch if required.

Elevator Control Panel - A visual display unit located in the lobby which indicates the status and location of all elevator cars and the necessary controls for the operation of the cars. Common in High-Rise buildings.

Elevator Door Vane - The connection between the elevator car doors and the hoistway doors. It allows the elevator car door to drive the hoistway door.

Elevator Machinery Room - Area where the equipment that raises and lowers the elevator is located. Usually located at the top of the shaft, machinery room may also be found at shaft bottom or two floors above the highest floor serviced by the elevator.

Elevator Motor - Turns winding drum raising and lowering elevator car.

Emergency Stop Button - Elevator car button which when activated cuts power to car and sounds alarm bell. Note: Do not rely on this button, elevator power switch must be used to insure motor power is off.

Emergency Escape Ladder - On the top of some elevator cars used to assist in top hatch removal operations.

Emergency Exit - Side door of a car in multi car hoistways.

Final Lower Limit Switch - A switch located in the elevator pit which prevents the elevator from descending too low in the shaft. When tripped by elevator it cuts the power to elevator motor. Acts as a backup to lower limit switch.

Fire Service - A feature required in many elevators which enables the department to gain control of the elevators

Floor Call Button - Located at elevator floor landing, used to call car to the floor when service is desired.

Floor Selector - Located in the machinery room can be used to determine the exact location of the elevator.

Governor - Regulates elevator car speed. Also engages car safeties and shuts off electrical power in the event of free fall or over speed.

Governor Rope - A wire rope or cable which travels with the car. If engaged by the governor it mechanically activates the car safeties.

Hoistway - The shaft the elevator moves in. Types: Single car (local service), multi car (local service), single car blind (express service), multi - car blind (express service).

Hoisting Cable - Cable (cables) used to raise and lower the elevator.

Hoistway Door - door leading from landing to elevator shaft.

Interlock - A switch on hoistway door, and some emergency exits that will prevent the elevator from moving when in open position.

Key 1620 - An official Fire Department alarm box key.

Key 2642 - Standard key used by elevator industry. This key is interchangeable with 1620 key for operation of Fire Service elevators

Limit Switch - A mechanical electrical device which is located at the top or bottom of the shaft. Its purpose is to prevent over extension of elevator car in an upward or downward direction.

Lower Limit Switch - A switch which stops the car in pit area, below lowest landing.

Main Electrical Power Switch - Located in machinery room, each switch controls the operation of one elevator.

Terminal Landing - lowest landing for discharge of passengers, may be at ground floor or above in which case it is known as a Sky Lobby.

Traction Sheave - Free turning pulley for elevator cables.

Ventilation Opening - "Smoke hole" - opening providing for the movement of air in the shaft caused by the movement of the elevator.



NON-STRUCTURAL FIRES

OBJECTIVE:	<ul style="list-style-type: none">• To make members aware of the variety of non-structural fires that the FDNY responds to and operates at.• To educate members about the dangers associated with non-structural fire operations.• To inform members of ways to operate safely at these incidents.
CONTENTS:	<ul style="list-style-type: none">• Incinerators and Compactors• Motor Vehicle Fires• Manhole Fires
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Training Bulletins Fires 7 & 8• FDNY All Unit Circular 180

PART ONE

INCINERATORS & COMPACTORS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	SIZE UP	1
2	INCINERATOR OPERATIONS.....	2
3	INCINERATOR SAFETY	4
4	ENGINE OPERATIONS.....	5
5	COMPACTOR OPERATIONS.....	5
6	COMPACTOR DESCRIPTION.....	5
7	COMPACTOR ROOM FIRE PROTECTION	6
8	COMPACTOR FIRE OPERATIONS	7
9	SAFETY PRECAUTIONS.....	9

The FDNY spends many hours at emergencies and minor fires that involve incinerators, compactors, autos, manholes, etc. We must know how to deal with them in a professional and safe way.

1. SIZE-UP: INCINERATORS AND COMPACTORS

1.1 New York City Regulations encourage the use of compactors rather than incinerators, and require that incinerators be used only with safeguards. This policy reduces the risk of fire or smoke emergencies occurring, but does not eliminate them. New incinerators can be installed in hospitals and in municipal buildings. In existing buildings, an incinerator must either be converted to a compactor or be updated by adding a scrubber, an auxiliary gas or fuel burning mechanism and oversized fans. New buildings (except hospitals and municipal buildings) are permitted to install only compactors.

1.2 Typical problems.

A. Heavy smoke conditions, in which people may be overcome by smoke or may panic.

NOTE: Some hallways do not have windows that can be ventilated.

B. Extension is unlikely but is much more probable in the case of a compactor than in the case of an incinerator, since compactor chutes are not designed for burning. Therefore the operational priorities are different, viz:

- 1) Compactor - Put the fire out.
- 2) Incinerator - Clear the blockage.

1.3 An important factor is to determine if it is a compactor or an incinerator. A compactor fire is a structural fire while an incinerator fire which does not extend or communicate from the shaft is an emergency. If the fire extends from the incinerator shaft it is a structural fire. Some ways of determining what we are dealing with are:

A. You may know ahead of time, perhaps through BISP whether the building has an incinerator or a compactor.

B. A large number of plastic bags on the sidewalk may indicate a compactor.

C. Steel cans filled with ashes may indicate an incinerator.

D. In City Housing Projects, the chute door on the first floor may be color coded: RED for incinerator, GRAY for compactor.

2. INCINERATOR OPERATIONS

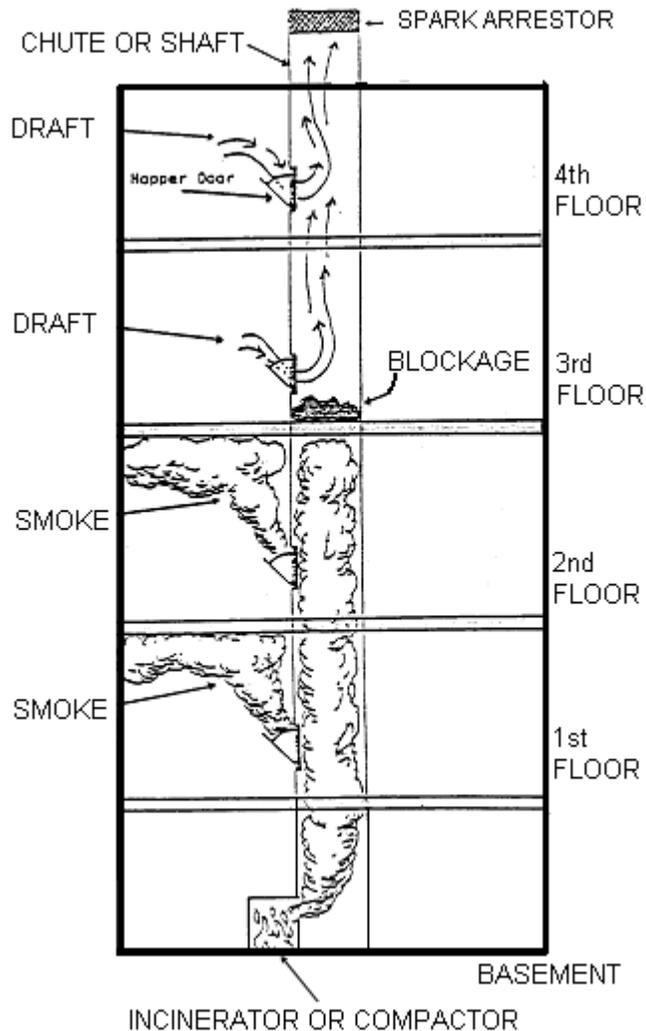


Fig 19-1

2.1 Officer, FE team, and OVM of the ladder company will generally operate inside the building to ventilate, search, and to locate the blockage.

A. Examples of ventilation.

- 1) Vent windows in halls, if there are windows.
- 2) Chock open doors to stairwells on floors with smoke conditions to allow vertical ventilation up stairwells.

NOTE: The roof firefighter (see below) can vent stairways by opening the door of the bulkhead and securing it.

B. Search floors above and below the source of the smoke where heavy smoke conditions call for this.

2.2 Locating the blockage.

- A. If you open a chute door on a floor and smoke comes out, the blockage is generally above that floor. Refer to **Fig 19-1**
- B. If instead, when you open it, a draft goes inward or there is little smoke, the blockage is generally below that floor or the blockage has freed itself.

NOTE: If smoke is present on the uppermost floor, there may be a clogged or blocked spark arrester or fly ash collector.

2.3 Possible ways to free the blockage once it is located.

- A. Bent reinforcing rod that is about 10 feet long, and bent into an L shape, can be used to push down the blockage from above.

- B. The blockage can be pushed down with a hook.

NOTE: Some hopper frames can be removed to provide easier access to the chute.

- C. Tie a heavy weight to a rope and drop it from above.

NOTE: Don't drop anything which is not secured with a rope, whether it is a brick, a cinder block, or a cement block.

1) It may damage the chute or compound the problem if the blockage is not cleared.

2) More important, it is possible to injure members operating below.

- D. If the blockage cannot be freed by use of the above methods, consider burning it off. (This is used only on incinerators).

NOTE: Caution must be taken to avoid any extension.

- E. If all else fails, a hoseline can be used from the floor above to extinguish the fire.

NOTE: Whenever fire is put out by flooding the shaft with water, the auxiliary gas or fuel burner must be shut down. If possible shut it down before flooding. This will mitigate the danger of explosive gases in shaft.

- F. The roof firefighter of the ladder company proceeds to roof to ventilate stairways and to check spark arrester for blockage. As stated above, the bulkhead door can be opened and secured in order to vent stairways.

NOTE: It is very important that, before the roof firefighter leaves the lobby he chocks open the stairwell door at the ground floor level. This will provide for maximum draft and vertical ventilation when the roof bulkhead door is opened.

- G. If there is a spark arrester, it should be checked for blockage. If there is blockage, the roof firefighter should notify the officer and attempt to clear it. Be cautious of fly ash collector.

- H. If there is a fly ash collector, there may be blockage inside the incinerator chute, at the top. If there is, the roof firefighter should notify his officer for assistance and start to force entry into the collector and clear the blockage.

NOTE: A fly ash collector is an area near top of the incinerator vent shaft for collecting fly ash that results from incomplete combustion of the waste material. It can be as small as an enlarged area in the shaft or as large as a small room. It is always equipped with a means of access cleaning (generally a steel door). Use caution in the larger collectors because there may be an open hole in the floor large enough to fall into. Also, if the area is small, hot ash may come down on member when opening door.

- 2.4 The duties of the chauffeur of the ladder company will vary dependent upon conditions. The chauffeurs duties may be:

- A. To locate and check out the incinerator room.

NOTE: The chauffeur may have to operate the fans to improve ventilation.

- B. If the blockage is between the incinerator and the first floor, a hook may have to be used to pull it down from below. (Shut off the auxiliary burner before commencing operations!)
- C. It may be necessary for the chauffeur to assist in search and ventilation of the building as ordered by the officer.

3 INCINERATOR SAFETY

- 3.1. Pay special attention to safety whenever you open a chute door. When chute doors are opened, dust explosions, exploding aerosol cans, and the eruption of fire are real possibilities.

- 3.2 Take the following precautions when opening a chute door:

- A. Be sure you are wearing full firefighting gear, including gloves and eye shields down. Consider using a mask if necessary.
- B. Stand to the side of the hopper door. If the door is hinged, stand on the hinged side.
- C. Eyes should be below the opening, and face turned away.
- D. Always stay clear of the opening, in case there should be an explosion or an eruption of fire.
- E. Shining a flashlight up or down the chute may aid in locating the blockage or observing smoke movement.

- 3.3 Members attempting to clear a blockage from the base of the incinerator should shut off the auxiliary burner before commencing operations. Gas explosions of some consequence involving the auxiliary gas burners, while infrequent events, have occurred.

4 ENGINE COMPANY OPERATIONS

- 4.1. Engine companies shall be guided by the following:
- A. Generally, the engine company will stand-fast in the lobby with masks, rolled ups and standpipe kit.
 - 1) Some members may be used to assist the ladder company in search, vent, etc. However, generally the officer and at least 2 men shall remain in the lobby.
 - B. If it is determined that the chute is to be flooded, a line is stretched to the floor above the fire and operated into the chute.
- 4.2 Additional considerations:
- A. There are buildings with incinerators and compactors that do not have standpipes. This will necessitate a hand stretch if a line is needed.
 - B. If after investigation, it is determined that the fire is in the basement incinerator room, entry may have to be made via an outside entrance. Use S.O.P. for basement fire.

5. COMPACTOR OPERATIONS

- 5.1 The air quality standards for New York City were revised by Local Laws 14 of 1966 and 49 of 1971 to improve the air pollution situation. In compliance with these laws, new buildings were equipped with compactors and many existing incinerators were converted to compactors.

6. COMPACTOR DESCRIPTION

- 6.1 There are several shapes, sizes and manufacturers of compactors.
- 6.2 A compactor is designed to reduce the volume of raw refuse. The refuse is dropped down a chute from the floors above, and guided by a shaped hopper into the compactor chamber. When the chamber is full, a photo electric beam is broken, initiating a ram that forces the refuse through a nozzle leading to a bag or container. This photo electric mechanism operates on a delayed time principle. An object must block the beam for four seconds before the compactor starts. The time factor may be either consecutive or accumulative.
- 6.3 The type of compactor that FDNY units most frequently encounter is the incinerator conversion, installed at the base of the original incinerator chute. It is usually located in a separate room, accessible from the rear of the building.

6.4 Diagram of Typical Compactor

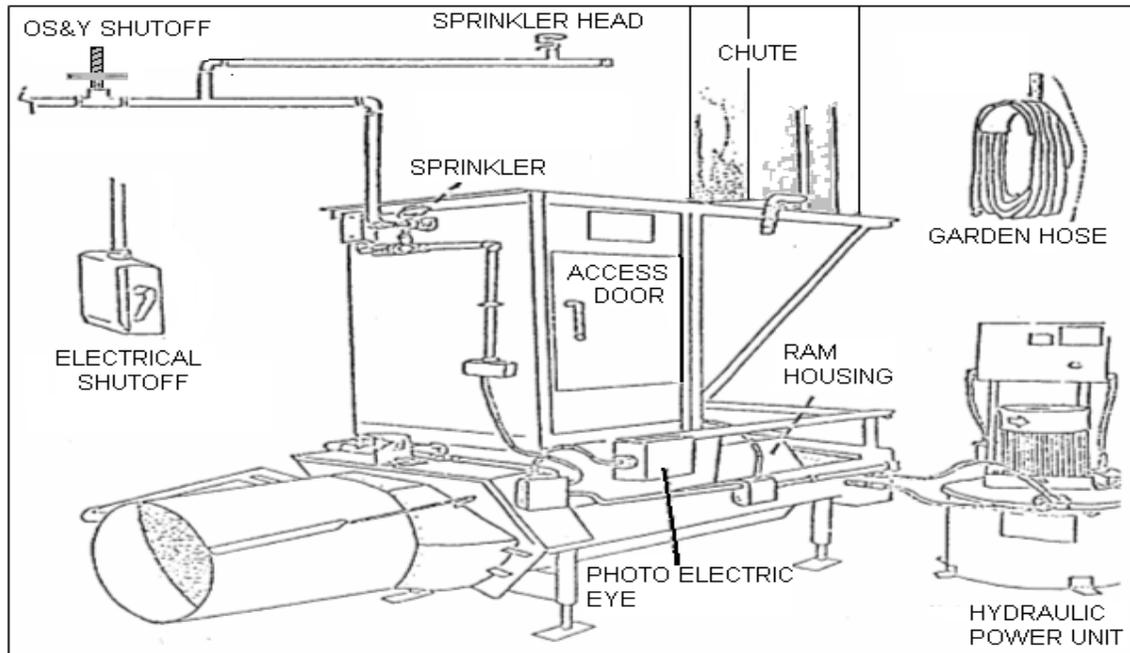


FIG. 19-2

7. COMPACTOR ROOM FIRE PROTECTION

- 7.1 The compactor room should be fire resistive, protected by a fire door and supplied with an automatic sprinkler.
- 7.2 A water outlet and a hose are required in the compactor room.
- 7.3 According to Department of Buildings Rules for Construction and Maintenance of Refuse Chutes and Refuse Rooms, sprinkler heads shall be provided in compactor units. The sprinkler heads shall be arranged so that they may be readily replaced, unless the heads are electrically operated and are approved by the Board of Standards and Appeals.

The electrically operated head is thermostatically controlled to operate at approximately 135°F. Once activated, it will flow until temperature falls below 135°F., when it will shut off. This is an open sprinkler head, designed not to be replaced after activation. It is a permanent feature of the compactor unit. Many times the head will not operate because it is clogged with refuse.

- 7.4 A small O. S. & Y. valve, controlling both the automatic head within the compactor and any heads within the compactor room, is usually found on the water line in or near the compactor room.

OS&Y for sprinkler is located in the supply line. It can be either inside or outside of compactor room. Sprinkler heads are not only in the compactor room but also in the compactor unit and in the chute. If they are not operating, they may have been previously shut down by maintenance or the heads may be insulated from heat by the garbage.

NOTE: The FDNY does not replace sprinkler heads.

- 7.5 In refuse chutes constructed in new construction, sprinklers shall be provided spaced not more than two stories apart for the height of the chute. They shall be recessed and so arranged that fused sprinkler heads may be readily replaced unless electrically operated.

8. COMPACTOR FIRE OPERATIONS

- 8.1 The operations at compactor fires will be governed by the location of the fire. There are three categories of compactor fires: in the chute, in the unit, or in the compactor room.

8.2 Chute fire (operations).

A. The first engine company to arrive will proceed to one level above the burning material, stretch a line and operate into the chute to extinguish the fire. Freeing the blockage, as you would in an incinerator fire, could result in a more serious situation in the compactor unit, because it is not designed for burning refuse. The possibility of extension is greater in the unit than in the chute.

- 1) OV of the ladder company operates with engine company to provide access to the chute and check for extension.

B. The officer and forcible entry team of the ladder company will operate in the compactor room.

- 1) The officer and forcible entry team must first, locate the electrical shut off and shut power to the unit before operations commence.

NOTE: The shut off will generally be on the wall in the compactor room. The compactor unit can be operated if there is a need, to help clear the unit; however, extreme caution must be exercised.

- 2) After the engine company has extinguished the fire, the ladder company may begin overhauling. Before opening the compactor unit access door be sure the hoseline is shut down and sprinkler OS&Y is closed. If the engine is still using the line or the sprinkler is still operating, glass and other debris may be driven out of the compactor unit.

- 3) Open door to unit and pull garbage to reach fire.

- 4) Most rooms have a hook up for a garden hose. Use it to wet down debris as it is pulled from chute.

- 5) Check for extension.

C. The roof firefighter of the ladder company will generally proceed to the roof to vent.

- 1) After venting roof, this member will search and vent stairways floors, etc., as needed.

- D. The chauffeur's duties will vary and will generally be as directed by the officer to:
 - 1) Provide special tools in the compactor room or assist in search and venting, etc.

8.3 Fire in Compactor Unit (no extension to the chute).

- A. If the fire has not extended into the room, the engine company stretches a line to first floor, and operates into chute to extinguish the fire.
- B. OV operates with engine to provide access to the chute and to check for extension.
- C. The roof firefighter of the ladder company will generally proceed to the roof to vent.
 - 1) After venting roof, this member will search and vent stairways floors, etc., as needed.
- D. The chauffeur's duties will vary and will generally be as directed by the officer to:
 - 1) Provide special tools in the compactor room or assist in search and venting, etc.
- E. The officer and forcible entry team of the ladder company will operate in the compactor room.
 - 1) The officer and forcible entry team must first locate the electrical shut off and shut power to the unit before operations commence.

NOTE: The shut off will generally be on the wall in the compactor room. The compactor unit can be operated if there is a need, to help clear the unit; however, extreme caution must be exercised.

- 2) After the engine company has extinguished the fire, the ladder company may begin overhauling. Before opening the compactor unit access door be sure the hoseline is shut down and sprinkler OS&Y is closed. If the engine is still using the line or the sprinkler is still operating, glass and other debris may be driven out of the compactor unit.
- 3) Open door to unit and pull garbage to reach fire.
- 4) Most rooms have a hook up for a garden hose. Use it to wet down debris as it is pulled from chute.
- 5) Check for extension.

8.4 Fire Extended from Compactor into Room.

Fire fighting tactics same as a cellar fire.

9. SAFETY PRECAUTIONS

- 9.1 Members working in area of compactor unit should make sure they have gloves on, eye shields down, and keep arms and hands out of unit. Bottles, spray cans and other potentially dangerous debris may be falling down chute.
- 9.2 **Electrical**
Compactors are powered by high voltage electrical lines (approximately 210 Volts). To eliminate the potential hazard, disconnect power at electrical shut off.
- 9.3 **Mechanical**
Compactor ram has a packing force of approximately 50,000 pounds, depending on size of the unit and the manufacturer. It is triggered by a photo electric circuit. When the electric power is shut off, the hydraulic ram is also deactivated, eliminating the danger of injury from the ram.
- 9.4 **Hydraulic**
If the hydraulic lines rupture, the escaping flammable fluid adds to the potential of the fire. This would also create a slippery condition for members operating in the area.

PART TWO

MOTOR VEHICLE FIRES

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	INTRODUCTION	13
2	PURPOSE.....	13
3	DEFINITIONS.....	14
4	CRITICAL FACTORS AFFECTING OPERATIONS.....	14
5	RESPONSE.....	16
6	PLACEMENT OF APPARATUS	16
7	HGH VISIBILITY VESTS.....	17
8	USE OF FLARES AND CONES AT OPERATIONS	17
9	ACCESS TO EXPRESS HIGHWAY/PARKWAY OPS.....	19
10	QUICK SAFETY TIPS AT MOTOR VEHICLE EMERG.	20
11	FIREFIGHTING OPERATIONS AT VEHICLE FIRES	21
12	CONCLUSION	26
	REFERENCES.....	26

1. INTRODUCTION

1.1 The dangers associated with present day traffic conditions have demonstrated a need for this Department to reassess and modify its operations on all roadways, especially express highways and other high-speed thoroughfares, as well as many secondary roadways. Traffic hazards formerly associated with only a few dangerous locations are now encountered throughout the city. These hazards include, but are not limited to:

- Disregard for speed limits and other traffic regulations.
- Persons driving vehicles incapacitated by virtue of alcohol and/or drug consumption, or other impairments.
- Distracted drivers, (e.g., cell phones, audio and visual entertainment devices.)
- Tailgating.
- Higher volume of traffic.
- Construction and road repair on many roadways.
- Tourists and others traveling unfamiliar routes making sudden stops, lane changes or other unexpected maneuvers.
- Rubbernecking.
- Inexperienced drivers performing faulty evasive actions.

2. PURPOSE

- 2.1 Improve safety for members and civilians.
- 2.2 Standardize operational procedures.
- 2.3 Identify problems associated with highway operations.

3. DEFINITIONS

- 3.1 **Express Highways:** Limited access highways and parkways, (e.g., Long Island Expressway, Belt Parkway, Cross Bronx Expressway, Staten Island Expressway.)
- 3.2 **Divided Boulevards:** Main primary routes, usually with service roads. The main road may have a physical center divider, or the center divider may be painted on the road surface, (e.g., Queens Boulevard, Grand Concourse, Kings Highway, Pelham Parkway.)
- 3.3 **Main Arteries:** Those with posted speed limits higher than 25 mph, such as Union Turnpike, Northern Boulevard, Hylan Boulevard.
- 3.4 **Secondary Roadways:** Other city streets, avenues, not falling into one of the categories above.
- 3.5 **Known Speedways:** Roadways where local experience shows frequent or regular disregard for speed limits. These "known speedways" may fall into any of the categories above.
- 3.6 **Secondary Collisions:** A "Secondary Collision" is one between a vehicle traveling in the vicinity of the fire or emergency and any other vehicle, object or person - happening at the time of the arrival of the Fire Department or thereafter.

4. CRITICAL FACTORS AFFECTING OPERATIONS

- 4.1 Some important points to be considered are: At a highway operation, the FDNY has an obligation to its members and to the civilian population to prevent further injury and to provide a safe working area, consistent with conditions.
- 4.2 Immediately upon arrival at an operation on a highway, the officer in command must take steps to prevent escalation of the incident in the form of a secondary collision.
- A. The cause of a secondary collision can be related to the original fire or operation.
- Examples:
- Civilian car strikes an apparatus; or,
 - Civilian car strikes a firefighter, because vision is obscured by smoke, etc.
- B. This may be avoided by completely stopping traffic flow in all lanes of the highway on the side where the fire or emergency has occurred, at least until arrival of the police department to control traffic. This should be done, when necessary, by using apparatus to stop traffic and then blocking traffic in the immediate working area. The Incident Commander shall coordinate which lane closures are necessary to control the scene with the ranking police officer.

- C. On arrival, the officer in command must assess the potential for secondary collision based upon:
- Traffic flow: the volume and speed of the moving traffic on the highway or street. The greatest danger of secondary collision occurs during periods of light to moderate traffic volume with the usual accompanying high speed.
During this type of traffic flow we can expect speeds of 70 mph or more, despite posted speeds of 50 mph on express highways.
 - Visibility of roadway: Weather conditions, topographical layout, curves and hills, buildings, overpasses, shrubbery and trees as well as smoke from the fire all affect the ability of oncoming drivers to perceive a dangerous condition in the roadway ahead in time for them to take proper and timely evasive action.
 - A very important fact which must be considered is that on DRY pavement with GOOD brakes a fully loaded tractor-trailer combination will need over 500 feet to stop at 50 mph AFTER THE DRIVER PERCEIVES THE DANGER! Unfortunately, many trucks of this type do not have good brakes. A passenger car traveling at 70 mph will need over 500 feet to stop. Wet pavement and other weather factors can double the stopping distance!
- 4.3 Severity of Incident: Does the incident involve:
- Motor Vehicle fire?
 - Hazardous materials?
 - Collision of vehicles?
 - Injuries or entrapment of civilians?
- 4.4 Police Assistance: Upon arrival at the scene of the incident on a highway, the dispatcher shall be notified to request response of police department and if required, authorized tow.
- 4.5 Sanitation Assistance: During freezing weather, water should be used judiciously to minimize formation of icing conditions. Where necessary, Sanitation Department should be promptly requested through the dispatcher for spreading of salt or sand.
- 4.6 Other Considerations:
- "Rubbernecking" which may result in a secondary collision.
 - Smoke obscuring driver's vision, possibly resulting in a secondary collision.
 - Time of day, physical and traffic conditions such that high speed light traffic is present.
 - Eventualities such as fuel tank explosion, hydraulic cylinder rupture, bursting of tires, causing firefighters to react by inadvertently stepping out of the safe operating area into the path of traffic.
- 4.7 Where weather conditions (snow, rain, fog, sleet, etc.) or smoke blowing across highway limit visibility, highway must be closed.

5. RESPONSE

- 5.1 One engine and one ladder from **each direction**, and a Battalion Chief will be assigned to all express highway incidents. No fewer than two units shall operate at an incident on an express highway or other potentially dangerous roadway.

At least one vehicle, other than the pumper being used to extinguish the fire, shall be used to divert or block oncoming traffic for the duration of the operation or until the police department arrives on scene and assumes traffic control. There may arise occasions where additional units are necessary to establish a proper area of safety. Example: Both units operating, handline stretched and extrication tools in operation. High Visibility Safety Vests shall be donned as per Section 7.

- 5.2 ENHANCED RESPONSE TO HIGHWAY INCIDENTS:

Fire units will be automatically dispatched to EMS responses on highways involving accidents with injuries and/or pedestrians struck. Fire units shall position apparatus to protect both EMS and fire members operating on or near the roadway. The existing dispatch policy of one engine and one ladder from **each direction** and a Battalion Chief will be assigned.

When EMS units are on scene at any other type of highway incident and requests a fire unit back-up, then a single ladder company will be dispatched to the verified incident location to divert or block oncoming traffic. Members shall support EMS operations as needed. A ladder company shall remain on the scene to divert or block oncoming traffic for the duration of both fire and EMS operations. High Visibility Safety Vests shall be donned as per Section 7.

- 5.3 All fires and emergencies involving motor vehicles on other than express highways shall receive a minimum response of one engine company and one ladder company.

6. PLACEMENT OF APPARATUS

- 6.1 Apparatus shall usually be placed to the rear of the incident or emergency in a manner that reduces the chance of a vehicle being struck by oncoming traffic. The apparatus should be positioned to shield the operational area and place the pump panel in the protected area. Apparatus should be placed at an angle to the incident when feasible to maximize safety (between the fire or emergency and the oncoming traffic).

However, an obvious exception will be a fire in a flammable liquids tank truck or other hazardous material carrier located on a grade. In such a case, the highway will have to be closed at a sufficient distance from the incident to prevent civilian vehicles becoming involved if a container should rupture or develop a leak. Apparatus will have to be located uphill of the involved vehicles.

- 6.2 Where placement of apparatus will expose it to the possibility of fire extension, pumper may be placed beyond the fire vehicle, but second apparatus, and third if necessary, shall always be placed between oncoming traffic and the operating forces.

- 6.3 Where the fire or emergency occurs near a curve, or beyond a hill, the second apparatus shall be located where it will be visible to oncoming traffic and furnish a warning to such traffic in sufficient time to avoid a secondary collision.
- 6.4 At times, particularly when fire is small and a period of examination and overhaul is necessary, it may be possible to move the fire vehicle and the fire apparatus off the roadway to a safe location. Even when the operation occurs off the roadway, an apparatus must be placed to provide a safe working environment.
- 6.5 Blocking apparatus shall be placed at least fifty (50) feet behind the first operating unit to create a safe working area.
- 6.6 Members shall avoid standing on highway pavement to the rear of second apparatus, unless placing flares, cones or signs, and traffic is stopped.

7. HIGH VISIBILITY VESTS

- 7.1 Department policy requires all members to wear high visibility safety vests when operating on all highways at all times, day or night. This includes, but is not limited to, incidents such as vehicle collisions, extrications, fluid spills, dangerous conditions, vehicle fires, and at any operation that the Incident Commander deems necessary. The scene must also be protected from the hazards of moving traffic by utilizing apparatus blocking or total lane closure.
- 7.1.1 Exemptions from wearing high visibility safety vests are for members directly involved and in the immediate vicinity of firefighting, hazardous material mitigation, or technical rescue. Some examples include:
- Members operating with donned bunker gear and SCBA working in close proximity to a source of heat during fire suppression.
 - Members operating with donned hazardous material personal protective equipment.
 - Members operating with donned technical rescue PPE and/or equipment for a technical rescue incident.
- 7.1.2 Once members complete their activities in fire suppression, hazardous materials mitigation, or technical rescue, or when they leave the immediate vicinity of the incident, they are required to don a high visibility safety vest.

8. USE OF FLARES AND CONES AT OPERATIONS

- 8.1 Flares and cones shall be used as follows:
- A. Flares and cones have been issued to all Battalions for distribution to all Engine, Ladder, Rescue and Squad companies.

- B. Except as stated in subsection D, flares shall be used at night or periods of reduced visibility and cones shall be used during both day and nighttime operations.
- C. Flares and cones may be used at any time where, in the judgment of the officer in command, their use would add to the safety of operation.
- D. Flares shall **not** be used in cases of flammable or combustible liquid or gas leak where their use would create a danger of fire or explosion.
- E. Placing Flares and cones.
 - 1. Flares and cones should be placed to block one or two lanes or to completely block a roadway. At least 4 to 6 cones and/or flares should be used to build a lane closure or safety zone. Vests shall be worn as per section 7.
 - 2. Member should obtain required number of flares and or cones. Before leaving apparatus light one flare and, carrying the lit flare, walks the proper distance to place the furthest flare and or cone first. Member should stay off the roadway and walk on the shoulder or divider facing traffic. The highest speed expected to be encountered should be estimated. Using this estimated speed, place flares and or cones at the distance indicated.
 - 3. **Fastest Speed Expected Minimum Distance to furthest Flare**

<u>MPH</u>	<u>FEET</u>
20	100
30	150
40	220
50	310
60	420
70	550

To calculate the furthest flare distance, the following can be used:
Multiply the first digit of the expected speed by that speed, then add 60.

Example: Expected speed is 30 mph

$$3 \times 30 = 90 \quad 90 + 60 = 150$$

The minimum distance of the furthest flare should be 150 feet.

- 4. The furthest flare and or cone is placed about 2' from the edge of the roadway. The next flare and or cone is then lit and or placed equidistant back to the scene of the operation, moving the flares and or cones about 2 feet further into the roadway at each point. This is continued until the lane is completely blocked.
- 5. When encountering curves in roadway, distance may have to be expanded or more flares and or cones employed to provide additional coverage.
- 6. The distance mentioned in the above table takes into account, reaction time, of oncoming drivers as well as stopping distance or distance required for a safe lane change maneuver.
- 7. When placing flares and or cones, member shall only step into roadway to place flare on pavement and then shall return to shoulder to walk to next flare location only when traffic is stopped. Never walk on pavement with

back to traffic and never walk on pavement assuming that flares and or cones already placed will protect you! After traffic is stopped, two members should place flares and or cones. Flares shall be carried on apparatus in a secure dry compartment as they are not waterproof.

F. Lighting and Carrying Flares

1. When lighting flares or carrying a lit flare, care must be taken to point flares away from body at all times. Carry lit flares in a horizontal position to avoid burning wax or chemical from dropping onto hand or body. Never look directly at lit flare as this may cause temporary "night blindness" which will hamper your ability to see oncoming traffic. Avoid breathing fumes from lit flares. When placing flares on pavement, first bend wire stand to form a tripod with base of flare.
2. Flares burn for approximately 30 minutes. If operation will exceed 30 minutes, prepare to replenish flares in time to prevent burnout before replenishment is completed.

9 ACCESS TO EXPRESS HIGHWAY/ PARKWAY OPERATION

- 9.1 Fires or emergencies on express highways require prompt response to render aid to persons injured or trapped and extinguish fire. However, a safe route to the incident will often furnish this prompt response better than a "fast" one. A fast approach is often the most dangerous. Following safe access rules will greatly reduce the chance of injury to our members or others, and ensure our arrival at the fire/emergency.
- A. Where feasible, approach an express highway incident from the same direction as the traffic. By exercising this option the fire and the engine company occupy only the lane or lanes in one direction, and exposure to secondary collision is thereby lessened.
 - B. Express Highway box assignments call for response of units from more than one direction. Often the company traveling in the direction opposite that of the incident will reach the scene first, and will have to commence operation across the center divider. As soon as possible, this unit should be released and its function taken over by one operating from the incident side of such divider.
 - C. Normally, operating across a center divider shall be avoided. If absolutely necessary to do so, traffic shall be stopped in both directions and safety warning devices set up. As soon as practicable our apparatus should leave the opposite roadway. Experience has shown that in this type of operation we are particularly vulnerable to being struck by "rubber-necking" drivers.
 - The preferred area of crossing shall be visually identified.
 - Direct a member to use a tool to test the surface on the opposite side of barrier, divider or highway separation for the presence of a solid and stable surface.
 - Once the presence of a solid and stable surface is verified, communicate location to all members.
 - This safe crossing corridor shall be the only means of access and egress utilized at this incident unless otherwise directed by IC.
 - Whenever a safe crossing corridor is established, it shall be clearly marked (cones/ barrier tape) to identify the designated area. In addition, at night or whenever visibility is reduced, members shall use all available means of lighting to illuminate the area.
 - If a safe crossing corridor cannot be established, members shall not cross any barrier, divider or highway separation.

- D. Also, at times the preferred route (in the same traffic lanes as the fire) will be unattainable because of the complete blockage of the roadway by vehicles. Therefore, an alternate will be taken
- E. Where it is necessary to stop the flow of traffic, the dispatcher shall be notified to relay the information to the Police Department.
- F. Notification should include recommended response instructions.
- G. When response of EMS is requested, similar recommended response instruction should be offered.
- H. At times the practice of gaining access to an express highway incident from a service road, across a grassy slope, avoids placing the apparatus on the highway proper. However, firefighters operating on/from a service roadway must be extremely careful and warning devices have to be placed as soon as possible at both locations.
- I. Where access to an elevated or depressed roadway is obtained by use of ladders, extreme caution shall be observed in placing and using the ladders. Aerial or Tower Ladder shall not be extended beyond shoulder where they could be exposed to moving traffic. Aerial and/or tower ladder should be cantilevered parallel to the elevated roadway.

10. QUICK SAFETY TIPS AT MOTOR VEHICLE EMERGENCIES

- Do not trust moving traffic.
- Never take a partial lane.
- Never assume traffic will behave the way you expect.
- Proper apparatus positioning is the first step to providing safety of the working crews at the scene of an incident.
- Many motorists and truck drivers have no regard or respect for emergency vehicles or personnel on the scene. In many cases, they don't even slow down near an accident scene.
- Never allow traffic to come around both sides of an accident scene.
- Request police assistance ASAP.
- Company officers should be given the discretion to summon additional resources as necessary.
- Ensure scene is controlled before commencing operations.
- Start operations at highway incidents defensively.
- Do not allow personnel to "wander" around the scene.

The following is a summary of results taken from case studies conducted nationally of firefighter fatalities on highways.

- A. Reduced-vision driving conditions: Although firefighters may be struck by vehicles in virtually any condition, the chances of an incident occurring are greater during obscured vision conditions, including darkness, fog, rain, snow, and blinding sunshine.
- B. Lack of situational awareness: Responders fail to recognize the dangers associated with a particular roadway situation they are facing due to insufficient training or lack of experience.

- C. Careless, inattentive, or impaired drivers: Even when we try to do everything correctly, we must be cognizant of the fact that there are drivers out there who will not react correctly to the altered traffic pattern that occurs at a roadway incident. This may result in them driving into our workspace.
- D. Improper positioning of apparatus: Numerous cases have been cited where apparatus were not positioned to the fullest advantage of the incident. In some cases the apparatus was not positioned in a manner that protected the work area. In other cases apparatus was unnecessarily positioned in the roadway.
- E. Failure to use PPE and high-visibility apparel and safety equipment: Responders working in the roadway must wear appropriate protective garments and use all available traffic control devices in order to prevent being struck by oncoming traffic.
- F. Altered traffic patterns: Drivers may be confused by the traffic control measures used at an incident scene or those being employed in a construction zone.

11. FIREFIGHTING OPERATIONS AT MOTOR VEHICLE FIRES

11.1 Operational considerations for extinguishment include:

- Apparatus shall be properly placed. Both the apparatus and the motor vehicle should be chocked. Be aware autos can start and proceed under their own power.
- Full personal protective equipment (PPE).
- Only minimum members in danger area.
- Approach vehicle from the sides and upwind if possible.
- Position line between the motor vehicle and exposures.
- For a fire in the engine compartment, where the hood is difficult to open, pry up the side of the hood and operate stream through this opening. Do **not** attempt to operate through the front grill.
- Cool hydraulic bumpers, tires or gas tanks in vicinity of the fire. Some foreign vehicles have gas tanks in the front. (See reference 1)
- Use a coarse spray stream when magnesium parts are on fire.
- When victims are trapped in the vehicle, use a fog stream to drive the fire away from victim.
- Members not operating the line, such as door or control position, may be used to:
 - a. Search the passenger compartment.
 - b. Search the general area (victim may have wandered off or been ejected from the motor vehicle). Use of thermal imaging camera may aid in this operation.
 - c. Search the area for evidence of arson.
 - d. Open the trunk and search it for extension, victims, etc.

Note: Flashlights are mandatory at night. Members shall always face the traffic and have a prearranged area of safety.

- Ladder company members may be used to operate a second line to either protect victims or to protect extrication procedure.
- Exposures such as buildings or other vehicles should be checked for extension.
- The possibility of damage to overhead wires or downed wires from damaged utility poles should be considered.
- When opening the hood during fire operations utilize the following guidelines:
 - a. A charged line should be in place during this operation.
 - b. Try the passenger compartment hood release first.
 - c. Use vise grips if the handle is burned away.
 - d. Pry up the side of hood for access to fires in engine compartments.
 - e. Operate handline streams through hood openings to extinguish the fire.
 - f. Stand back when opening the hood. (There may be a burst of flames).
 - g. Bolt cutters may be needed to cut locks or chains.
 - h. Use a 6' hook to support the hood once it is opened.
- Vans.
 - a. Engine cover in the passenger compartment should be removed after the fire is knocked down.
 - b. Stand to one side of the cover when removing it. Do not open it from the rear. (A sudden flare up could cause burns to the face and neck area.)
- Pneumatic pistons, which are used to hold up the hood in the open position, have become a serious danger at vehicle fires. The danger is the result of exploding hood pistons. When heated due to a fire in the engine compartment the rods have become projectiles penetrating the hood and grill. This could cause serious injury to anyone standing in front of the vehicle.
- The trunk must always be examined for victims or extension. Hazards which may be found in trunks include gas cans, pressurized containers, booby traps, glass containers, ammunition / guns, etc.
- The methods of opening the trunk include:
 - a. Drive in the cylinder with the point of a halligan tool, and unlock the trunk with a screwdriver.
 - b. Pull out the cylinder with a Bam-Bam tool and use a screw driver to turn the lock.
 - c. Cut around the bezel ring on the cylinder (with an ax or a screwdriver), then turn the cylinder with a screwdriver.

- d. If entry into trunk is difficult consider the following:
 - Entry via rear seat.
 - Extinguishment of trunk fire via tail-light. Use a tool to break plastic tail-light housing.
- e. The striker plate should be bent with the back of an axe after the trunk has been opened. This will prevent the trunk from relocking and prevents children from being locked in trunk after units leave the scene.

11.2 Additional hazards at motor vehicle fires:

- A. The battery must be disconnected to prevent: sparks, the starter from engaging, or power windows from operating and causing injuries to members or civilians. Some vehicles have two batteries which are remote from one another. The negative terminal must be removed first to eliminate sparks. Be aware that hydrogen gas from batteries could explode and spray acid. (See reference 2)
- B. Magnesium parts may be difficult to extinguish. Engine companies should use a coarse spray stream (partially open nozzle with tip removed) to extinguish these fires. Particles of molten magnesium may fly in all directions or steam explosions may occur, endangering members. Full PPE should be used, including eye shields.
- C. The hazards of the passenger compartment include: windows shattering, noxious fumes, PVC, gas cans, pressurized containers, flammable liquid storage, gasoline powered equipment, etc. (See reference 3)
- D. The hazards of the engine compartment include cooling systems that are under pressure and pneumatic hood pistons which when heated by fire become projectiles penetrating the hood and grill.
- E. Propane tanks which when involved in fire can BLEVE. (See reference 4)

11.3 Container ruptures:

- A. The gasoline tank location on most vehicles is in the rear but there are exceptions on foreign cars where they may be located in the front. On trucks, buses, and other vehicles location will have to be determined at the scene. The application of heat to a tank will cause a rise in internal pressure due to fuel vaporization causing a possible tank rupture. It is possible for an almost instantaneous ignition of vapors where a ball of fire can travel a considerable distance in any direction.
- B. Gasoline spillage from any cause can suddenly become a large area fire should vapors reach a source of ignition. Exposure problems in this type situation are intensified. Examples are gasoline running along street threatening other vehicles, flowing into sewers, gratings, cellars, etc. Be aware plastic high density polyethylene (HDPE) gasoline tanks have been known to fail and release their entire contents.
- C. Tires bursting are capable of dispersing particles in all directions. If fire involves these tires, these particles will be extremely hot. Serious burns or injury can result.

- D. Air conditioning or refrigerating systems on vehicles are located in different areas and require consideration because of possible rupture releasing noxious gases. (See reference 5)
- E. The application of excessive exterior heat on hydraulic or pneumatic pressure systems, such as hydraulic brakes, steering or confined pressurized systems, coolant systems and energy-absorbing units for bumper systems can cause them to rupture violently. Each of these, by itself, can cause serious injury if the pressure contained in that system is suddenly and unexpectedly released. The liquid contained in some of these systems (hot oil or water) is spewed in all directions, and small parts, breaking off from major components can act like projectiles.
- F. Pressurized containers for paints, flammable liquids, de-icing fluids, air for tires and others may be carried in any part of vehicle and their reaction to heat is well known.

11.4 Other hazards:

- A. Caution must be exercised when breaking windows of any vehicle, especially when heated, as there is possibility of glass being shattered throughout area when struck.
- B. When hoods are opened, members should stand back and be aware that a sudden burst of flame can occur. Similar precautions should be exercised by members when opening a locked trunk involved in fire.
- C. Electrical systems can cause sparks, shocks and burns. Short circuits can activate windows convertible tops, etc. But the most dangerous is the possibility of vehicle being in gear on a stick-shift transmission and the starting motor being engaged, moving vehicle. Always chock wheels to insure maximum degree of safety.
- D. Loss of brakes due to fire may cause vehicle to roll down incline. Chock wheels.
- E. When victims are trapped in vehicular fires, all attempts must be made for their removal and protection from fire by use of fog streams driving fire away from them. When removing victims, all precautions must be exercised to prevent further injuries especially where there is no fire involvement. In the latter case, stand fast with a charged line. Use wood or blocks when necessary to prevent slippage and possible production of sparks.
- F. Garbage truck fires. (See reference 6)

11.5 The ADV (Abandoned Derelict Vehicle)

- A. Extreme care should be taken, as accelerants used to start fires in ADV's are varied and at times suddenly flare when attempts are made to extinguish them.
- B. Vehicle may have wheels removed and placed on haphazard blocks which can collapse. Parts of vehicle may have been removed without regard for integrity of the whole vehicle. Attempts to remove parts when overhauling may cause adjoining sections to fall away and cause injuries.
- C. Live ammunition, explosives, fireworks and rubbish containing sealed bottles and pressurized containers have been found in these vehicles.

11.6 Hybrid Vehicles:

- A. Hybrid vehicles are becoming a more common sight on roads today. In some hybrids, the car starts out in a full electric mode to save gas, then starts the engine and switches to gasoline mode when the vehicle reaches a certain speed. Other hybrids do not have a full electric mode. Instead, they use their hybrid battery and electric motor primarily for the engine start/stop system that saves gas when the vehicle is stopped in traffic, or to boost engine power when accelerating or passing. Though hybrids get better fuel economy than conventional vehicles, they also present some unique hazards. The high voltage hybrid battery and hybrid powertrain components create a potential shock hazard.
- B. The voltage in most hybrid batteries can deliver a lethal shock, much like that of an electric chair. The voltage from a hybrid battery is Direct Current (DC). Hybrid vehicles can be rated between 144 and 330 volts DC. The threshold voltage where DC becomes dangerous can be as low as 55 to 60 volts, compared to 110 volts for AC.
- C. Hybrid Vehicle Safety Considerations:
- To avoid being in the path of a moving vehicle do not approach from the front or rear until the vehicle has been disabled. Hybrids may appear as if they are shut down but may actually be in “Ready Mode”. Never assume the vehicle is off simply because it is silent. The vehicle makes virtually no noise when the drive system is powered.
 - **NEVER** cut any high voltage cables. High voltage cables in hybrid vehicles are usually color-coded to warn you of their potential danger. On most, the high voltage cables are color-coded ORANGE. Although some cables are color-coded BLUE. Avoid contact with these cables unless the high voltage battery in the back of the vehicle has first been disconnected.
 - All hybrid batteries have a safety switch or disconnect mechanism to disconnect the battery from the vehicle's electrical system. The location of the battery disconnect safety switch and the disconnect procedure will vary from one application to another.
 - Many hybrid vehicles use a keyless start system. Make sure the ignition is OFF and the key or key fob is at least 15 feet away from the vehicle.
 - Make sure the READY light is not on. If the power is on, the high voltage system is live and poses a shock hazard should you come into direct contact with any of its uninsulated electrical components (such as the inverter under the hood).
 - At a hybrid vehicle fire, **ALWAYS** make sure that the high voltage battery case is cooled down to prevent re-ignition.
 - Always chock the vehicle, put transmission in park, shut off ignition, remove key, and engage parking brake.

12. CONCLUSION

- 12.1 When operating at incidents (especially on highways), all personnel must be continually alert to the ever present danger of oncoming traffic, and must be vigilant and ready for the unexpected. The collective safety of the entire fire force depends on the individual safety contributions of each member. If one member should let down his/her guard, all members may be jeopardized in a moment.

Reference 1

1 Motor Vehicle Gasoline Tanks

It has been reported that in order to sell junk cars to be crushed and sold as scrap metal, automotive junk yards must remove the gas tanks. Consequently, some unscrupulous automotive junk yard owners are indiscriminately dumping the gas tanks in vacant lots on streets and just about anywhere. Often, these tanks still contain varying amounts of gasoline. Incidents have been reported involving as many as forty of these tanks in ADV vans. Should these vans or any vehicle or container holding these partially filled gas tanks take fire, they are potential bombs.

Units responding to large vehicle or rubbish fires shall approach the fire with caution using the reach of the hose stream to their full advantage as well as the shielding effect of any object between the fire and the nozzle.

2. More Dangers at Motor Vehicle Fires

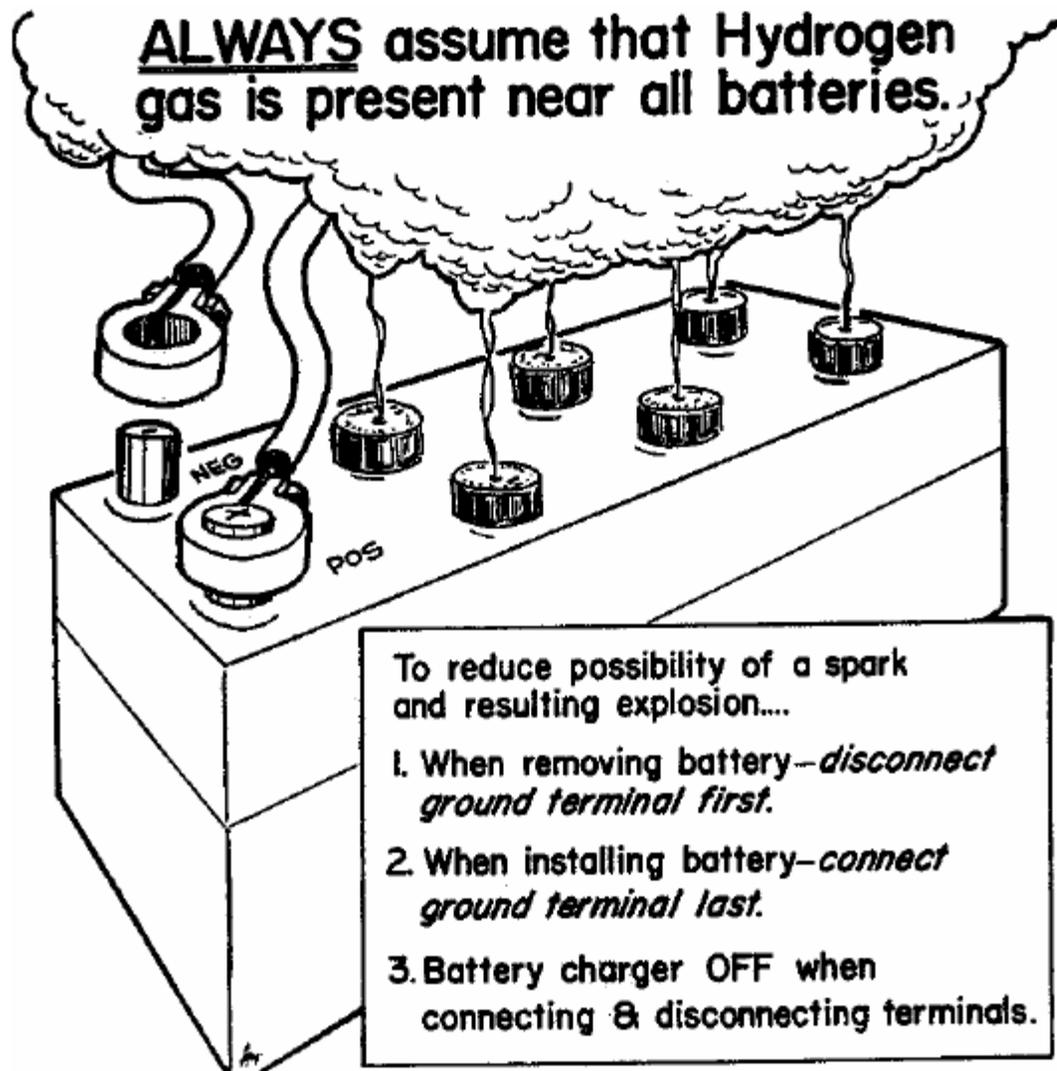
Members should be aware of the dangers present at car fires equipped with shock absorbing bumpers. The heat of the fire increasing the pressure in the shock absorbing mechanism could reach a point where the bumper is actually blown off the car.

We recently received a report of a similar mishap at an operation involving three ADV's. Both bumpers were missing from one of the vehicles. As the fires were being extinguished, an explosion was heard from one of the vehicles. At the conclusion of the operation, an inspection of the vehicles revealed that the vehicle missing both bumpers was also missing one of the front bumper supports. Further investigation revealed that the missing support was embedded in the grill assembly of one of the other vehicles, twenty feet away. This projectile weighed three pounds and its leading edge was a 1/2" inch piece of steel measuring three inches by five inches.

The above incident indicates that cars that have had their shock absorbing bumpers removed could be more dangerous than those with bumpers still in place. The shock absorbing mechanism could become a bullet-like projectile capable of inflicting very serious injury.

The recommendation to use the reach of the hose stream to its full advantage is reinforced in this type situation. Whenever possible, avoid standing directly in front of or in the rear of vehicle fires. Attack from the flanks. Keep onlookers from standing in front of or to the rear of vehicle fires for a distance of at least one hundred feet.

Reference 2



Reference 3

1. HAZARDOUS SITUATION – Motor Vehicle Fires

1.1 At a recent motor vehicle fire, units encountered a potentially hazardous situation. The fire began in the engine compartment and extended through the dashboard into the interior of the vehicle. The fire was extinguished without incident. During overhaul, a six gallon can of kerosene was found between the seats.

1.2 The vehicle contained a machine for steam cleaning carpets. The machine is fueled by the kerosene. Vehicles used as dog grooming services may also contain a heater fueled by kerosene. The purpose is to warm water for bathing pets.

2. PRECAUTIONS

2.1 It should be noted that the above-mentioned vehicle was not marked, and members were unaware that the vehicle was used for such a purpose.

2.2 When a fire occurs in these types of vehicles, exercise extreme caution.

2.3 As a final note, members should also be cognizant of vehicles that are used to carry power washing machinery, tree services, stump grinding, etc. These vehicles may house machinery containing gasoline as fuel. They may also be carrying a can for refueling.

THIS PASSENGER CAR IS....
PROPANE POWERED



IF INVOLVED IN FIRE
BEWARE OF

BLEVE



Boiling **L**iquid **E**xpanding
Vapor **E**xplosion

LOOK FOR THIS REFLECTORIZED WARNING
STICKER ON THE LEFT SIDE OF THE BUMPER

Reference 5

1. INTRODUCTION

1.1 “OZ-12” is a product which is presently being sold in our area as a replacement for auto freon (R-12) in automobile air conditioners. Unlike R12 Freon which is non-flammable, and non-toxic, OZ-12 is extremely flammable and toxic. OZ-12 is a compressed hydrocarbon mixture that is composed of 70% LP gas. OZ-12 is manufactured by OZ Technology, Inc. of Post Falls, Idaho.

1.2 Despite the fact that on July 13, 1995, the U. S. Environmental Protection Agency declared the use of OZ-12 as a replacement for R-12 (auto freon) in automobile air conditioners illegal, the sale of such product was not. OZ-12 is used as a replacement for refrigerant in industrial processes.

1.3 The use of OZ-12 in automobile air conditioners is very desirable to the user for reasons of convenience and economics. OZ-12 is significantly less expensive and requires no retrofitting of the auto’s air conditioning system.

2. SAFETY OPERATIONAL CONSIDERATIONS

2.1 Based on the above, it is apparent that the use of OZ-12 in an automobile air conditioning system is likely to be found.

2.2 Units operating at automobile fires shall exercise extreme caution when fire is confined to the engine compartment, especially when a unit is opening the hood for extinguishment.

2.3 Officers of units operating at such incidents are reminded that automobile fires shall not be taken as routine. Strict control and proper supervision are the keys to a safe operation.

Reference 6

Incidents involving garbage truck fires have been reported to the Safety Command for information and dissemination to field units. The following is one account:

PARTICULARS:

An Engine and Ladder Co. responded to a fire involving a "commercial" garbage truck. On arrival, the trash container of the truck was found to be fully involved. The truck was parked in the garage. In order to preclude extension to the structure, the truck driver was ordered to drive the truck onto the street. This was done. Without the knowledge of the officers and members operating at the scene, the driver then attempted to raise the back portion of the truck. In doing this, he placed pressure on the hydraulic system of the truck. He was unaware of the possibility that the hydraulic lines may have been burned. In this case, they were. When hydraulic pressure was applied, it forced fluid out of the burned lines. Two bursts of fluid passed through the burning trash, out of the rear of the truck, and were ignited. In both instances, a fire ball, similar to that from a military flame-thrower, was hurled approximately forty feet.

CORRECTIVE ACTION:

If the truck is not equipped with a 2 1/2" female inlet coupling then the rear of the truck will have to be raised in order to extinguish the fire.

Certain precautions should be used when using a hydraulic system to raise the rear of the truck.

- A. No one should be allowed within 50' of the rear of the truck.
- B. Position the truck so that the rear does not face an exposure that could cause additional problems.
- C. Brakes and chocks should be used to prevent truck movement.
- D. All members shall have on full protective equipment.
- E. No one shall be allowed to work or stand under a raised section of the truck.
- F. No one shall be permitted to enter the garbage storage section of the truck.
- G. Hydraulic systems are under pressure and usually contain flammable oils.
- H. Garbage storage section could contain pressurized cans that could explode.
- I. All vehicles contain a multiple of pressurized cylinders, i.e., braking systems, bumper systems, air conditioners, etc.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

PART THREE

MANHOLE FIRES

<u>Section</u>	<u>Title</u>	<u>Page</u>
1	GENERAL CONSIDERATIONS	35
2	OPERATIONAL GUIDELINES.....	35
3	TRANSFORMER VAULTS	38

1. GENERAL CONSIDERATIONS

- 1.1 The Officer in Command at the scene shall determine the cause and severity of the fire or emergency. Using signal 10-25, this officer shall transmit particulars to the dispatcher for immediate notification to the utility company concerned:

10-25 **Manhole or Transformer Fire or Emergency**

Any type of manhole or transformer fire or emergency.

Without Code: Situation other than as described in Codes 1, 2, 3, or 4.

Code 1: Fire has extended from a manhole, conduit, or transformer into a building.

Code 2: Fire has blown one or more manhole covers, or smoke is issuing from a manhole under pressure.

Code 3: Smoke is seeping from a manhole.

Code 4: Fire or smoke condition from a transformer at any location, i.e., pole, vault, room, etc.

Note: Utility Company will dispatch an emergency crew immediately upon receipt of a Code 1 or Code 4 signal.

- 1.2 Should conditions change after original report, a supplementary report shall be Transmitted immediately to describe the existing conditions in accordance with the above code.
- 1.3 Utility company will dispatch an emergency crew immediately upon receipt of a Code 1 or Code 4 signal. If all crews are engaged, utility company will detach a crew operating at other than a Code 1 or Code 4 signal and direct such crew to respond immediately.
- 1.4 Units should be alert to the possibility that a manhole/transformer incident could have damaged the adjacent gas piping. If an odor of natural gas is encountered at these incidents, the dispatcher must be notified to request the immediate response of a utility's gas crew in addition to their electric crew. Additionally, downed overhead primary and secondary wires have the potential to damage underground gas piping. All gas piping (plastic, steel, cast iron and copper) can be impacted by burning, arching or smoldering electric cables.

2. OPERATIONAL GUIDELINES

- 2.1 The area shall be cordoned off to vehicular and pedestrian traffic. All apparatus shall be clear of the area in a safe location.
Area shall be taped off. This marks the danger area for civilians and FD personnel.
- 2.2 Inspect electrical services in surrounding buildings. Units should use carbon monoxide meters when performing these inspections.
- Possible extension.
 - This may also be the cause of the problem.
- 2.3 Members shall **not** attempt to move vehicles located in the danger area.

- 2.4 Precautionary hose lines shall be stretched as necessary. Units should not operate into manholes unless requested by a Con Edison employee at the scene. If requested to place water into a manhole, do not direct the stream directly into the manhole. Instead, let water flow or pour into the manhole. Use a fog nozzle to reduce or prevent any shock hazard.
- 2.5 The Officer in Charge shall order response of a utility company emergency crew and shall request the expected time of arrival.
- 2.6 When operations are within the capability of a single unit, the Officer in Command may leave one unit (preferably an Engine Company) to await the arrival of the emergency crew. If the expected time of arrival is more than 30 minutes, the Officer in Charge, based on evaluation of existing conditions, may order one of the following:
- A. The unit remaining on the scene may respond to assigned alarms received via department radio; one member shall be left at the scene.
 - B. One member shall be left at the scene and the unit shall return to quarters. Company officers shall provide relief for members.
 - C. When a member is left at the scene, the company officer shall at frequent intervals contact the dispatcher for re-notification of the utility company.
 - D. The manhole shall be protected by traffic cones and tape, and all units placed in service.
- 2.7 During periods of multiple incidents within an area, the following actions may be authorized by the deputy chief in charge:
One or more units shall be relieved from response assignments and utilized as follows:
- A. A member of the unit shall be left at the scene of each incident.
 - B. The officer and the chauffeur shall remain with the apparatus to perform surveillance of the incident locations.
 - C. Battalion chiefs shall provide for necessary relief of units or members.
 - D. Deputy Chiefs may authorize the use of messenger vans and spare cars for travel and shelter of members at incident locations.
- 2.8 Members left at the scene of an incident shall:
- A. Be alert to changing conditions and shall call for assistance when necessary.
 - B. Maintain surveillance of surrounding properties.
 - C. Prevent entry to area by pedestrian or vehicular traffic.
 - D. Obtain information necessary for required reports, under the direction of the immediate superior officer.

NOTES:

1. Members are reminded that explosions in manholes are not uncommon and that they have caused serious burns to members of this department.
2. Members should not pull covers off electrical manholes at manhole fires or if a manhole fire is in the area. It is the responsibility of utility crews to open manhole covers at these incidents. Pulling covers may cause an explosion by mixing air with the gaseous products of combustion in the presence of an ignition source e.g., manhole fire and/or electric arcing.
Note: This does not change Department policy of pulling electric manhole covers under certain circumstances at gas emergencies.
Be cautious of the **PELLET EFFECT** from the dirt and gravel that is trapped on the sides of the cover if an explosion occurs.
3. Explosions can take place after considerable time has elapsed and when the conditions in the manhole appear dormant. When a cover blows, do not run. Keep your eyes on the cover so you can approximate where it will land.
4. Serious explosions have also occurred in adjacent manholes that are connected by conduits with the originally involved manhole.
5. When operating at manhole emergencies, the location of traffic control boxes must be taken into consideration when deciding the size and location of the "AREA OF DANGER". The smoke and gases from a manhole incident can travel up the hollow pole of a nearby light stanchion and at times accumulate with considerable pressure. The gaseous mixture may be ignited by a spark inside the control box.
6. Hose lines stretched in the street to prevent involvement of adjacent properties should be positioned at a point beyond the predictable limits of fire or explosion damage.
7. Close and continuous supervision is required to keep citizens and Fire Department personnel at a safe distance and avoid injuries.
8. Where conditions indicate the electric lines in a building are becoming hot, hose lines shall be stretched and a thorough examination made.
9. Fire Department representation at the scene shall continue until all dangerous conditions are alleviated, or until informed by utility company emergency crew at scene that Fire Department presence is no longer required. Information for the required reports shall be obtained from the utility company personnel at the scene.

3. TRANSFORMER VAULTS

Members of this Department must recognize that underground transformer vaults present a highly volatile situation when encountered. All members must exercise extreme caution when these incidents occur. The use of full Personal Protection Clothing and SCBA, even in light smoke conditions, should be stressed when operating.

3.1 A word about sub-surface transformer vaults:

- A. CON EDISON distributes electricity throughout New York City by means of both overhead and underground power lines. Overhead transformers are easily recognizable since they are bolted to the tops of poles in the many residential areas throughout the city except in the Borough of Manhattan. Underground transformers are not easily noticed since they are located in subsurface concrete structures. CON EDISON has stated that there are approximately 75,800 transformers citywide. The subsurface structures, known as transformer vaults, come in various sizes but a typical vault is approximately 12' x 4'. These vaults are installed either in the street or the sidewalk below grade level.
- B. To prevent subsurface transformers from overheating, slotted gratings are usually installed over the vaults to allow air to circulate and cool the transformer. Vaults in the street sometimes have solid gratings since heavy vehicles may cause damage to the weaker slotted gratings. The gratings are usually rectangular in shape.
- C. The transformers convert primary voltage (27,000 Volts) to secondary voltage (120 Volts) for use by CON EDISON customers. Either of these voltages can cause fatal injury if not handled properly. Some vaults contain submersible equipment, meaning that they function properly even if the vault is filled with water. Other vaults contain non-submersible equipment and must have a sump pump installed to prevent flooding.
- D. All transformers that are in the vaults contain dielectric oil, which acts as a coolant, in amounts ranging from 200 gallons to 600 gallons. The trade name for the newer oil that CON EDISON is presently using is SUN-OIL or MOBIL-X. This oil contains PCBs in the range of 10- 49 PPM and therefore is considered a Non-PCB Transformer. However, CON EDISON still has in use vault transformers that are considered PCB-CONTAMINATED TRANSFORMERS that contain 50-499 PPM of PCBs.

NOTE: THE NEW YORK CITY FIRE DEPARTMENT CONSIDERS A TRANSFORMER WITH ANY AMOUNT OF PCBs AS A PCB TRANSFORMER. OPERATE ACCORDINGLY.

3.2 Hazard potential:

- A. Transformer Vaults can present many hazards to civilians and fire personnel.
- B. Environmental and physical dangers presented by transformer vaults include the presence of carbon monoxide or other gases in high concentrations, PVC in wire insulation, PCBs in transformers, high vapor pressures and the possibility of explosions.

- C. The possibility of asbestos may also be present, although the Environmental Protection Agency has mandated that any asbestos present must be removed in electrical vault systems.
- D. The greatest hazard of course is the amount of electricity that is contained in these vaults.

3.3 Safety precautions for operations:

A. Units are to operate in accordance with the guidelines as set forth in this bulletin and AUC 266 “ PCB Incidents”.

B. Added emphasis shall be placed on the following:

- Cordon of and secure an area a safe distance from the vault for members and apparatus. It is not necessary for members to closely examine these vaults. Remember the potential dangers involved and the likelihood of an explosion exists. There is inherent danger for serious injury, if the latter occurs. (See reference 1)
- Full use of Personal Protective Clothing (PPC) and SCBA shall be adhered to. This type of incident can escalate very easily and unexpectedly. Be prepared to protect yourself.
- Stretch a precautionary handline. Due to the amount of flammable liquid contained in these transformers, Engine Companies shall also be prepared to initiate a foam operation if the need arises.
- Examination of surrounding exposures for extension of fire and/or gases through electrical conduits which service electricity to buildings. The main service panel is usually located in the cellar or basement. Units instructed to initiate examination shall be guided by the following:
 - 1) Teams of two members shall be used to examine an exposure. Each member shall be fully equipped with PPC, SCBA and Handie-Talkie. In addition, they shall carry a Carbon Monoxide Monitor. Readings shall be taken in the meter room, surrounding rooms and on the first floor if necessary. High levels of CO have been found in exposures at these incidents.
 - 2) Due to the nature of these incidents and possible duration, it will be necessary to re-examine these exposures on a periodic basis.

C. Monitor the situation and await arrival of Con Edison.

3.4 Remember the primary consideration at these types of incidents is the safety of civilians and fire personnel.

Reference 1

1. INTRODUCTION

The following narrative is an excerpt from a report on an unusual fire incident involving a Con Ed transformer vault.

“On Arrival Units Found A Light Smoke Condition Issuing From A Sidewalk Transformer Vault Adjacent To A 40 Story High Rise Office Building. Conditions At The Vault Deteriorated Rapidly With A Heavy Smoke Condition And Two Explosions Emanating From The Vault. After The Explosions, Conditions Some What Subsided And A Smoldering Fire Resulted Until Con Edison Cut The Power. Electricity To The High Rise Office Building Was Cut And An Examination Revealed No Extension.

Units Stood By While Con Ed Made An Examination Of The Vault. Con Ed Found That The Cause Of The Fire Was The Theft Of Copper Bus Bars In The Vault.

The Fire Involving The Vault Was Routine. The Cause Of The Fire Is Unusual In That Someone Entered This Vault And Remove Con Edison Equipment With The Power Still On. A Con Edison Official At The Scene Stated That The Theft Of These Copper Bus Bars Has Taken Place In The Past.”

2. CONSIDERATIONS

- 2.1 Units arriving at the above incidents should be aware that there is a possibility that the perpetrator of these crimes has been trapped and/or electrocuted in the vault during the theft.
- 2.2 Units shall be guided by A.U.C. 180. For operational procedures for fires and emergencies in this type of installation.
- 2.3 Members are not to enter these vaults until Con Edison has made their examination.
- 2.4 Con Edison will make the determination that the vault is safe for entry, if necessary, by F.D. personnel.
- 2.5 F.D. personnel receiving this authorization will conduct a cursory search of the vault for victims.

Reference 2

Pole Mounted Transformers

Con Edison does not test pole mounted transformers for PCB content. Almost all of Con Edison's overhead transformers are not, or were not, designed to be PCB liquid filled. They are mineral oil transformers. However, due to past storage and/or servicing practices some of these transformers have become PCB contaminated, i.e., 50-499 PPM PCB. A small percentage of these transformers have attained levels of 500 PPM PCB or greater which classifies them as PCB transformers.

All new transformers being installed by Con Edison as replacements for existing ones and/or new installations are non PCB transformers.

All officers at operations involving overhead pole transformers shall insure that all proper precautions are taken to provide for the safety of all members on the scene as outlined in All Units Circular No. 266 (Revised) and Fire Tactics and Procedures, Hazardous Materials 2.



FOAM

OBJECTIVE:	<ul style="list-style-type: none">• To show introduce members to the tools used for foam operations.• To educate members on the types of foam concentrate.• Show members the different methods of finished foam. Ex. Rain down, leading edge and deflection.
CONTENT	<ul style="list-style-type: none">• Foam Nozzle• Foam Eductor• AR-AFFF• AFFF• High Expansion
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Training Bulletin Foam• T.B. Foam Evolution 1



FOAM

CONTENTS

1.	INTRODUCTION	1
2.	CHARACTERISTICS OF FOAM.....	1
3.	TYPES OF LOW EXPANSION FOAM	4
4.	IDENTIFICATION.....	5
5.	FOAM PROPORTIONING.....	6
6.	FOAM EQUIPMENT	6
7.	FOAM DELIVERY SYSTEM	7
8.	STRATEGIC AND TACTICAL CONSIDERATIONS.....	8
9.	MAINTENANCE	10
10.	HIGH EXPANSION FOAM.....	11
	DEFINITIONS	16

ADDENDUMS

1.	STRETCHING A FOAM HANDLINE.....	19
2.	125 GPM FOAM EDUCTOR AND NOZZLE.....	20

1. INTRODUCTION

- 1.1 This bulletin will explain the use of foam on flammable and combustible liquid fires and spills. The topics that will be addressed include foam concentrates, foam equipment and the foam delivery system. Strategic and tactical considerations, as well as training in the use of foam, are essential components of a successful operation. Proper foam storage, replenishment of supplies and maintenance of equipment is necessary to keep the foam delivery system operational and effective.

2. CHARACTERISTICS OF FOAM

- 2.1 Foam is a fire-extinguishing agent designed for certain unusual-type incidents. There are two main categories of foam in use in the Department - low expansion foam and high expansion foam (Hi-Ex). Low expansion foams are useful on Class "B" fires and spills involving flammable and combustible liquids. They provide extinguishment and vapor control when properly selected and applied. High expansion foams are intended to fight fires of Class "A" combustible materials in areas that are inaccessible to firefighters, such as cellars and ship-holds. High expansion foam is not suitable for use on outdoor, flammable liquid fires.

2.2 *Advantages of Foam*

Foam provides firefighters with several advantages over other extinguishing agents such as dry chemical, carbon dioxide or halons, when used on flammable liquids.

- Foam extinguishes progressively. Firefighters can begin extinguishing a fire at the edge of the fuel that is nearest to them and continue to apply more agent, projecting the boundary of the foam blanket further away with each movement. Other agents are very "transient," meaning that the area extinguished is subject to fire coming back across the surface as the agent disperses. An important point to consider is that the fire must be **completely** extinguished or it will begin to burn back across the surface as soon as the foam begins to break down. In this case all of the foam applied will have been wasted.
- Foam provides long-lasting control. This is due to the comparatively long life of a foam blanket. With any of the other agents, as soon as discharge stops the extinguishing ability stops, unless contained within an enclosed area.
- Foam can prevent ignition. While it is possible to use halon or carbon dioxide to inert an enclosed space, this is not possible on open-air liquid spills. Foam can be applied to such spills to minimize the release of vapors, preventing them from reaching their explosive range.

2.3 *Foam Concentrate*

- Foam concentrate is a mixture of various foaming agents specifically formulated to produce a mass of air-filled bubbles which, when mixed with water and air in the proper proportions, will float on the surface of a fuel.
 - There are a wide variety of foam concentrates, each designed to behave in slightly different fashion for a specific purpose. There is not any one specific foam concentrate that will solve every problem the Department faces. Different concentrates may be required for different fuels. Concentrates that work well on most fuels have drawbacks that prohibit their use in everyday operations, such as freezing conditions or corrosiveness. For this reason, the FDNY deems it necessary to utilize a number of foam concentrates.
 - The Department presently uses the following low expansion foams:
 - Universal Gold 1% - 3% Alcohol Resistant - Aqueous Film Forming Foam (AR-AFFF) – for flammable and combustible liquid fires; and
 - Aqueous Film Forming Foam (AFFF) – for oil burner fires.
- Note:** The AR-AFFF foam that the Department now utilizes surpasses all other foam concentrates that the Department has considered.
- In addition to foam used by the Department, various bulk oil storage plants and other agencies such as the Port Authority (Airports) utilize a variety of foams, and will make these available to the Department for large-scale incidents.
 - Members must be aware of the properties of the different types of foam they may encounter. They must select the proper type of foam for the particular incident and apply it properly. Failure to do so could result in inability to extinguish the fire and/or sudden ignition of the spill, potentially causing injury or death to members operating in the vicinity.
 - Different types of foam concentrates are not compatible and should **never** be mixed during operations or for storage (e.g. in the tanks of Foam Tankers, the Foam Tender, etc.)
 - At an incident it is permissible to apply two different types of low expansion foam simultaneously using two different appliances (e.g. handlines, deck guns, etc.) if necessary due to a lack of sufficient quantities of the correct type of foam to complete extinguishment (i.e. Fluoroprotein, Alcohol (Polydol), Universal Gold 1% - 3% AR-AFFF). Hi-Ex foam, for use on Class “A” confined space fires, is not to be used in conjunction with low expansion foam for flammable liquid fires.
 - Protein Foam is not used by the FDNY; however, it might still be encountered at some bulk plants. It provides fair to good burn-back resistance, but is slower to control fires than other agents and does not possess a fuel shedding property, making it less effective when applied to a spill through handline nozzles or monitors. It is not effective on gasohol or polar solvents.

2.4 *Foam Solution*

- Foam solution is the mixture that results when foam concentrate is proportioned at a predetermined rate with water. Foam solution can be produced in several ways:
 - Premixed solutions such as the AFFF extinguisher are easy to prepare, but lose their strength over time, and it is impossible to premix sufficient quantities to extinguish large fires. When using the AFFF extinguisher, knockdown will be observed but the film produced might be unstable because it is not aerated. Breakdown around hot metal, especially pipes in boiler rooms, should be anticipated. As a precaution, a foam handline should be made ready.
 - Another method used to obtain foam solution is to educt the concentrate into a moving stream of water using a foam eductor. Water moving through a hoseline is forced through the body of the eductor, which tapers down to a narrow throat area where it is then permitted to expand back to the full size of the hose. As the water rushes across the throat and expands, it creates an area of low pressure. This is called the “venturi effect.” This venturi effect is used to draw concentrate out of its container up through a pick-up tube and into the eductor where it is mixed with the water stream.
 - Foam solution can be produced by injecting a supply of concentrate at the proper proportion into a pumper that is also receiving a source of water. The foam and water mix in the pump and are discharged as solution. This is accomplished by a portable Foam Injection Metering Module (FIMM) carried by Satellite Units and Foam Tankers.

2.5 *Finished Firefighting Foam*

- Finished Firefighting Foam is what is applied to the fire or spill and accomplishes the extinguishment. Aerating foam solution produces much lighter, finished foam. The Department primarily uses aerated foam when producing a 3% finished foam blanket. When aerated at 3%, foam produces a better flashback and burn-back resistant foam blanket, increasing safety for personnel who may have to operate in or near pools of fuel. Aerating foam also prolongs the consistency of the foam blanket.

Note: There are times when members may be operating in or near a non-aerated foam blanket such as:

- An oil burner fire; where the AFFF extinguisher, with its straight stream nozzle, has been used to knock down the fire.
- A fire or emergency at an airport; where Port Authority crash trucks have applied AFFF to a spill. It is important to recognize the fast draining nature of AFFF foam under these circumstances and avoid entering the area until a stable AR-AFFF foam blanket has been established by FDNY units throughout the area to control vapors.

- Finished firefighting foams are designed to be lighter than the fuels they are placed on and thus float on the surface of the fuel. This results in four primary methods of extinguishment:
 - Smothers - prevents air from mixing with the flammable vapors given off by the liquid.
 - Suppresses - stops or reduces the generation and release of flammable vapors.
 - Separates - separates the flame from the surface of the fuel, which reduces the tendency of the fuel to boil, thus giving off fewer vapors.
 - Cools - water content of the foam cools the fuel, further reducing vapor generation. It also extinguishes burning Class "A" materials in the spill area and cools adjacent metal surfaces such as tank walls.

3. TYPES OF LOW EXPANSION FOAM

3.1 Universal Gold 1% - 3% Alcohol Resistant - Aqueous Film Forming Foam (AR-AFFF)

- *Extinguishing Characteristics*
 - AR-AFFF foam concentrate is designed to fulfill two specific functions. The first is to form a protective membrane between the fuel and the foam. The second is to make the foam much more stable and heat-resistant, which provides better burn-back resistance.
 - AR-AFFF is freeze/thaw stable. If the product is frozen, upon thawing there is no performance loss.
 - AR-AFFF should not be **mixed** with any other type of foam product.
 - AR-AFFF can be **used** side-by-side with other foam products on the same fire, when necessary.
 - AR-AFFF foam can be generated with either fresh or salt water.
 - Properly stored, AR-AFFF can remain effective for up to 25 years.
- *Distribution*
 - AR-AFFF foam is the most widely used concentrate in the Department and is currently allotted as follows:
 - Three (3) red-banded five-gallon containers issued to every Engine company.
 - Two (2) red-banded five-gallon containers issued to every Ladder company.
 - 1500 gallons stored on each of the Department's five (5) Foam Tankers.
 - Stored in 55 gallon drums at each of the Foam Tanker locations.
 - Stored in five-gallon containers at each of the 19 Foam Depots citywide.
 - Marine Division carries 3300 gallons in both the "343" and "Firefighter 2." "The Bravest" holds 200 gallons and each of the 10 - 33' boats carry 25 gallons.

3.2 Aqueous Film Forming Foam (AFFF)

- *Extinguishing Characteristics*
 - AFFF spreads rapidly over the surface, leading to faster knockdown of fire than protein-based foams. This permits use of a lower application rate and results in less concentrate used.
 - AFFF can be used through a standard fog nozzle where the reach of the stream is a consideration, or in other specialized circumstances.
 - AFFF's rapid drainage time causes poor resistance to flashback and burn-back.
 - AFFF is not suitable for use on Reformulated Gasoline, Gasohol or polar solvents. Its use should be restricted to hydrocarbon fuels which do not contain any polar additives. It is excellent for fuel oil, kerosene and jet fuel products.
 - AFFF has little fuel-shedding ability and it should not be used for sub-surface injection.
 - AFFF has trouble sealing against hot metal tank surfaces. Additional cooling lines on the tank exterior or higher application rates may be required to overcome this.
 - Wind, water spray and extended pre-burn times affect the stability of the blanket.
- *Distribution*
 - FDNY's use of AFFF is limited to a 2 ½-gallon hand-held extinguisher, through a straight bore nozzle, on small oil burner fires either in or out of the pit.

4. IDENTIFICATION

4.1 It is imperative that the correct foam concentrate is used for the situation encountered. To ensure that foam concentrates are not mixed, containers are color-coded (banded) around the top, as follows:

- AR-AFFF RED
- Hi-Expansion YELLOW
- AFFF BLACK

4.2 *Foam Concentrate Compatibility*

- Mixing different concentrates must be avoided at all costs, particularly in the storage tanks of Foam Tankers and the Foam Tender. The reaction that takes place when two different types of concentrate mix, or when two different brands of the same type of concentrate mix, can have a very destructive effect on the foam. This could result in a foam blanket that does not work when applied. In extreme cases, the mixing of two different types of concentrate may result in the foam gelling into a semi-solid mass that cannot be removed. When this occurs, the storage/booster tank and everything in it must be placed out-of-service and disposed of.

- At times, the Department will intentionally apply two different types of finished firefighting foam at an incident. This is routinely done at aircraft incidents. Port Authority crash trucks are mandated by the Federal Aviation Administration to use AFFF, due to its fast knockdown capability on jet fuels. Either prior to or after the evacuation has occurred, FDNY units will arrive and may be faced with the task of overhauling the scene. This could involve entering a foam blanket that is floating on jet fuel. Prior to and throughout the entry into this area, a blanket of aerated AR-AFFF foam should be applied to provide maximum security to our members.
- Modern foams do not have an adverse reaction with dry chemical, but the force of a high velocity stream of dry chemical can mechanically disrupt a foam blanket. It may be necessary to utilize a dry chemical extinguisher to extinguish spot fires around the edges of a tank. Dry chemical must be used to extinguish a three-dimensional fire when the burning fuel is dropping down. Apply dry chemical in combination with the foam stream so that any disruption is immediately recovered. This can be accomplished by discharging the dry chemical into the foam stream using hand-held extinguishers or one of the Department's six Dry Chemical Units. The foam stream will carry the dry chemical to where it is needed.

5. FOAM PROPORTIONING

- 5.1 Premixed solutions provide little additional benefit and should be restricted to the following:
- Premixing of AFFF should be limited to the 2 ½-gallon hand-held extinguisher.
- 5.2 The FDNY purchases low expansion foam concentrate that is used in 1% - 3% proportioning ratios. Units shall identify the foam to be used in order to set operating equipment at the correct flow rate.

6. FOAM EQUIPMENT

- 6.1 Eductors are the most common way to produce foam solution. Every Engine company in the Department is equipped with a foam nozzle and eductor that can be used with a 1 ¾" or a 2 ½" hoseline.
- 6.2 Handlines with foam nozzles may be used in conjunction with an eductor and are very useful at a small operation like an oil burner with fire outside the pit, gas pump knocked over, car fire with a ruptured gas tank, a small spill (approximately 600 square feet) or similar situation.

- 6.3 Self-Educting Nozzles have the eductor built into the nozzle. They have a greater capacity than hand-held nozzles and are very useful at facilities with stationary monitors or when attached to apparatus with a supply of foam concentrate. The Department uses these nozzles in conjunction with its Foam Tankers. The Foam Tanker is a self-contained unit capable of supplying foam concentrate, or finished firefighting foam when supplied with water. This method of supplying finished firefighting foam is a fast and efficient way of producing an effective knockdown at a medium-sized flammable/combustible liquid incident such as a spill over 600 square feet, tanker truck mishap, loading rack incident or similar situation.
- 6.4 Master Stream Nozzles are used at the largest-type operations such as oil tank farms, large spills over 2,000 square feet or a large capacity tank truck that has spilled its product. In order to perform this operation the foam delivery system must be activated.

7. FOAM DELIVERY SYSTEM

7.1 The FDNY Foam Delivery System is a multi-tiered approach, which provides different levels of response to various sized incidents.

7.2 First Alarm Units

- Ladder companies have very limited foam capability. Ladder companies are limited to 2 ½-gallon hand-held AFFF extinguishers. In addition, Ladder companies are required to carry two (2) five-gallon containers of AR-AFFF (red band) foam concentrate. This AR-AFFF foam is to be used by Engine companies.
- Each Engine company must carry at least three (3) five-gallon containers of AR-AFFF (red band) foam concentrate. Each Engine company has also been issued a handline foam eductor, which flows 125 GPM, and an aerating foam nozzle; both carried in a pelican case. This equipment provides the Department with limited foam capabilities until the arrival of a Foam Tanker to augment the operation.
- A first alarm assignment of three Engines and two Ladders should provide 13 five-gallon containers of foam which is a total of 65 gallons of AR-AFFF foam concentrate. This will provide approximately 17 minutes of finished firefighting foam at a 3% setting on the eductor with the aerating foam nozzle. At 3% the eductor will be consuming 3.75 gallons of foam concentrate per minute. The 3% setting will be used for Hydrocarbons and Polar Solvents.

7.3 Foam Depots

- The Department has established 19 Foam Depots throughout the five boroughs. Each depot stocks 50 five-gallon containers of AR-AFFF, 50 five-gallon containers of Hi-Ex foam concentrate and additional containers of AFFF. The depot stock can be used to replenish units at the conclusion of an incident, or to augment supplies at an ongoing operation.

8. STRATEGIC AND TACTICAL CONSIDERATIONS

8.1 The FDNY has the ability to deal with all types of incidents requiring foam application. The strategy for dealing with many of these incidents includes stopping the leak and covering the spill surface with foam. In some cases, covering the spill will not allow the owner to recover the product. If there is no hazard with leaving a spill uncovered it will greatly assist in recovery, however, if the Incident Commander has any doubts about a product, cover it with foam.

8.2 General considerations when dealing with any type of flammable/combustible liquid incident include the following:

- Position apparatus upwind.
- Position apparatus uphill.
- Identify the product.
- Transmit a 10-80 with appropriate code.
- Ensure the correct foam is present. Transmit additional alarms and/or signal 10-86 if the incident is beyond the first alarm assignment capability.
- Stretch a foam handline (SEE ADDENDUM 1) and put it into operation if upon arrival the following is observed:
 - The product is on fire.
 - It is a flammable liquid.
 - Members will be operating in the area.
 - The product causes an exposure problem.
- Eliminate all sources of ignition starting with the area downwind and downhill.
- Remember that many of these vapors are heavier than air and will collect in basements and depressions.
- Have the appropriate unit(s) (e.g. Rescue, Squad, HMTU, Haz-Mat Company 1, etc.) take explosive readings.
- Evacuate as per prescribed distances in the DOT Emergency Response Guidebook.

8.3 *Fire in a Confined Area; Tanks, Pits, etc.*

- If there is sufficient freeboard on the interior of a tank, direct the stream against the side or back of the burning area. The velocity of the stream will be broken and foam will fall gently over the surface.
- If the top of the container is close to the ground and there is little or no freeboard inside the tank, the stream should be directed at the ground in front of the tank in such a manner as to bounce the foam onto the burning surface.

- With tanks of this magnitude it is imperative that enough foam concentrate is on scene before any foam operation is started. This cannot be stressed enough. If enough concentrate is not on scene before starting foam operations and the fire is not extinguished, it will burn back and involve the entire tank again. All of the concentrate that was used will have been wasted.
- If the tank is filled to the top, bulk oil personnel will have to remove some product via the bottom of the tank. If planning to extinguish the fire, ensure that the product level is within five feet of the top of the tank. If too much product is removed a large "chimney" will form and carry away much of the foam. Also, the lower the product level in the tank, the more likely the top of the tank is to curl in, making application of foam more difficult. Apply the foam as gently as possible to the surface of the tank. Try to apply the foam into the "WINDOW". This is an area in the plume, which is located on the upwind side of the tank. It is a small area where the flames aren't as tall. There are less convection currents in this area, which allows more foam to reach the surface of the fuel.

8.4 *Spills*

- If the spill has ignited, stretch a foam handline and extinguish the fire. The amount of concentrate available on a first alarm assignment is 13 five-gallon containers. With one handline in operation, you will be able to extinguish approximately 600 square feet (20'X30') of fire. This supply will last approximately 17 minutes at a 3% setting. Using two handlines simultaneously will increase the area covered, but reduce operational time. Both criteria are important for a successful operation. Anything more than a small spill may require additional alarms as well as the transmission of signal 10-86.

Note: NFPA 11 recommends having a 15-minute supply of concentrate on hand for spill fires.

- If the spill is contained or not flowing:
 - Direct a foam stream on the ground ahead of the fire in such a manner as to bounce the foam onto the fire. This will achieve the widest pattern at the lowest velocity.
 - Try to deflect the stream against something and allow the foam to slide down and work its way across the burning liquid.
 - If the above methods are not possible, then direct the foam stream skyward in a slow back and forth motion, allowing the foam to fall as gently as possible over the surface. This will cover the spill and reduce disruption at the blanket.
- If the spill is flowing and not contained:
 - Work against the run of the spill, either directly or from the flanks, towards the source of the spill, directing a foam stream on the ground ahead of the fire in such a manner as to bounce the foam onto the fire. If the burning liquid is running down a ditch, gutter or depression, it is best to establish a heavy foam blanket below the point of fire, so that when the burning liquid reaches the blanket it will flow underneath it and be extinguished. A hole dug or an earthen dike erected to collect burning liquid, then covered with a foam blanket, can be utilized under certain conditions to prevent further flow.

- Determine if the product entered the sewer system. If not, dike and dam the spill to prevent it from doing so. If the leak has entered the sewer, the sewer must be included in the spill area. If the product is burning in the sewers and there is no exposure problem, it may be beneficial to let the product burn off. If the fire is extinguished, the product may reach another source of ignition and cause a larger problem. The Incident Commander shall notify DEP if any product enters the sewer system.
- Try to find the source of the leak and shut it down, if possible. This should be performed under the protection of a charged handline. A fog stream can be used if the runoff will not interfere with the foam blanket and the valve is remote from the leak.
- Entry into a foam blanket should be limited to the rescue of trapped or injured victims. All precautions should be taken to provide the most stable foam blanket possible and additional foam should be applied, as required, to maintain the foam blanket if members are required to enter. When members move through foam, potentially disrupting the stability of the foam blanket, a charged foam handline should be prepared to operate and cover the exposed area. This will add a level of protection for the advancing members.

8.5 *Additional Considerations*

- Additional foam must be applied to maintain the foam blanket. Drainage time of the blanket will depend on the type of concentrate used. The faster the drainage rate, the more frequent the application necessary. If personnel are working in the blanket reapplication should be constant.
- Avoid disturbing the foam blanket; this is especially true when walking through it. There will be instances (i.e. rescue) where members will have to enter the blanket. All members that enter the blanket shall wear all personal protective clothing, including a donned facepiece. Personnel working in a foam blanket should be kept to a minimum. All personnel that are not needed to maintain this blanket should be withdrawn to an area that could not become involved in the incident.

9. MAINTENANCE

- 9.1 Foam concentrate can have a severe, debilitating effect on the equipment used to generate it. Foam eductors, pick-up tubes, FIMMs, generators, hose, pumps, etc. are to be washed out and cleaned after every use. Anything that comes in contact with foam requires flushing. When cleaning an eductor, water should be educted through it until clean water flows through the eductor.
- 9.2 All valves, pumps and gates of foam pumpers need to be operated on a regular basis to maintain functionality.

10. HIGH EXPANSION FOAM

- 10.1 High expansion foam concentrate is a detergent-based product designed for use in special generators that blow large quantities of air through a screen, which is being sprayed with solution. This results in the production of large quantities of very large, light foam bubbles. These bubbles have much less resistance to disruption by wind, water spray, heat or fire than do other foams. Hi-Ex foam is best suited for use in confined areas on Class “A” fires. It is not recommended for use on flammable liquid incidents because the foam blanket can become permeated with vapors, which can subsequently ignite.
- 10.2 Hi-Ex foam is primarily used to control fires that are inaccessible or difficult to approach due to excessive heat. It is particularly suited for use on Class “A” fires in confined spaces. Hi-Ex foam can confine and suppress the fire to a point where final extinguishment can be achieved with less debilitating effect on members. Under certain conditions Hi-Ex foam has been found effective on:
- Liquid Natural Gas (LNG) fires.
 - Suppressing or minimizing the release of toxic or flammable vapors with the exception of Liquefied Petroleum Gas (LPG).
- 10.3 Expansion is dependent upon the type of Hi-Ex foam concentrate and generator used. An expansion ratio of 200/1 to 1000/1 is necessary to be classified as Hi-Ex foam.
- 10.4 Bubbles are much larger and consistencies considerably lighter than low expansion foam.
- 10.5 The size and consistency of Hi-Ex foam bubbles are determined by:
- Type of foam concentrate.
 - Type of generator.
 - Water pressures at eductor and generator.
 - Contents of foam bubbles (fresh air, smoke, CO₂, CO, etc.).
 - Eductor mixture setting.
 - Use and configuration of foam chute.
- 10.6 Limitations of Hi-Ex foam:
- Should not be used on alcohol or polar solvents.
 - Short drainage time, necessitating frequent re-applications.
 - Relatively poor burn-back resistance.
 - Freezing weather could have an adverse effect on the foam concentrate and finished foam blanket.
- 10.7 The effectiveness of a Hi-Ex foam blanket depends on the expansion ratio, eductor mixture setting and thickness of the blanket, and drainage time characteristics. Increasing the setting on the eductor can increase the thickness of the blanket, increase the foam’s resistance to heat and fire and improve drainage time. The amount of concentrate used will also increase.

10.8 Components of the Hi-Ex Foam System:

- Foam concentrate in five-gallon containers with yellow band.
- Water supply line. The length of the line should be kept as short as possible by placing the pumper or manifold as close to the operation as conditions permit. Fresh or salt water can be used to develop Hi-Ex foam.
- In-line proportioning device (eductor) with a pick-up tube affixed to it. This device employs a venturi action to pick up foam concentrate from a container and introduce it into the stream.
 - Only the eductor supplied with the Hi-Ex generator should be used. This eductor should have a 1" yellow band painted around the throat.
 - Each eductor is designed to operate at a pre-determined amount of water flow.
 - The metering valve, if present, may be adjusted from 1% to 6%. The dial can be set at any point to give a more diverse selection of foam consistency. These calibrations are relative and do not necessarily indicate the actual percentage of solution that will be formed. The higher the setting, the heavier the resulting body of foam and the quicker the rate of foam concentrate consumption.
 - The balance between the eductor intake pressure and the pressure at the foam generator is critical. Any factor that would upset the balance (e.g. friction loss in the line, head pressure, etc.) could affect the formation of foam.
 - Insufficient pressure at the eductor may prevent pick up of foam concentrate or supply inadequate pressure at the foam generator. The generator's distance from the eductor, as well as the grade difference between the generator and eductor, also affects the pressure at the foam generator.

10.9 Although a relatively small flow of water is required in Hi-Ex foam operations (60 GPM), high pump pressure is necessary to overcome the pressure loss at the eductor. Maintain between 200 PSI and 220 PSI at the inlet of the eductor to deliver sufficient water under proper pressure to the foam generator.

10.10 Eductor placement is dependent on the conditions encountered in the field. It may be placed one length from the pumper or at the generator. Placement one length from the pumper is the recommended position for most fire situations. This location affords better control of:

- Water flow rates.
- Metering valve settings.
- Foam supply (reduces distance foam concentrate must be transported).

10.11 The eductor is equipped with a ball check. If the generator is shut down or there is a restriction in the hoseline, the ball check prevents water from flowing into the foam container.

- 10.12 At the completion of foam operations, the ECC should remove the eductor pick-up tube from the foam container, place it into a pail of fresh, clean water and run the system at the same pressure used during operations for 15 minutes to adequately flush foam from all components of the system. If the eductor is not flushed thoroughly, foam concentrate may dry inside it, causing the unit to malfunction.
- 10.13 The foam generator converts foam solution into Hi-Ex foam.
- Foam solution is supplied to the inlet of the generator at a pressure specific for the generator.
 - A nozzle-like orifice sprays solution into the body of the generator.
 - Air is forcibly introduced into the spray by a water or electric-powered fan mounted on the rear of the generator.
 - Aerated spray is forced through a screen on the front of the generator and expands into Hi-Ex foam.
- 10.14 The Foam Chute Applicator is a plastic sleeve used to deliver Hi-Ex foam from the generator to the fire.
- The generator should be used with the delivery chute. The chute used should be one foot larger in diameter than the mouth of the generator. It fits over the generator screen and is secured by means of a metal band or rope.
 - Eliminate kinks or bends in the chute as much as possible.
 - The chute cannot be placed to deliver foam to a level higher than that of the generator. The generator cannot overcome the backpressure of the foam. Foam will flow back down the chute and out through the generator, ceasing foam generation.
- 10.15 *Tactical and Operational Procedures*
- Before Hi-Ex foam operations are started, all members operating in and around the fire area must be warned. Heat generated by the fire and steam resulting from the introduction of foam will be forced to upper and adjoining sections of the fire area. A warning is also required to prevent operating forces from becoming enveloped in foam.
 - Vertical and horizontal ventilation play a very important role in the extinguishing capability of Hi-Ex foam. Horizontal ventilation, opposite the point of entry of the finished firefighting foam, will allow the release of built-up pressure as a result of the steam developed by the foam coming in contact with fire. Vertical ventilation above the fire will allow the release of heat at the ceiling level. It would also be a point from which the progress of the finished firefighting foam could be monitored. Vertical ventilation should not be attempted if it places members in a dangerous position.
 - The generator should be positioned in an area relatively clear of smoke, heat and foam. Proper foam expansion is dependent on an adequate supply of fresh air. Smoke, heat or foam drawn into the generator will adversely affect foam expansion, increase the drainage rate and make the foam blanket toxic.

- It may be necessary to utilize a handline with a fog nozzle to keep the area around the generator clear of any contaminants that may be drawn into the generator.
- When using the generator to fill an area on the same level as the generator, it is necessary to seal the area around the foam discharge. The sealing of this area is essential in keeping the foam contained. To seal off the area around the chute discharge, use materials such as wood, rugs, cardboard, salvage plastic, drapes and/or tarpaulins, etc. If the foam continues to back out of the area, it is an indication that the foam is being prevented from gaining access into the fire area. This would suggest that an alternate point be selected for foam delivery.
- When delivering foam into an area that is below the generator it may not be necessary to seal off the area around the foam discharge. If there are obstructions in close proximity of the discharge preventing a free flow of foam and causing the foam to back out of the area, sealing the area around the discharge outlet or repositioning the generator must be considered.
- The generator can also be used as a smoke ejector. Turning the generator around will accomplish this.

10.16 *Members Operating In a Foam Environment*

- Personnel shall be equipped with full firefighting clothing, SCBA, search rope, hoseline and necessary tools for checking the path in front of the team.
 - Entering a Hi-Ex foam mass without a SCBA shall not be attempted. Under fire conditions, foam may become contaminated with products of combustion and toxic materials. Inhalation or ingestion of these products could create immediate breathing problems, coupled with disorientation due to noise suppression created by the Hi-Ex foam.
 - If a SCBA malfunctions in the foam mass, the member should leave the area accompanied by another member, and notify his/her officer. A backup team should always be made ready for possible assistance or relief.
- Layout of the area, type of storage, and length, height, depth and width of the building must be considered before entering.
- Electrical equipment **must be de-energized** before the team enters the area.
- Members are cautioned to move slowly through foam to avoid stepping into any openings or tripping over any obstructions.
- Members are to avoid becoming completely immersed in foam. If submerged in foam, members' hearing and vision will be impaired and the possibility of becoming disoriented greatly increases. The use of handie-talkies will be difficult because of possible contamination of the microphone caused by the foam, which will also garble messages. The microphone can be protected inside of the turnout coat; however, when used to transmit, it shall be placed directly on the voicemitter while the other hand uses a waving motion to clear the area around it.
- The foam is essentially a detergent and any prolonged contact with the skin can cause a detergent burn. It also has an irritating effect on the eyes and nose, causing sneezing and burning eyes, similar to any soap product.

10.17 *Operational Considerations*

- Fires may be brought under control in inaccessible areas, collapse areas and areas where toxic materials are stored. For example, in storage areas containing toxic materials (e.g. fertilizers, pesticides, insecticides, etc.) use of Hi-Ex foam would limit water runoff that could cause widespread contamination to people, terrain, sewers, manholes, waterways, etc. Its use would reduce exposure of toxic substances to members since a minimum number of properly-equipped personnel would be required to operate in the exposed area.
 - Hi-Ex foam is a firefighting tool that uses a minimum amount of water and should be considered for use when water is at a premium.
 - Hi-Ex foam chutes of various lengths allow personnel to apply foam from a safe distance. This is particularly advantageous during operations involving buildings in danger of collapse.

DEFINITIONS

Alcohol – A colorless, water-soluble, volatile flammable liquid widely used as a solvent in drugs, cleaning solutions, explosives and beverages.

Alcohol Foams – Firefighting foam, resistant to the detrimental effects of water-soluble substances such as alcohol and polar solvents.

Angus Modified Foam Cannon – A large capacity (1000 GPM) aerating foam nozzle used to apply large quantities of foam.

Aerated Foam – Foam produced by nozzles that force air into the flow of foam solution.

Application Rate – The rate in GPM of foam solution that is needed to extinguish a flammable or combustible liquid fire or to cover a fuel spill.

Aqueous Film Forming Foam (AFFF) – A combination of synthetic, fluorinated, surfactant foaming agents which spread quickly, providing a film across the surface of hydrocarbon fuels.

Back-Flow Prevention Valve – A 4 ½" check valve designed to prevent foam solution from backing up into the domestic water supply. This valve must be attached to the hydrant supply when the pumper is involved in a FIMM operation. This includes any pumper used to augment the FIMM pumper.

Backup Pumper – A 1000 GPM pumper that responds when a Satellite 2000 GPM pumper is not available for a foam operation. It is assigned to transport the Satellite apparatus with its tools and equipment.

Boiling Point – The temperature at which vapor pressure equals atmospheric pressure. The lower the boiling point, the faster the liquid will change to a vapor.

Burn-back Resistance – The ability of a foam blanket to resist direct flame contact.

Combustible Liquid – A liquid with a flash point of 100 degrees F. or higher.

Drainage Time – Amount of time it takes for the water to drain from a finished foam blanket.

Eductor – A proportioning device that employs a venturi action to pick up foam concentrate from a container and introduce it into a stream of water, thus producing foam solution. The eductor must match the rated flow from the nozzle (GPM).

Fire Point – The temperature to which a vapor has to be heated to sustain combustion. This temperature is usually no more than three degrees above the flash point.

Flammable Liquid – A liquid with a flash point below 100 degrees F. and a vapor pressure of 40 PSIG at 100 degrees F.

Flammable Range (Explosive Range) – The percent of a flammable vapor mixed in air to form an ignitable mixture.

Flash Point – The minimum temperature to which a liquid must be heated to produce enough vapors to allow a vapor flash when an ignition source is present.

Flashback Resistance – The ability of a foam blanket to resist ignition by the flammable vapors coming in contact with a hot surface or a spark.

Foam (Finished Firefighting Foam) – An unstable air/foam solution emulsion used for firefighting.

Foam Tanker – A tanker which carries 1500 gallons of AR-AFFF foam concentrate. This unit is equipped with a foam deck gun.

Foam Chute – A plastic sleeve used to deliver Hi-Ex foam from the generator to the fire.

Foam Concentrate – A liquid which, when mixed with water, creates a foam solution.

Foam Coordinator – A Battalion Chief trained in the operation of the foam system. All Battalion Chiefs are trained to function in this role.

Foam Depot – A unit that stores at least 50 five-gallon containers of AR-AFFF, 50 five-gallon containers of Hi-Ex foam concentrate and additional containers of AFFF.

Foam Injection Metering Module (FIMM) – A device that attaches to the gated inlet of a pumper and proportions foam concentrate into the pumps as it is supplied by the Foam Tanker. It is ejected under pressure into water, creating a foam solution.

Foam Nozzle (Aerating) – A nozzle used to discharge foam solution, mixing air into the solution to produce finished firefighting foam.

Foam Solution – A mixture containing foam concentrate and water. Solution is pumped through hoselines with foam nozzles where it is mixed with air to produce finished firefighting foam.

Foam System – The Department's foam system consists of the Satellite System (six 2000 GPM pumpers along with their corresponding Satellite apparatus), backup pumpers, Foam Tankers, the Foam Tender, Foam Depots, Foam Coordinators and Marine units.

Frothing – The production of a mass of bubbles in or on a liquid. This occurs when foam concentrate is transferred at a rapid rate or is allowed to splash into a container.

Fuel Shedding – The ability of foam to resist saturation by hydrocarbons.

Hi-Ex Foam Concentrate – A detergent-based liquid which, when mixed with water and deployed with an aerating device, produces lightweight foam with an expansion ratio of 200/1 to 1000/1.

Hydrocarbons – Compounds that only contain carbon and hydrogen. Examples are methane, ethane, butane and propane. Gasoline, diesel, home heating oil and crude oil are hydrocarbons that contain additives.

Methyl Tertiary Butyl Ether (MTBE) – A slightly polar additive, added to gasoline to meet Federal Air Standards.

Non-Aerated Foam – Foam produced by a nozzle that does not force air through the foam solution. A foam nozzle that is non-aerating generally has a greater reach than an aerating nozzle; the tradeoff is a foam blanket that is not as stable as one that is produced with aerated foam.

Pick-up Tube/Hose – A tube or hose in which the foam concentrate is moved from the source (container) to the eductor.

Polar Solvent – Water-soluble chemicals that readily combine with water in a foam blanket, thus destroying it. Examples are alcohol, ether, lacquer, thinner and acetone. Alcohol resistant foam needs to be used on these substances.

Pour Point – The minimum useable temperature at which foam concentrate can be proportioned.

Satellite System – Six 2000 GPM pumpers (along with their corresponding Satellite apparatus) that are equipped with a FIMM incorporated into the pump control panel.

Self-Educting Nozzle – A nozzle with a built-in venturi section.

Solubility – The ability of a material to mix with water.

Specific Gravity – A measure of density in liquids relative to water. Refers to whether a substance will float on, or sink in, water. A liquid with a specific gravity of less than 1.0 will float on water while a liquid with a specific gravity equal to or greater than 1.0 will sink in water.

Surfactant – A chemical that lowers the surface tension of a liquid.

Vapor Density – A measure of density in vapors compared to air. Refers to whether a gas will rise or fall when mixed with air. A substance with a vapor density greater than 1.0 will sink while a substance with a vapor density of less than 1.0 will rise, when mixed in air.

Vapor Pressure – The pressure of a confined vapor in equilibrium with its liquid. Increasing the temperature of a liquid will produce more vapors and increase the vapor pressure.

Venturi Action – As water flows through an eductor, negative pressure is created in the pick-up tube. The foam concentrate is suctioned from the container to the appliance.

Water Supply Pumper – An Engine company assigned the duty of supplying water to a FIMM pumper. This water supply pumper must use a Back-Flow Prevention Valve.

STRETCHING A FOAM HANDLINE

1. PROCEDURE

- 1.1 Connect the pumper to a hydrant and charge the pumps.
- 1.2 Location for the eductor is at the pumper outlet **only**.
 - 1 ¾" hose - maximum stretch is six (6) lengths to the nozzle.
 - 2 ½" hose - maximum stretch is ten (10) lengths to the nozzle.
- 1.3 Ensure a sufficient quantity of AR-AFFF (red band) foam concentrate (five-gallon containers) is at the location of the operating pumper.
- 1.4 The officer gives the command to start water. The member at the pumper places the pick-up tube into the container and the ECC starts water, providing **200 PSI at the eductor**. The foam nozzle shall then be **fully opened** and directed at the fire.
 - Upon opening the nozzle, foam solution will immediately flow from the nozzle. Avoid opening and closing the nozzle as this interrupts the educting process and causes an intermittent flow of foam.
 - After charging the line, the ECC shall monitor the go-gauge to ensure that, with the nozzle fully open and water flowing, the go-gauge needle remains in the **green**. If the needle enters the **red**, this will indicate a flow problem which the ECC needs to correct. When the needle is in the **red** the following could be the cause of the problem:
 - Kink in the line - Ensure there are no kinks in the supply line.
 - Elevation - When operating uphill, head pressure is created and will have minimal effect on foam production; however, this could cause the needle on the go-gauge to approach the **red**.
 - Nozzle not fully open - In order for the eductor to function properly, the nozzle should be opened fully when in use.
 - Nozzle shut down.

NOTE: Always use the matching GPM foam nozzle and eductor.

125 GPM FOAM EDUCTOR AND NOZZLE

1. DESCRIPTION

- 1.1 The 125 GPM Foam Eductor has been issued to all Engine and Squad companies. It is housed in a protective pelican case which includes the following equipment:
- 125 GPM Foam Nozzle with pistol grip (adjustable fog/straight stream)
 - Extra-long pick-up tube
 - Go-gauge (with Red and Green indicators)
 - Metering head (meters at 1% - 3% - 6%)
- 1.2 The 125 GPM Foam Eductor shall be used with Universal Gold 1%-3% AR-AFFF foam concentrate (red band container).
- 1.3 The 125 GPM Foam Eductor and Foam Nozzle combination provide the following benefits:
- Allow for longer stretches, when required
 - Greater reach of the stream
 - Faster foam on the fire
 - Faster clean-up
- 1.4 The go-gauge needle has two positions; **green** and **red**. The needle in the **green** indicates proper foam proportioning. The needle in the **red** indicates there is a problem such as the following:
- Kink in the line
 - Burst length
 - Nozzle not fully open
 - Nozzle shut
 - Elevation problem



Figure 1: Pelican Case with Eductor and Nozzle



Figure 2: Go-Gauge



Figure 3: 125 GPM Foam Nozzle with Pistol Grip

2. OPERATION

2.1 The eductor is to be operated at the pumper outlet **only** and is not to be operated in-line.

- Place the eductor onto the pumper outlet.
- Connect the metering head to the eductor.
- Place the pick-up tube into the foam bucket.
- Eductor is to be operated with either 1 ¾" hose or 2 ½" hose. The stretches are not to be combined. When stretching 1 ¾" hose not more than six (6) lengths are to be used off of the eductor. When using 2 ½" hose not more than ten (10) lengths of 2 ½" hose are to be used off of the eductor.
- When foam is called for, the ECC supplies the foam line with 200 PSI/125 GPM.
- The nozzle is to be maintained completely open.
- The nozzle is capable of providing fog or straight stream and is equipped with a flush position.
- The go-gauge needle should be in the **green** position. If the needle is in the **red**, a problem exists and foam is not being produced at the desired percentage.



Figure 4: Eductor correctly assembled



Figure 5: Eductor incorrectly assembled



Probationary Firefighters Manual Chapter 21

PORTABLE FIRE EXTINGUISHERS

OBJECTIVE:	<ul style="list-style-type: none">• To provide an explanation of portable fire extinguisher use, care and maintenance.
CONTENTS:	<ul style="list-style-type: none">• Illustrations of various fire extinguishers with explanations of their use and care.
SOURCE:	<ul style="list-style-type: none">• Essentials of Fire Fighting (Third Edition) International Fire Service Training Association.• FDNY Training Bulletin, Purple K• FDNY Training Bulletin Foam, Addendum 1
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Training Bulletin, Purple K• FDNY Training Bulletin Foam, Addendum 1

Portable fire extinguishers are classified according to their intended use on the four classes of fires (A, B, C, and D). In addition to the letter classification, extinguishers also receive a numerical rating. The number preceding the letter designates the potential size fire the extinguisher can be expected to extinguish (Figure 2-1).

Extinguishers suitable for more than one class of fire should be identified by multiples of the symbols previously described. Most present-day extinguishers have these markings on them when they are purchased. If a new extinguisher is not properly marked, the seller should be requested to supply the proper decals.

The “picture-symbol” labeling system now in use is designed to make the selection of fire extinguishers easier and their use more effective and safe. The system also emphasizes when *not* to use an extinguisher on certain types of fires. Examples of this labeling system are shown in Figures 2-2 and 2-3.

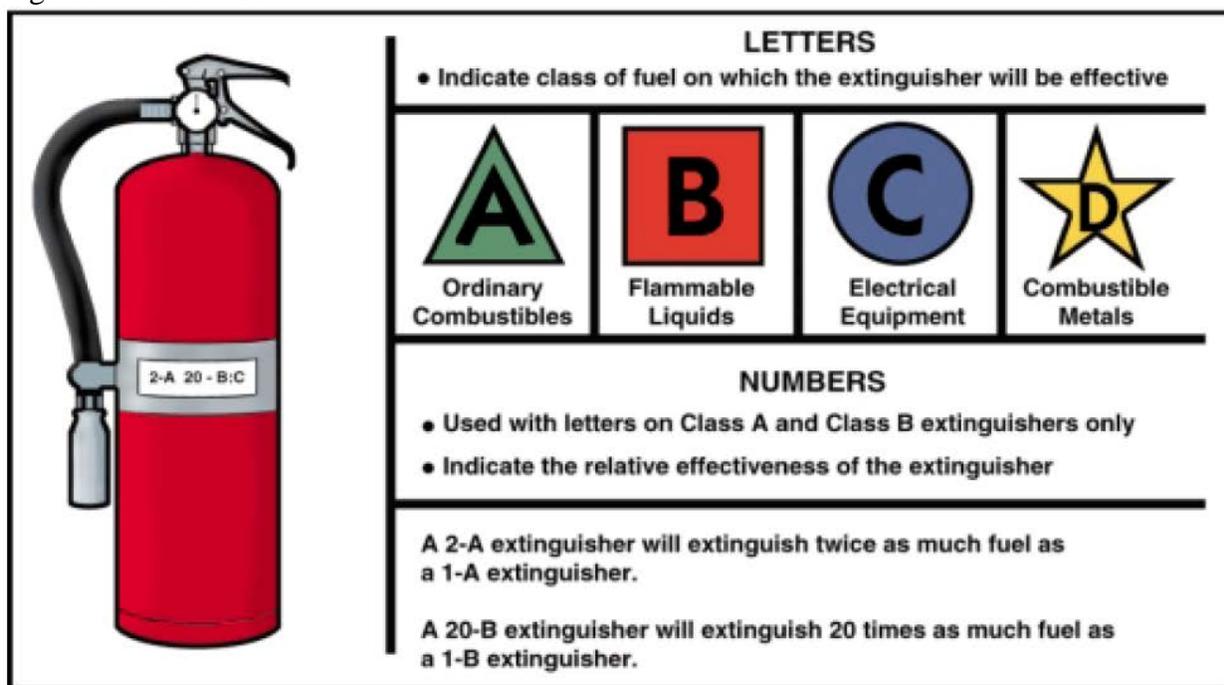


Figure 2-1

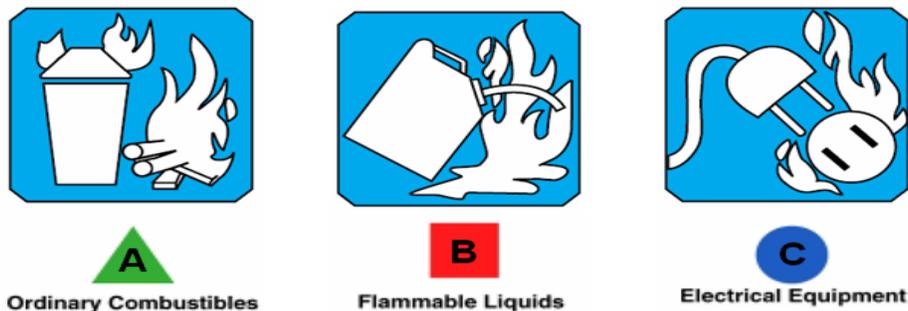


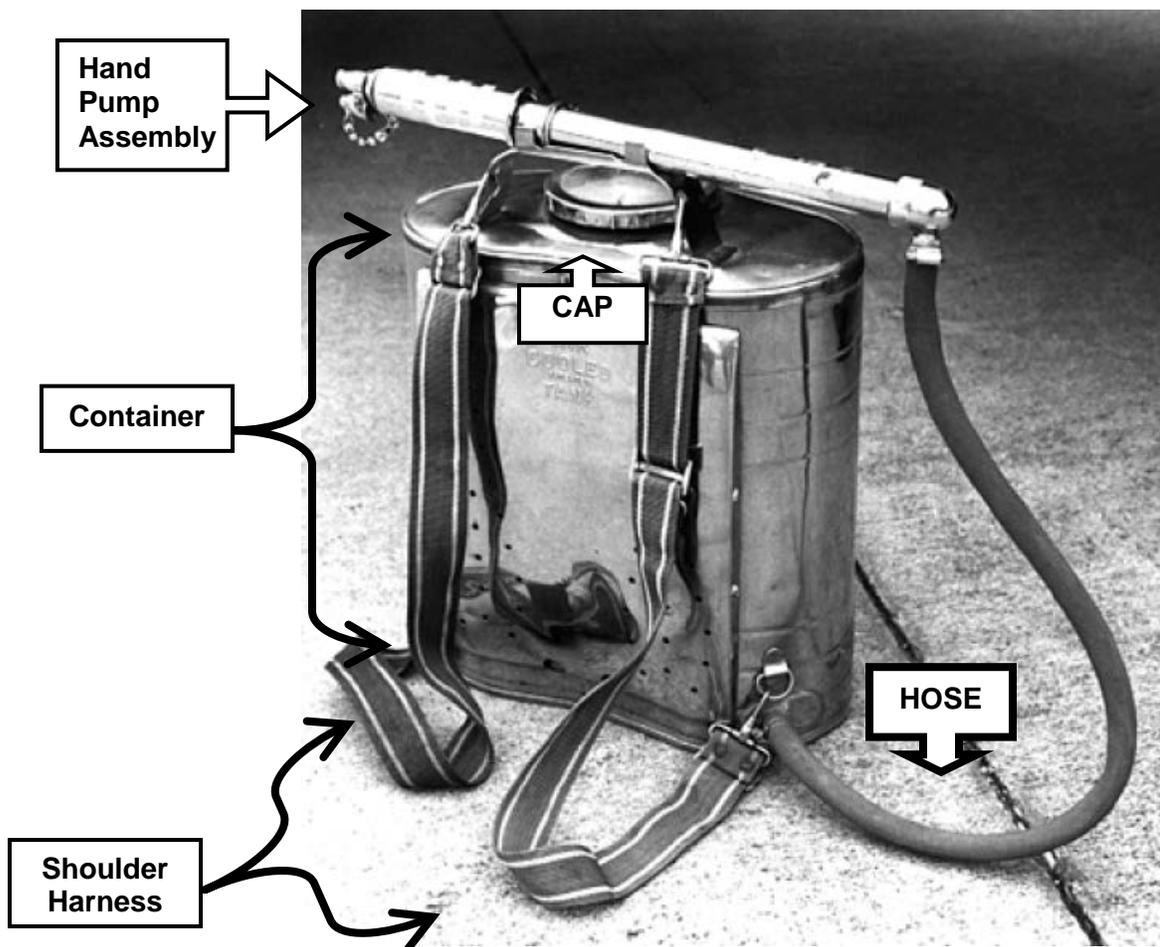
Figure 2-2



Figure 2-3

- Class A Fire Class A fires, listed under the green pyramid involve such things as wood, cloth, paper, rubber and many plastics. Generally, these ordinary combustibles require cooling with water or certain dry chemicals that also retard combustion.
- Class B Fire Class B fires, listed under the red square involve flammable liquids, flammable gases, greases. Exclusion of air by smothering, or inhibiting the combustible chain reaction with a chemical are the most efficient methods of extinguishment for Class B fires,
- Class C Fire Class C fires, listed under the blue circle, involve live electrical equipment, and for safety reasons, a non-conductive agent must be used to extinguish these fires.
- Class D Fire Class D fires, listed under the yellow star, involve burning metals such as magnesium, sodium, or potassium. These fires require an extinguishing agent that does not react with the burning metal to give off dangerous gases or cause explosions

PUMP TANK EXTINGUISHER



Extinguishing Agent: Water

Use: Class "A" fires

Capacity: 5 Gallons

Range: Variable (30 to 40 feet max.)

Pressure Source: Hand pumping action of operator

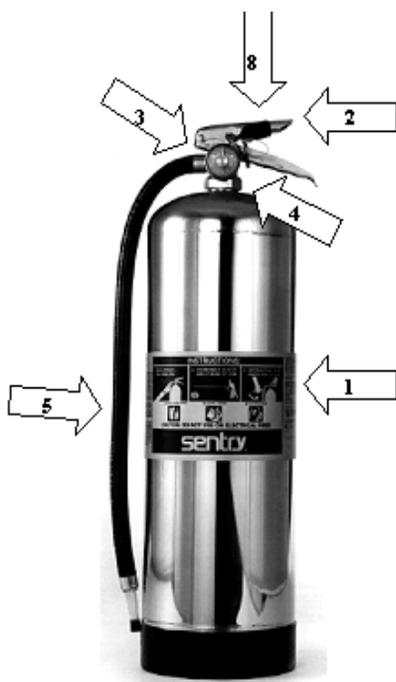
Recharge: After Use

Freeze: Yes

Maintenance: Wash, flush, check hose connection, condition of hose, nozzles, harness, operating parts. Place drop of oil on piston rod packing, keep air vent in cap open.

To Operate: Place on back, grasp pump assembly, operate hand pump assembly while directing stream at base of fire.

PRESSURIZED WATER EXTINGUISHER



1. Container or Shell
2. Discharge Lever
3. Pressure Gauge
4. Head Assembly
5. Hose & Nozzle
6. Siphon Tube
7. Bottom Screen
8. Locking Ring Pin
9. Air Valve

Extinguishing Agent:

Water (Cools and saturates)

Use:

Class "A" fires

Capacity:

2½ gallons

Range:

35' to 40'

Expelled:

55 seconds

Pressure Source:

Compressed air (100 psi)

Examine:

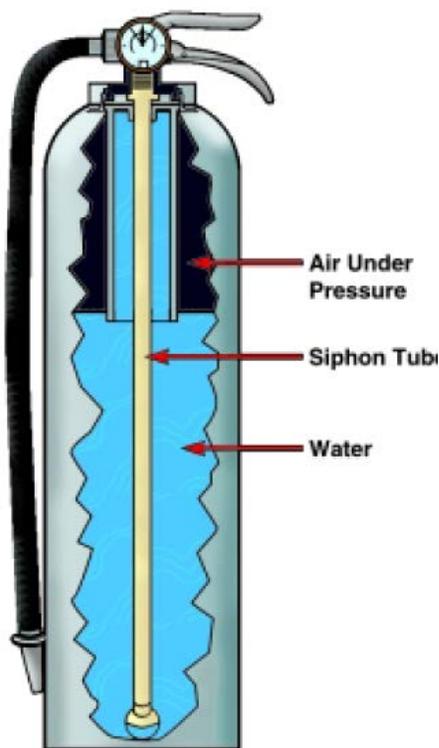
Each Tour, i.e. 9x6 & 6x9

Recharged:

After use

- See detailed recharging instructions on the following pages

(Always follow directions of manufacturer on label; some models are different.)



Freeze:

Yes

Electricity:

Conductor

Maintenance:

Wash flush head and container after use. Examine container for rust etc. Check head assembly, strainer, gasket, hose coupling, hose for brittleness, nozzle clogged, head coupled properly. After recharging check gauge reading and for leakage. If hydrostatic test date is greater than 5 years, extinguisher must be placed out of service.

To Operate:

Hold upright, pull pin, grasp hose, squeeze lever, direct stream at base of fire.

PRESSURIZED WATER EXTINGUISHER: RECHARGING

EXTINGUISHER WITH SCHRADER CONNECTION

- A. Invert the extinguisher, and point the nozzle in a safe direction.
- B. Squeeze the lever to release residual air pressure then check the extinguisher gauge to verify all pressure is removed.
- C. Inspect extinguisher.
- D. Remove the head assembly. Closely examine all components to ensure they are not damaged cracked or worn.
- E. Wash all parts with water. Rinse hose and nozzle.
- F. Fill the extinguisher with clean potable water to the inside mark.
- G. Replace the head assembly, and properly snug it down.
- H. Using a regulated air hose with gauge and Schrader connection, slowly fill with air to 100 PSI. Reference the extinguisher pressure gauge to check proper charge.
- I. Install ring pin into valve assembly.

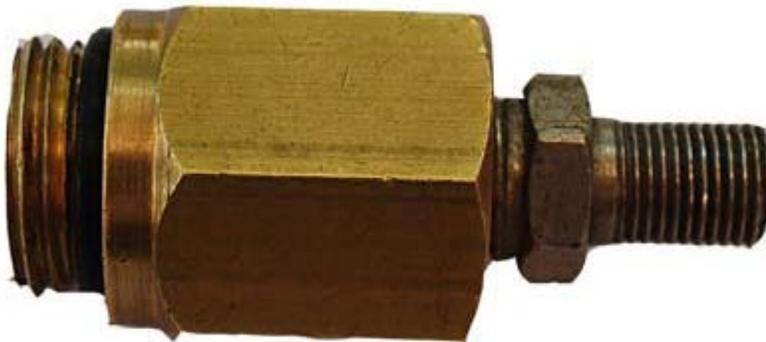


EXTINGUISHER WITHOUT SCHRADER CONNECTION

- A. Invert the extinguisher, and point the nozzle in a safe direction.
- B. Squeeze the lever to release residual air pressure then check the extinguisher gauge to verify all pressure is removed.
- C. Inspect extinguisher.
- D. Remove the head assembly. Closely examine all components to ensure they are not damaged cracked or worn.
- E. Wash all parts with water. Rinse hose and nozzle. Fill the extinguisher with clean potable water to the inside mark.
- F. Replace the head assembly, and properly snug it down.
- G. Unscrew and remove discharge hose from assembly



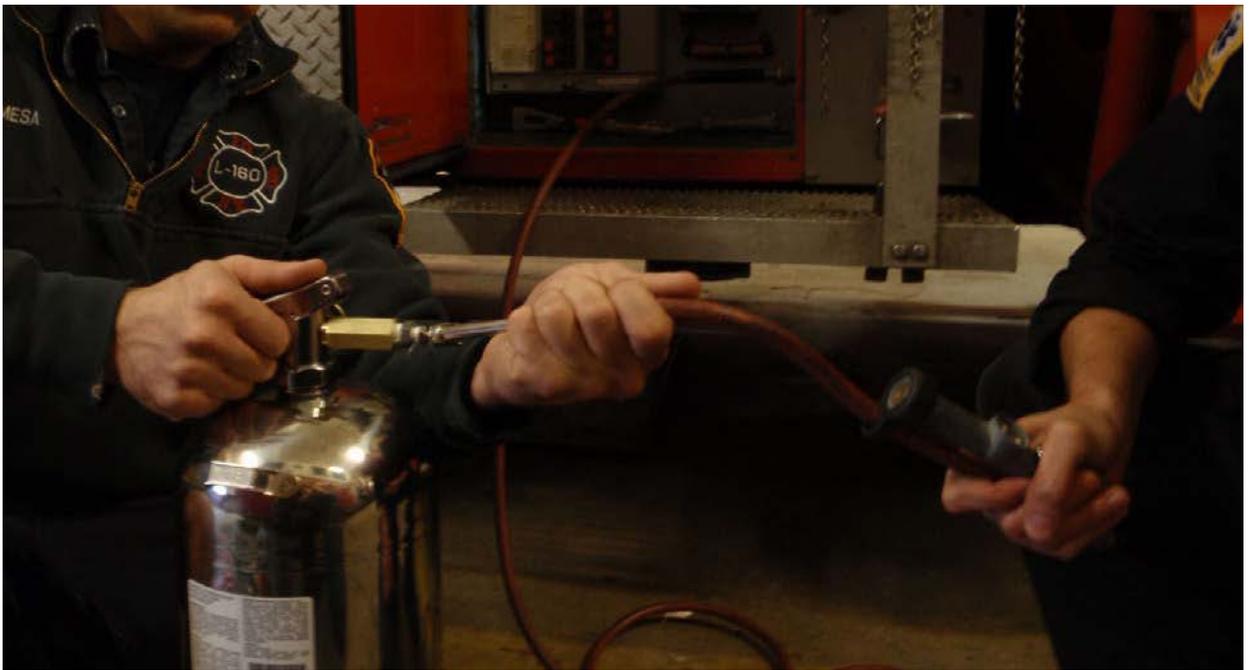
- H. Carefully install pressurization charge adapter with pre-attached Schrader connection into the discharge valve outlet port and hand tighten.
- I. Using a regulated air hose with gauge and the Schrader connection, depress the extinguisher operating lever and slowly pressurize the extinguisher to 100 PSI.
- J. Release lever and remove the pressure source, reference the extinguisher pressure gauge to check proper charge. Install ring pin into valve assembly.
- K. Uninstall charge adapter from discharge valve output port.
- L. Reinstall and secure the hose assembly into the discharge valve outlet port.



CHARGE ADAPTER



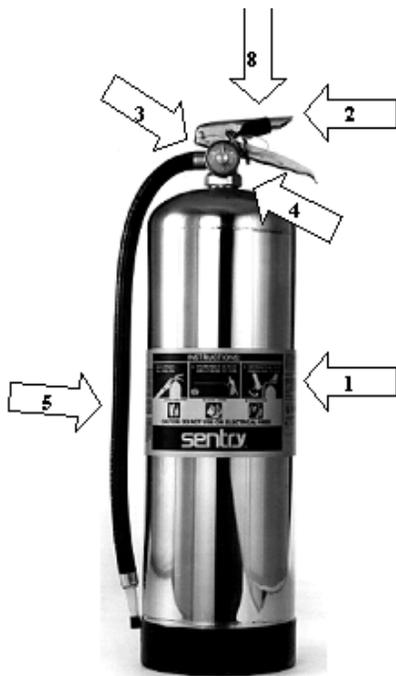
ADAPTER IN PLACE



CHARGING THE EXTINGUISHER

Note: The apparatus has a one way valve in the airline to prevent water from entering the brake system.

PRESSURIZED AFFF FOAM EXTINGUISHER



1. Container Or Shell
2. Discharge Lever
3. Pressure Gauge
4. Head Assembly
5. Hose Nozzle
6. Siphon Tube
7. Bottom Screen
8. Locking Ring Pin
9. Air Valve

Extinguishing Agent: AFFF foam solution

Use: Class "A" fires- cools, quenches
Class "B" fires- cools, smother

Capacity: 2½ gallons

Range: 35' to 40'

Pressure Source: Compressed air (100 psi)

Examine: **Each Tour, i.e. 9x6 & 6x9**

Discharge: Approximately 50 Seconds

Freeze: Subject to freezing. Protect but
use no anti-freeze solution.

Electricity: Possible

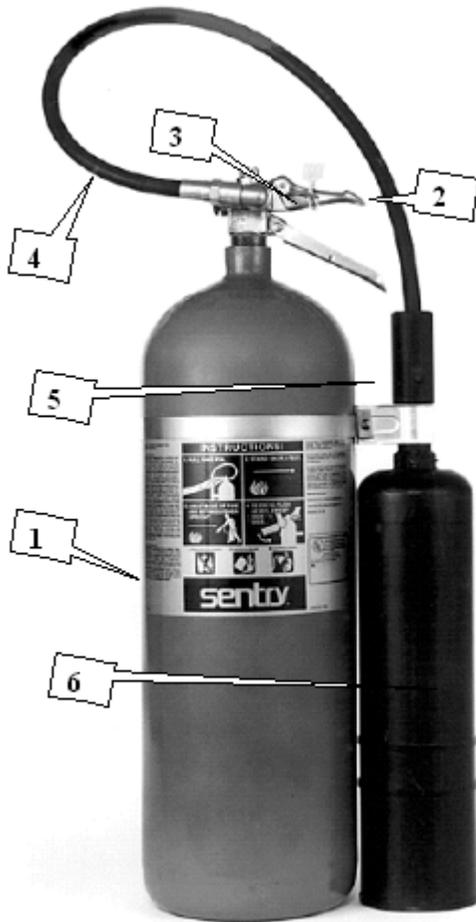
To Recharge: Rinse tank. Add 2 gallons of water; SLOWLY add 10 ounces of 3% AFFF concentrate. SLOWLY add remaining water to reach the 2 ½ gallon mark. Replace cap and charge extinguisher to proper air pressure. Invert extinguisher several times to insure proper mixture. Label with date of recharging. If not used within **ONE YEAR** after charging, it shall be removed from apparatus and used for drill purposes and recharged.

Maintenance: Examine for damage or corrosion, condition of cap and collar threads. Serviceability of gasket. Condition of hose and nozzle. Check pressure daily.

To Operate: Hold extinguisher upright, pull ring pin, grasp hose near nozzle with one hand, squeeze discharge lever with free hand.

It is not necessary to play AFFF against a backboard or the side of the tank to form a film on the surface. It can be applied gently on the surface of the oil by placing a finger over the nozzle. However, the stream SHOULD NOT be driven directly through the surface due to the possibility of causing a steam explosion or splashing hot oil back on the operator.

CO2 EXTINGUISHER



1. Cylinder
2. Discharge Lever
3. Locking Ring Pin
4. High Pressure Hose
5. Insulated Handle
6. Discharge Horn

Extinguishing Agent: CO2 gas (heavier than air) smothers fire

Use: Class B Fires
Class C Fires
Class A Fires – Small surface fires only

Capacity: 2 to 20lb. (net weight of gas)

Range: About 4'

Pressure Source: Liquefied CO2 at pressure of 900 psi

Examine: Each Tour, i.e. 9x6 & 6x9

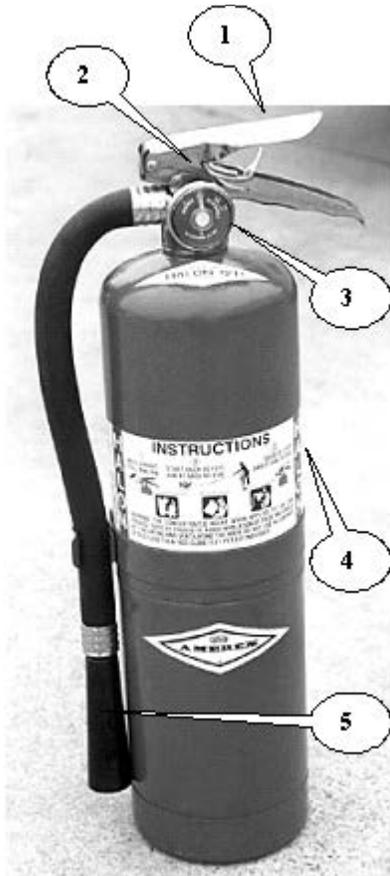
Recharge: When expended **loss of 10%** of weight, check every 6 months

Freeze: Will operate at -40 F

Maintenance: Keep clean; check for damage; weigh to determine if it is fully charged; don't drop.

Operate: Upright position; pull pin; grasp insulated handle; squeeze handle. Do not grasp discharge horn during operation.

DRY CHEMICAL EXTINGUISHER



1. Discharge Lever
2. Locking ring pin
3. Pressure gauge
4. Container or shell
5. Nozzle

Extinguishing Agent: Bicarbonate of soda with drying additive to prevent absorption of moisture. Has some cooling, smothering and radiation shielding effect on fire.

Use: Class B fires
Class C fires – non-conductor
Class A fire – small surface fire

Capacity: Classified according to weight in pounds of dry chemicals

Range: For 5 & 10lb about 4 to 12 feet will operate at minus - 40 degrees

Pressure Source: Compressed air at 150 psi.

Examine: Each Tour, i.e. 9 x 6 & 6 x 9

Recharge: After use, or leakage of air below operable range

Discharge Time: Varies according to capacity of extinguisher. For capacities of 5 lb. to 10 lb. about 10 - 16 seconds

Maintenance: Examine for damage, leakage of air at least every six months and tag it.

To Operate: Pull pin, squeeze lever, direct discharge at base of fire. On flammable liquid fires, discharge as directed at the near side of the fire, moving the nozzle rapidly side to side and gradually progressing forward as the flames are extinguished.

PURPLE K EXTINGUISHER



Extinguishing Agent: Potassium bicarbonate base dry chemical

Use: Class B fires. Particularly effective in combating methanol fires.

Capacity: 27 lbs of extinguishing agent.

Total weight: 52 lbs

Range: 19'- 20'

Discharge Time: 11 seconds

Examine: Each Tour, i.e. 9 x 6 & 6 x 9

Recharge: Send to Tech Services with RT-2 attached for replacement

Temp. Restrictions: Can be used between - 40F and +120F

Maintenance: Thoroughly examine once a month for physical damage (corrosion, etc.) If defective, send to Tech Services with RT-2 for replacement

Operation:

1. Remove ring pin and hose
2. Squeeze handle
3. Direct stream at base of flames using a side to side motion. Hold extinguisher upright.

THIS PAGE WAS INTENTIONALLY LEFT BLANK



HOUSEWATCH

OBJECTIVE:	<ul style="list-style-type: none">• To impress on members the importance of the HW functions relative to the receipt of alarms and as the first point of contact with the general public.
CONTENTS:	<ul style="list-style-type: none">• An explanation of the means by which the FDNY receives alarms and transmits response instructions to firehouses.• An explanation of the proper procedures for acknowledging the receipt of alarms of fires and emergencies.• An explanation of the company journal and its proper care and use
SOURCE:	<ul style="list-style-type: none">• FDNY Communications Manual• FDNY Guide to Company Journal Entries
FDNY REFERENCE:	<ul style="list-style-type: none">• FDNY Communications Manual• FDNY Guide to Company Journal Entries

The member performing housewatch duty is responsible during the assigned watch for the receipt of all communications directed to all units assigned or relocated to quarters.

The most important communications received by the housewatch are those which direct units to respond to alarms of fire and emergencies.

The receipt of the alarm and the communication of that alarm information to the units assigned is the responsibility of the member assigned to housewatch.

Appearance

- ◆ The member assigned to housewatch duty is an official representative of the Fire Department and his assigned unit to other members of the department and to the general public.
- ◆ As such a representative the member assigned shall present a neat and clean appearance. The member assigned to housewatch duty shall insure that the housewatch area is maintained in a clean and orderly fashion.
- ◆ All visitors to quarters shall be addressed by the housewatch. Members of the department shall be addressed officially and the reason for their visit ascertained and relayed to the officer on duty. Other visitors shall be addressed with courtesy, the reason for their visit ascertained and relayed to the officer on duty.

Alarm Receipt

When an alarm is received it shall be promptly acknowledged and the Company turned out. The particulars of the alarm shall be read aloud and addressed to the members of the units responding when they have reached the apparatus floor.

Communications

- ◆ The department telephone is an official instrument in the Fire Department communications network. Its' use is restricted to the conduct of official Fire Department business by department members. It is also used to transmit alarms from the Borough Dispatcher. The use of the department phone for personal reasons is prohibited.
- ◆ Official department phone lines in quarters shall be kept open during the hours 0800-0900 and 1700-1800 to facilitate any changes in manning assignments for the ensuing tour.
- ◆ The member assigned to house watch duty is assigned to monitor the department telephone and is responsible for the receipt and transmission of all telephone messages.

- ◆ The members assigned to housewatch duty shall answer the department phone in the following manner:
 - Unit number, Title, Name
 - Example: **“Engine Company 999, Firefighter Smith, may I help you?”**

Company Journal

- ◆ The Company Journal is an official continuous record of a unit’s activities
- ◆ The member assigned to housewatch duty is responsible to maintain entries in the Company Journal in accordance with “The Guide to Company Journal Entries”.
- ◆ The Company Journal shall be kept neat and up to date at all times.

Alarm Transmission Systems

- ◆ A fire or other emergency can be reported to FDNY by:
 1. BARS alarm boxes
 2. ERS alarm boxes
 3. Telephone
 4. Special building alarms
 5. Verbal

BARS (Box Alarm Readout System) ALARM BOXES

- ◆ There are still some of the traditional BARS alarm boxes in use.
- ◆ Description of the BARS Alarm Box

A BARS alarm box is an electromechanical device which, when activated, will send a coded signal to a Borough Communications Office. These boxes are non-interfering which means that several boxes can be pulled on the same circuit simultaneously without interfering with each other's signals.

ERS (Emergency Reporting System) ALARM BOXES

- ◆ The ERS alarm box allows the caller to establish direct voice contact with the Fire or Police Department to report a fire or other emergency.
- ◆ Description of the ERS Alarm Box

Each ERS alarm box contains two channels identified by the words "Fire" and "Police" on the outside of the alarm box. Depressing the push button beneath the appropriate handle will activate the system.

TELEPHONE ALARMS

- ◆ A civilian may transmit an alarm by telephone by dialing either the seven-digit number of the Borough Communications Office, 911 or 0. The first alternative is preferred. It is important to know that the alarm was transmitted by telephone since statistically these are more likely to represent legitimate alarms.

CLASS 3/SPECIAL BUILDING ALARM SYSTEMS

- ◆ Special building alarm systems are located in buildings and tunnels and on bridges, highways and on Randall's and Wards Islands. These alarm systems are installed, maintained and monitored by either the Fire Department or by private fire alarm companies. They are referred to collectively as Class 3 alarms because 3 was the preliminary telegraph signal used to announce such alarms.

- ◆ Class E Alarm Systems

Under provisions of the City's high rise fire safety code, Local Law 5, all high rise buildings (occupancy group E) are required to have Class E private alarm systems installed. These systems include various types of manual and automatic alarms connected to a fire command station in the building lobby. Alarms are automatically transmitted to the private fire alarm company from the fire command station.

PRE-RECORDED TELEPHONE ALARMS

- ◆ These alarms are transmitted via recording or pre-dialed machines either directly to the Fire Department or to a private fire alarm company for relay to Fire Department.

VERBAL ALARMS

- ◆ Verbal alarms are fires or emergencies reported to or observed by units while in or out of quarters.

COMPUTER ASSISTED DISPATCH SYSTEM

- ◆ The Computer Assisted Dispatch System (CADS) within the Bureau of Communications helps the Fire Department by facilitating the dispatch of units; maintaining coverage; and organizing information. Every unit in the Department is linked to CADS via a Personal Computer/Alarm Teleprinter Selector (PC/ATS) which:
 - provides concise information in printout form relative to response (retained printouts serve as the basis for reports, etc.)
 - transmits administrative messages
 - provides information relative to hazardous situations contained in the Critical Information Dispatch System (CIDS).

DESCRIPTION OF THE PC/ATS

- ◆ The Alarm Teleprinter

The Alarm Teleprinter (Figure 2-1) provides printouts for response, relocation, return from relocation, or administrative messages. These are preceded by two types of alert tones.

- A. A response message is indicated by an Alarm Alert tone and a Beeping Alert tone at the PC/ATS.

NOTE: The Alarm Alert tone is followed by a “.wav” file that alerts the appropriate company (Engine, Ladder, Battalion etc.) with a computer generated voice, which is transmitted via firehouse intercom speakers in quarters.

- B. An administrative message is indicated only by a beeping Alert tone at the PC/ATS.



Figure 2-1

◆ **Selector Panel**

The PC/ATS interface (Figure 2 - 2) provides a convenient means of reporting a unit's status or acknowledging a response. The PC/ATS interface is composed of Unit Identification Buttons, Status Buttons and Function Buttons.

The screen is a touch screen. Most objects (finger, pen, glove, etc) can be used to select a button. Touching the screen on the button or anywhere within the border surrounding the button will select the button. The button can also be selected by pressing the underlined character on the keyboard. When a button is selected, the border surrounding the button will change to red.

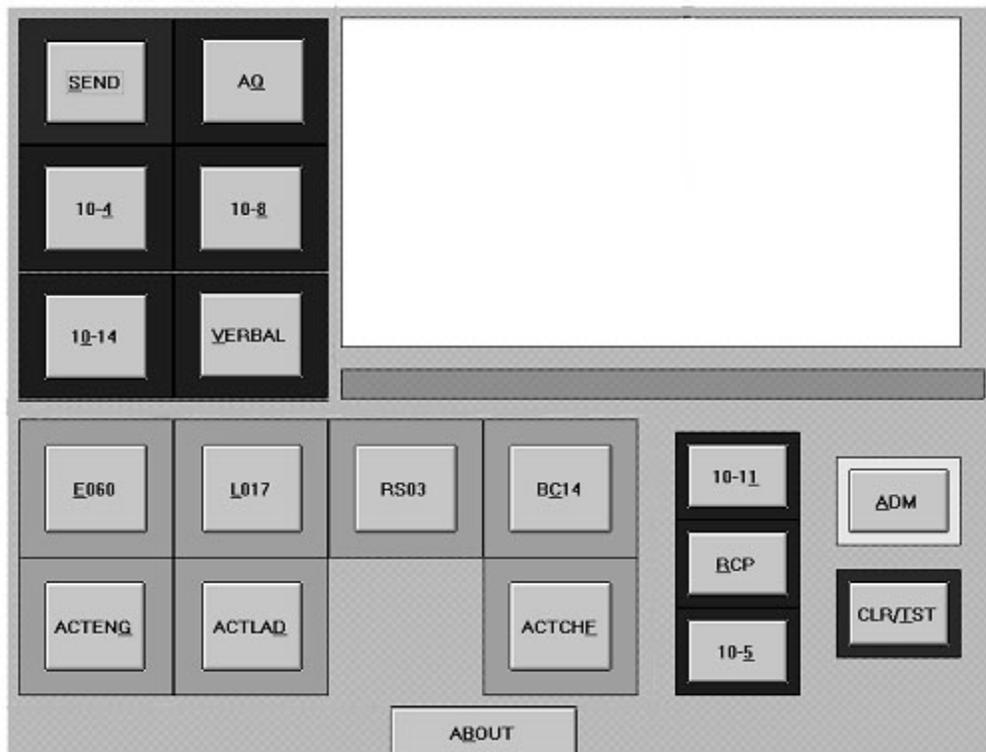


Figure 2-2

◆ **Unit Identification Buttons**

- ENGINE.....Engine Companies
- LADDERLadder Companies
- SPL UNITSpecial Unit, i.e. Rescue
- CHIEF.....Battalion or Deputy Chief
- ACTENGDesignates a relocated Engine in quarters. It must be used in all instances affecting status of a relocated engine.
- ACTLADDesignates a relocated Ladder in quarters. It must be used in all instances affecting status of a relocated Ladder.
- ACTCHF.....Designates a relocated Chief in quarters. It must be used in all instances affecting status of a relocated Chief.

◆ **Status Buttons**

- 10-4.....Acknowledges a response, relocation or return from relocation.
- AQ.....Available in quarters.
- 10-8.....Available on the air (A.F.I.D., securing meals, etc.). This eliminates the need for announcing 10-8 via radio.
- RCP.....Rest and recuperation.
- VERBAL.....Responding to a verbal alarm near home box.
- 10-14.....Used by an engine company staffed with an Officer and four Firefighters to acknowledge receipt of an alarm requiring a structural response. Since the engine could be assigned 2nd or 3rd due on the box, the apparatus MDT must be checked to determine the unit assignment.

◆ **Function Buttons**

- SEND.....Releases information to the computer, thereby completing message.
- 10-5.....Furnishes a duplicate copy of the last message received.
- 10-11.....Tests operation of PC/ATS. To see if PC/ATS and computer are working, depress 10-11, followed by SEND button. The alarm teleprinter will then print out the following test message: "This is a test of the communication line." If the test message is not received, notify Starfire Control Center.

- CLR/TEST Performs the following functions:
- a. Verifies that the touch screen is functioning properly by turning all borders red.
 - b. Clears the Selector Panel if a button is erroneously pressed in either the identifying or reporting stage (or both).
 - c. Stops the audible signal beeping.

When the PC/ATS is on line, the red border surrounding the CLR/TEST button will be flickering on and off. If the red border remains steady the PC/ATS is out of service and Starfire Control Center should be notified by phone.

- ADM Is used to generate a Borough Status Report (MICS 201) only in quarters where Battalions and Divisions are located.

To obtain this report from the PC/ATS, units at the housewatch desk or in the chief's office must depress the ADM, 10-4 and SEND buttons in that order.

OPERATING INSTRUCTIONS FOR PC/ATS

◆ Response Message (Alarm Receipt at PC/ATS)

- a. Immediately prior to receipt of a response, the Alarm Alert tone, “.wav” file and the PC/ATS audible signal (beeping) are activated and heard in quarters.
- b. Alarm message is displayed in the window and printed on the printer. The housewatch shall read the message and determine which units are to respond. The housewatch acknowledges only for those units responding from quarters. The housewatch then tears the message off at the knife-edge.
- c. The housewatch has **20 seconds** to acknowledge. If there is no response in 20 seconds, the dispatcher will prompt the unit to verify response via the Voice Alarm.
- d. To acknowledge a signal the housewatch shall select the UNIT IDENTIFICATION, 10-4 and SEND buttons. If more than one unit is to respond, UNIT IDENTIFICATION buttons must first be depressed for all such units followed by 10-4 and SEND buttons. (When a unit is ACT'G follow instructions in section 2.2.6)
- e. To obtain additional copies of a response message, press 10-5 button followed by SEND. Before any copies of response messages are made, all responding units shall acknowledge.
- f. The housewatch shall announce the response particulars aloud and give the printed copy to the officer(s) responding.

◆ **Reporting "In Service"**

Immediately upon return to quarters, and if "available", update status by bringing unit "in service"

EXAMPLE: L123 AQ SEND

After the SEND button is depressed, the computer will return, in small print, an acknowledgment of the status entered.

Note: All units in the same quarters can make themselves AQ simultaneously unless:

- a. Units responded to different boxes.
- b. Unit(s) did not go 10-8.
- c. One unit is a relocated unit.

◆ **Teleprinter Messages Received while Units are 10-8**

Check alarms to see if previously responded to.

All alarms to which a unit responded while 10-8 are also printed in quarters. Upon return to quarters, the Selector Panel will be "beeping" and alarms will be printed on the Alarm Teleprinter. The housewatch should do the following:

- ◆ Check "time out" on bottom of ticket to verify that this is a previous alarm.
- ◆ If no response is required, press CLR/TEST button and then proceed to make the unit available in quarters.

◆ **Verbal Alarms**

A. Units responding to verbal alarms must be identified via Selector Panel.

EXAMPLE: UNIT/UNITS VERBAL SEND

This automatically assigns the response to their home box.

- B. This must be followed by a radio report, upon leaving quarters, indicating what they are responding to and the location. The units must also indicate if additional assistance is required.
- C. The VERBAL button should be used only if the alarm is within **two blocks** of a unit's quarters in any direction. **If the alarm is more than two blocks away, the unit should respond and give information and location via radio.**

◆ **RCP Button**

Units that are granted R&R shall not go 10-8 when leaving the scene of an incident. Upon return to quarters, place unit on R&R via selector panel in the following manner:

EXAMPLE: E259 RCP SEND

At the conclusion of recuperative time, the unit will bring itself back into service in the following manner:

EXAMPLE: E259 AQ SEND

Note: The unit's officer shall ensure that the unit comes back in service at the appropriate time via the PC/ATS.

◆ **ACT'G Button: Relocated Units**

A. The relocated unit must use the ACT'G button at all times to identify itself.

EXAMPLE: ACT'G E033 AQ SEND

Indicates relocated unit is in service as E033, either initially or returning from the scene of an incident.

B. Acknowledgments and status updates involving relocated units must be done independently. For example, Box 2185 is received in quarters of E60, L17 and BC14. The following would indicate that a relocated Engine, Ladder and Battalion Chief are responding.

EXAMPLE: ACT'G E060 10-4 SEND
(immediately followed by)

ACT'G L017 10-4 SEND
(immediately followed by)

ACT'G BC14 10-4 SEND

Note: The ACT'G button can only be used by the first relocater into the original unit. If subsequent relocations are made into that unit, the ACT'G button can no longer be used. Thereafter acknowledgments and status reports must be done via Voice Alarm, radio or telephone.

◆ **Non-Emergency Response, Unit Status**

- A. Units scheduled for non-emergency activities away from quarters must wait for a response message before leaving quarters. If such message is not received, units shall contact the dispatcher by telephone.
- B. Receipt of a non-emergency response message must be acknowledged by use of the 10-4 button. The 10-8 button shall not be used for this purpose.
- C. Units not scheduled for a non-emergency response who receive such a message to respond must contact the dispatcher by telephone for clarification. Also, units unable to leave quarters as directed shall contact the dispatcher by telephone.
- D. Non-emergency response activities are:
 - Preventive Maintenance.
 - Training at Randall's Island.
 - Medical Examinations at the Bureau of Health Services.
 - Training at a location other than the unit's own quarters when the unit will be unavailable.
 - Fire Prevention or Community Relations activities away from quarters when the unit will be unavailable.
 - Other authorized movement of unit from quarters when the unit will be unavailable.

◆ **SAMPLE TELEPRINTER MESSAGES**

There are two types of teleprinter messages: Response messages and Administrative messages.

Two types of printing are used to differentiate between the two types of messages. Response messages are in EXPANDED print and require an acknowledgment. Administrative messages appear in smaller print and do not require an acknowledgment.

○ **Response Messages**

Response messages include messages to respond, relocate and return from relocation. Only the units affected receive these messages. All messages requiring a unit response contain information as to the type of alarm, unit(s) assigned, source of alarm, the nearest box number and location, an incident number and the date and time the message was transmitted (the "time out"). In addition, information on hazardous materials may be provided through CIDS.

If an alarm is received by telephone or from an ERS box, information about the address, type of structure (residential, commercial) and location of fire (apartment number, basement, etc.) may be provided.

For an explanation of the coded numerical signals used in teleprinter messages, see FDNY Communications Manual: section 2.5.1.

A. BARS (Box Alarm Readout System)

This message designates an alarm originating with a pulled street box. These boxes are described on page 2 of this chapter.

```
1ST ALARM - BARS
E258 E260 L115 L116 BC45

BOX 7125 - 45TH RD AND VERNON BLVD
INCIDENT# 12
09/08/03 235300
```

B. Class 3

This message indicates that the source of the alarm is a Class 3 Special Building Alarm. These alarms are described in Chapter 1, Section 1.4 of this Manual.

```
1ST ALARM - CLASS 3(STRUCT)
E033 L009 BC06

BOX 0342 - (=3-342-42) 627 BROADWAY

W HOUSTON ST          BLEECKER ST
1=STRUCTURAL AFA VALVE
INCIDENT# 7

09/15/03 224815
```

Line 3. Initial signal 3 indicates a private fire alarm box; 342 is the box number and 42 is the terminal number which designates a specific area within the building.

Line 5. AFA is the abbreviation for one of several private fire alarm companies. Valve indicates the type of special alarm.

C. ERS (Emergency Reporting System)

This message designates an alarm originating from an ERS box. Since the caller from an ERS box can speak to the dispatcher, the teleprinter message often includes the same information as a phone alarm message. ERS boxes are described in Chapter 1, Section 1.2 of this Manual.

```
ERS - 1ST ALARM - COMMERCIAL
E014 E005 L003 L009 BC06

BOX 0556 - 850 BROADWAY

E 14 ST                      E 13 ST
B=STORE BASEMENT
INCIDENT# 21

09/15/03 233120
```

Line 3. Box and reported address of fire building

Line 4. Nearest intersections to reported address

Line 5. Occupancy - Location of fire in building

D. Greater Alarm

A second or higher alarm is a greater alarm.

```
SIG 2 - 2
2ND ALARM
E055 E015 E028 L008 ST01 FC01 E009 SB01

BOX 0045 - 40 WALL ST

NASSAU ST                    WILLIAM ST
C=OTHER COMMRCCL 5 FLOOR
INCIDENT# 17

09/15/03 232117
```


G. Return from Relocation

Units must wait for a Return from Relocation ticket before returning to their own quarters. If both the original and relocated units are AQ in the same quarters and a Return from Relocation ticket is not received, contact the dispatcher by telephone for instructions. A relocated unit must not return to their own quarters without being instructed to do so.

This message is to be acknowledged using: UNIT I.D., ACT'G, 10-4 and SEND buttons (first relocater only).

SIG 17 RETURN FROM RELOCATION

L025

07/05/03 203603

H. Administrative Messages

Administrative messages appear in small print on the PC/ATS. They do not require acknowledgment.

A. ACT'G (Acting) Indeterminate

This message will be transmitted if a second relocated unit uses the PC/ATS to report its status. A call to the dispatcher is required as an answer to this message. To avoid confusion, second relocaters must report in service by telephone or, if that isn't possible, by Voice Alarm.

ACT'G UN2 AQ

07/05/83 202854

"ACT'G" INDETERMINATE - PHONE INFORMATION TO CO

07/05/03 202855

THE COMPANY JOURNAL

- ◆ The company journal records chronologically the day-to-day events of a unit. In it are entered vital particulars of alarms, accidents, deaths, injuries, other matters requiring an entry for proper record keeping. As such, it forms an official enduring record to be retained for 20 years. Therefore, it is incumbent upon all members to exercise the utmost care in the maintenance, use and preservation of this journal.
- ◆ The purpose of this guide is to:
 - a. Set up simple standardized procedures for company journal entries, making them as concise, yet as informative as possible.
 - b. Assure entries which will aid in the continuity of supervision providing incoming officers with a chronological resume of activities since the last working tour.
 - c. Increase the efficiency of all units.

GENERAL INSTRUCTIONS

- ◆ Entries shall be neat, accurate and properly indexed. Entries by member on housewatch shall be in blue or black ink. Entries by other members shall be in red ink. No line shall be left blank between entries. Each line shall be started at left in a uniform manner.
- ◆ Entries omitted shall not be forced. They shall be made at time of discovery of omission by member responsible for entry and include full particulars that would have been made in omitted entry.
- ◆ Entries by members, other than member on housewatch, are to begin with rank and surname, thereby eliminating signature. However this shall not apply to roll call entries.
- ◆ When member, other than member on housewatch, makes an entry in a unit to which they are not assigned, member shall write unit number after their name. Members making entries in a company journal shared by two (2) or more companies shall write number of their unit after their respective names.
- ◆ When articles are received or delivered the housewatch entry shall begin with the word "received" or "delivered."
- ◆ In quarters housing two (2) or more companies the officer in command of each unit shall write a separate roll call.

- ◆ At the beginning of each calendar day, immediately following 2400 hrs. and before taking over of housewatch duties, the day and date shall be written across the page on line directly below last entry of the previous calendar day. Also, on same line in "Time Column" 0001 shall be written.
- ◆ Members beginning housewatch duties at time of a roll call shall not make an entry of that fact until particulars of roll call have been duly entered by the officer in command.
- ◆ Entries of members reporting for duty shall be limited to one such member per line.
- ◆ Incoming member reporting for duty and finding unit out of quarters shall record his entry in company journal. Officer on duty shall call the roll, make entry of departure and proceed as per Section 11.1.6, Regulations. Particulars of roll call shall be duly recorded upon return from operations.
- ◆ Civilian employees of the Department shall make entries in their own handwriting in company journal when entering and leaving quarters.
- ◆ Members returning from alarms during their assigned housewatch tour shall record return as "RESUMING HOUSEWATCH".
- ◆ If return is beyond their assigned housewatch tour, the relieving housewatch shall record return as "ASSUMING HOUSEWATCH".
- ◆ Military Time shall be used when making entries except that the terms 9x6 and 6x9 shall be used to designate tours of duty.
- ◆ If a unit is required to respond to an alarm while the officer is in the process of writing the roll call, members shall be permitted to make necessary entries in company journal e.g. OT entries.
- ◆ The officer shall when returning to quarters from the response, continue the roll call. Members are not to skip any lines when making their entries.
- ◆ Entries concerning events or conditions requiring notifications shall include the name, rank/title and unit of persons(s) notified.

LAYOUT OF JOURNAL

- ◆ Pages 500 running backward to 498 shall be ruled and indexed to record chief's visits in accordance with Regulations.
- ◆ Pages 497 running backwards to 495 shall be ruled and indexed to record company drills, using the following columnar headings: Date; Training Subject; Conducted By; Groups on Duty.
- ◆ Individual Page

Across top of first line shall be legibly written the complete date.

For example: **Monday, May 30, 1965**

1st column from left (time column) shall be used to record time of each entry. No mark other than time shall be entered in this column.

2nd column shall be known as "Flagging Column" and used to rapidly locate and emphasize entries of an unusual or serious nature, or entries of special interest that affect the administration of the unit. The use of "Flagging Code Letters" shall be limited to those specified in this guide.

Where the journal supplied does not have a flagging column, unit commanders shall cause a red line to be drawn 3/8" to the left of the existing red line to provide for such column.

3rd column shall be used to record the complete journal entry.

- ◆ Rear pages of company journal shall contain a record of chief's visits and company drills. All other records, statistics, etc., shall be maintained in Office Record Journal. The receipt and dispensing of fuel etc., shall be recorded in company journal chronologically at time of this activity.



DECONTAMINATION PROCEDURES

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with the FDNY's policy on Emergency Mass Decontamination.• To familiarize members with the procedure to establish a "Gross Decontamination Corridor".
CONTENTS:	<ul style="list-style-type: none">• Emergency Mass Decontamination Using Water Spray, with hand lines & apparatuses.• Secondary/personal decontamination•
FDNY REFERENCE:	<ul style="list-style-type: none">• Fire Tactics and Procedures<ul style="list-style-type: none">○ Hazardous Materials 7

1. PURPOSE

1.1 After a hazardous materials release, vapor or aerosol hazards can still exist on victims even after they have left the area of the release. Toxic levels of a material may be trapped inside clothing, which can vaporize (off-gas) and continue to harm people even after they have left the scene. Rapid physical removal of the material from the victims is the single most important action associated with effective decontamination. Reasons for decontaminating exposed victims are:

1. Removal of the agent from the victim's skin and clothing to prevent any additional exposure.
2. Protecting responders and medical personnel from cross contamination.
3. Providing psychological comfort to the victims by removing contamination.

2. EMERGENCY MASS DECONTAMINATION

2.1 In New York City, an incident may result in a large number of contaminated victims that need to be rapidly decontaminated. The Fire Department must have procedures in place to ensure that a simple and effective method of performing gross Decon can be set up and operational as quickly as possible. Our ability to deliver large volumes of water quickly is the key to reducing exposure times and saving lives by rapidly removing contamination.

2.2 All exposed people must be immediately removed from the area of the release to an area of safe refuge. This area of safe refuge is considered to be in the warm zone, but is physically removed from any contamination and thus prevents any additional exposure to the released agent. The concept of the Mass Decontamination Procedure is to establish a "Gross Decontamination Corridor". Process the contaminated victims from the hot zone or area of safe refuge to the cold zone, where they can safely be released or transported to a medical facility for further care. The purpose of the corridor is to remove the contamination from the victim. This process is accomplished in two steps:

1. Have the victims remove their outer clothing
2. Wash the victims down with water – soap can be added to the process if available.

Ideally, removal of victims' outer clothing should be the first step in the Decon process after removing people from the contaminated area. Studies have shown that removing a victim's clothing removes up to ninety percent of the contamination. Street clothing will absorb liquids, which will continue to vaporize and further expose the wearer. Quickly removing outer clothing vastly reduces the exposure time, and thus the total dose received, of any contaminant. Also, a stream of water, even in a fog spray, will drive any liquid contaminant further inside clothing towards a victim's body, increasing the likelihood of skin absorption. Civilians must be informed of the benefits of removing their outer clothing and encouraged to do so. There will be some people who will not remove their clothing, regardless of the circumstances or the benefits. Such persons should be encouraged to remove what they will, and continue through the Decon process. (For a firefighter wearing bunker gear, SCBA, gloves, and a hood, the percentage of contamination eliminated by removing outer clothing is even higher than ninety percent. The bunker gear should be removed while continuing to wear the SCBA with the facepiece to protect the respiratory tract. The SCBA is removed, with the facepiece remaining on, and the member holding the SCBA via the strap. Another member should then remove the bunker gear. After the bunker gear has been removed, the facepiece is then taken off and the firefighter sent to the gross Decon.)

2.3 Emergency Mass Decon Using Water Spray

- 2.3.1 Fire Department units should use resources that are immediately available and start gross decontamination as soon as possible. The most expedient approach is to use our standard firefighting equipment to provide emergency low-pressure streams supplying high volumes of water, allowing for large amounts of people to be deconned quickly.
- 2.3.2 After the removal of clothing, the victims should be moved through a "Gross Decontamination Corridor" which utilizes water spray to remove the remaining contamination. There are several options available to the decontamination officer for delivering this water spray. Several factors that will affect the choice of decontamination procedures include: number of victims involved, type of material that has been released, impact of weather conditions on the use of water sprays for decontamination, and personal protective equipment (PPE) available to members performing the decontamination process.
- 2.3.3 One option for setting up a mass Decon is to stretch a 2½" handline equipped with an Aquastream fog nozzle. The nozzle team should operate the nozzle in the fog position and the victims should be directed through the fog spray, rinsing any remaining contamination off them. The members should avoid contact with the victims until the proper PPE is in use. They must monitor the operating pressure of their line to ensure that it is not too forceful for the victims. The recommended operating pressure range is between 50 to 80 psi. Additional handlines can be deployed as necessary. Consideration can be given to the use of two handlines operating opposite each other, approximately 25' – 30' apart, to form a large shower area that multiple victims can move through at the same time. Care must be taken to avoid pushing the contamination across to the opposing nozzle team. (See Figure 1 and Figure 2)

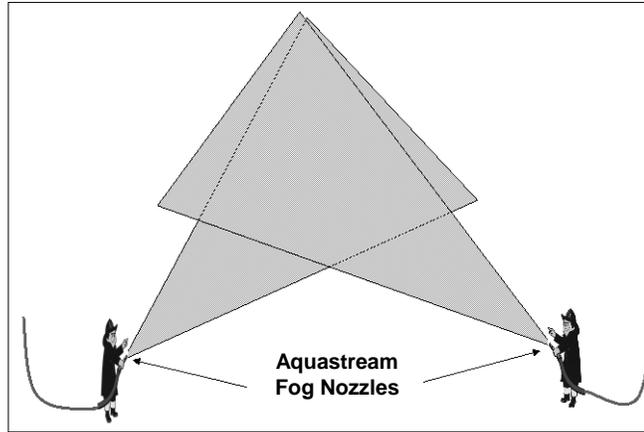


Figure 1



Figure 2

- 2.3.4 A second option involves the use of two pumpers and greatly increases our decontamination capabilities (See Figure 3):
- a. Position two pumpers parallel to each other approximately 25 feet apart with the control panels facing the outside.
 - b. Place an Aquastream fog nozzle on each pumper on a selected inside discharge gate. Additional discharges and nozzles can be used if available.
 - c. Operate the nozzles in the fog position.
 - d. Monitor the operating pressure to ensure the stream is not too forceful. The recommended operating pressure is 50 to 80 psi.



Figure 3

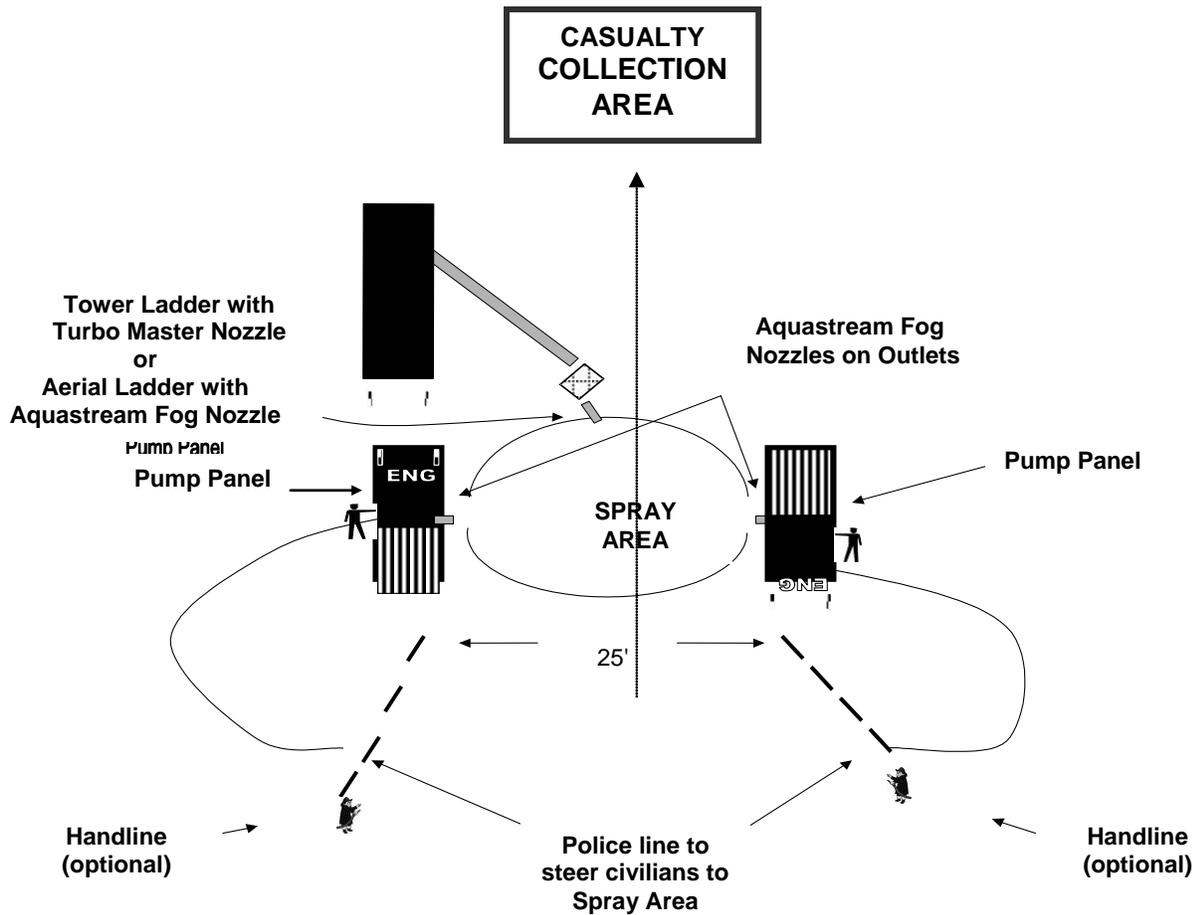
- 2.3.5 Other options include positioning a tower ladder with a Turbomaster fog nozzle or an aerial ladder with a ladder pipe and Aquastream fog nozzle at the edge of the water spray formed from the pumpers. If a tower ladder or aerial ladder is not available or will be delayed, a 3rd pumper with an Aquastream fog nozzle attached to the apparatus mounted multiversal nozzle can be positioned parallel to and in line with one of the first two pumpers as shown in figure 5. This configuration should produce a water spray shower area approximately 20 feet wide by 30 feet long, which the victims can now be directed to pass through. (See Figure 4 and Figure 5)

Figure 4



DIAGRAM FOR TWO ENGINES AND ONE LADDER CONFIGURATION

Figure 5



NOTE: Pumpers will set up with control panels facing outside of the spray area, approximately 25' feet apart, and a tower ladder with a Turbomaster fog nozzle, or aerial ladder with Aquastream fog nozzle aimed down on the spray area.

- 2.3.6 In immediately life threatening exposures where emergency decontamination is necessary, fog nozzles can be attached to the multiversal on an engine, or to a tower ladder outlet, for a very quick gross Decon setup. As time permits, the configuration shown in fig. #3 should be implemented and the tower ladder (as per figure #4) added, as the resources become available.
- 2.3.7 As the victims exit from the water spray shower area EMS Haz-Tac personnel or other EMSC units, who will evaluate the victims to determine further needs, should meet them. Haz Tac personnel are qualified to operate in chemical protective clothing, and can also operate in a hot zone if necessary and would be the primary unit for this task.
- 2.3.8 The SOC Decon Support Unit can supply disposable clothing, which can be issued as victims exit gross decontamination for matters of privacy and weather related exposures.
- 2.3.9 Victims can then proceed to a holding area where EMS can evaluate them. A secondary personal decontamination may be warranted. Refer to section 3 for FDNY assets available for secondary/personal decontamination. After this secondary decontamination, the victims should be considered clean and they can be removed from the scene.
- 2.3.10 It is important to remember that in most cases the establishment of a mass decontamination procedure is viewed as a life saving operation. In this regard, the hazard to our members staffing the operation is from product that may be absorbed into victims' clothing. Thus, members initially staffing the Decon operation must wear their full protective equipment, including mask, gloves and hood. Using this ensemble will give adequate protection from cross-contamination in most instances. It must be emphasized that a SCBA will give adequate protection from inhaled contaminants, which is the primary route of exposure. However, bunker gear is not vapor tight, and members must still use care to avoid contact with the victims. As soon as resources become available these firefighters should be removed from the decontamination process and then go through decontamination themselves. If the Decon officer deems it necessary, the operation may be staffed by members wearing chemical protective clothing (CPC), as they become available. Incident Commanders and Decon officers shall be cognizant of these issues and be sure adequate Squad and Rescue personnel, who are qualified to wear CPC, are available.

2.3.11 The threat of a hazardous materials release, be it accidental or intentional, affecting large amounts of victims is real. The Hazardous Materials Emergency Response Plan is in place to deal with this occurrence. The Mass Decontamination Procedure is just one more tool for the Incident Commander to help control the situation. The basic rule of protection from hazardous materials is time, distance, and shielding. The Mass Decontamination Procedure is the key to reducing the amount of time that the victims are exposed to the hazard. The faster we can reduce their exposure to the harmful effects of the hazardous material, the better the chances they will not be injured as a result of their exposure.

3. SECONDARY/PERSONAL DECONTAMINATION

- 3.1 Secondary/Personal decontamination is a more complete, definitive process than that described in the emergency mass decontamination section. It is a more time consuming process that usually requires brushes and soaps, sometimes assistance and generally heated water shower units. The FDNY Special Ops/Haz-Mat Group deploys several different shower systems to conduct this process.
- 3.2 Water containment tubs and low volume garden hose equipment are carried by CPC Ladder Companies, the HMTU's, and HMC1. (See Figure 6)



Figure 6

- 3.3 Air inflatable tents, with designed in shower hoses, and portable water heaters, are carried by several HMTU's and the SOC Decon Support Unit. (See Figure 7)



Figure 7

- 3.4 Decontamination trailers and attached tractors for delivery to incidents anywhere in the city. These units are self-contained, delivered and set-up by assigned companies, and operated by Squad personnel. (See Figure 8)



Figure 8

BY ORDERS OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT



Probationary Firefighters Manual Chapter 24

EMERGENCY OPERATIONS



OBJECTIVE:	<ul style="list-style-type: none">• To familiarize members with emergency procedures associated with specialized rescue circumstances• To ensure the safety of members during such operations
CONTENTS:	<ul style="list-style-type: none">• Vehicle Disentanglement and Patient Extrication• Water Rescue Operations<ol style="list-style-type: none">1) Water Rescue Operations<ul style="list-style-type: none">Add. 1) Inflatable Water Rescue Hose2) Ice and Cold Water Rescue3) Surf Rescue4) Steam System Emergencies
FDNY REFERENCE:	<ul style="list-style-type: none">• Operational Procedures at Emergencies

PART ONE

Vehicle Disentanglement and Patient Extrication

1. INTRODUCTION

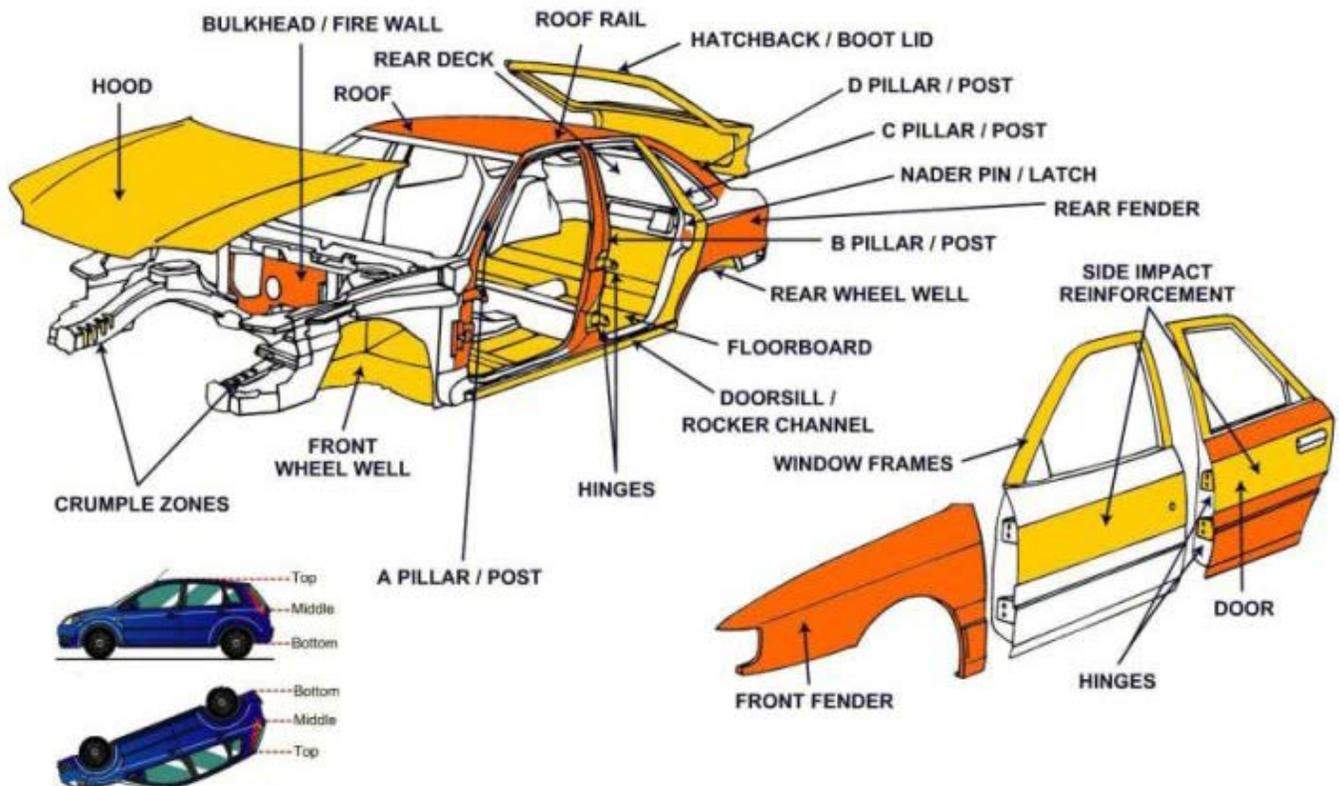
- 1.1 Motor vehicle accidents (MVA) with victims pinned pose a unique challenge to our members. Medical authorities refer to the first hour from the beginning of an accident with critical injuries as the Golden Hour. A victim delivered to a surgical team within this first hour has the best chance of survival. Because of this, our operations must be well coordinated in order to achieve efficient victim removal without compromising member safety. Our knowledge of disentanglement procedures, new vehicle technology, tool capabilities, medical considerations and tactical procedures will aid us in achieving this goal. Each accident scene will be unique. Factors that will play a role in determining the appropriate actions taken and the order in which they are carried out will be the type and number of vehicles involved, their positions, number and condition of patients and any external hazards at the scene. This bulletin should serve as a source of information that will assist you in determining a proper course of action to be taken when you arrive at the scene of a MVA.

2. NEW CAR TECHNOLOGY

- 2.1 Today's cars save lives by wrapping occupants in reinforced alloys, impact absorbing crumple zones and as many as sixteen air bags. Safety features vary from year to year in their design and location amongst the different makes and models. It is paramount to know how these safety features could possibly affect our disentanglement and extrication operations. Listed below are some of the advancements made in the construction of new vehicles.
- 2.2 Reinforced wheel and engine deflection systems that upon impact, deflect the wheels and motor under the car away from the passenger compartment.
- 2.3 Crumple zones that absorb the energy of the impact, preventing it from being absorbed into the passenger compartment. While this has drastically increased the ability of occupants to survive the impact, it can complicate the disentanglement effort due to the strength of the deformed metal structures.
- 2.4 Reinforced dashboards have been developed to protect the occupants in case of a front or side impact. The transverse dash beam located behind the dashboard ties into the A posts and the floor pan making dashboard lifts more difficult.
- 2.5 High-Strength Low-Alloy and boron steel is used in vehicles for improved strength to weight ratio. The side door beam, when driven into the frame upon impact, will make door removal more difficult due to its strength. These lightweight, high strength materials are used to reinforce roof and post structures hindering our cutting operations.

- 2.6 Airbags located in the steering wheel, dashboard, under the dashboard, and now any combination of the doors, seats, roof rails and even some seat belt systems present several challenges. Airbag systems are equipped with an energy storage feature that enables them to deploy even when the battery has been destroyed in an accident. Airbags can either be deployed electronically or mechanically. Disconnecting the battery will start the drain time, which varies, for an electronically activated device, but not a mechanically activated one. All airbag systems are not alike but do contain similar components. Exact location, volume and mechanism of deployment will vary. Newer systems include the use of dual stage inflators which basically means that just because an airbag has deployed it does not mean that there cannot be a second deployment. In the large majority of our responses the airbags will have already deployed. However our members should always treat the area around the airbag as if they have not deployed. The rule of 5-10-20 should be observed; at least 5” from side airbags, 10” from driver airbags and 20” from passenger airbags.
- 2.7 Seatbelt pretensioners are designed to reduce blunt force trauma as well as impact with airbags. These devices are either mechanically or electrically activated using a spring mechanism or a pyrotechnic device to deploy. The mechanically activated pretensioner will remain live even after the battery is disconnected. Removal of the seatbelt from a patient as soon as practical is recommended. Accidental deployment during extrication can cause serious injury to both rescuers and occupants alike.
- 2.8 High impact plastic, carbon fiber, aluminum and other composite materials are replacing sheet metal in all or parts of the exterior bodies. Composite materials and carbon fiber can be difficult to cut. Plastic tends to crumple or shatter instead of bending making it hard to find a purchase point for leverage.
- 2.9 Tempered glass is being replaced on side and rear windows by laminated glass or rigid plastics due to it being highly resistant to breaking. This new type of glass presents a formidable barrier in gaining access to the occupants inside of the vehicle. Conventional methods used in the past will not work on these newer types of glass.
- 2.10 Unibody construction results in a vehicle that is made from many pieces welded together to make a lightweight but strong vehicle. This construction is such that the body and chassis is one unit. The outer surface of the vehicle adds to the overall strength of the vehicle.
- 2.11 Space frame construction usually does not depend on the exterior surface of the vehicle for strength. The body panels are attached to the frame to provide an outer surface many times consisting of plastic or a composite material.

- 2.12 The seats in vehicles today are generally stronger, some wrapping around the occupant, and are mounted more firmly to the floor pan making seat displacement more difficult. Many new design vehicles have airbag components mounted in the seats upholstery. Avoid cutting through airbag sensors, gas cylinders and the airbags themselves. Removing the upholstery prior to cutting might be a good practice.
- 2.13 Automatic roll-over protection systems deploy as the vehicle begins to roll over. They are typically stowed behind the seats in convertibles in the rear deck area. This presents a risk to members operating when deployment accidentally occurs during the rescue operation. Disconnecting the battery and avoiding its deployment path are steps to follow. In some newer vehicles these systems can be manually deployed. When this is the case, manually deploying it would be a course of action.
- 2.14 The pillars and posts contain components that should be avoided. Reinforcement for the mounting of seatbelts, pretensioner systems and airbag inflators as well as the advances in construction presents more of a challenge during cutting operations. Exposing the posts rails and pillars prior to cutting will allow members to see where these components are located so that they can be avoided.
- 2.15 The batteries can be in many different locations. Under the hood, in the wheel well, under seats or in the trunk are some of the areas they may be found. Some vehicles may have more than one battery.



3. TACTICAL PROCEDURES

- 3.1 Personnel at the scene of an MVA with victim(s) pinned must have a specific strategy for overall safety and efficient victim removal. First arriving officers must immediately notify the dispatcher when a person is pinned in the vehicle.
- 3.2 Size-Up Considerations
- 3.2.1 Additional units required (e.g., EMS, Rescue).
 - 3.2.2 Transmitting a 10-75 for an emergency should be considered when there are several vehicles with numerous patients.
 - 3.2.3 Downed electrical wires, gasoline spill, etc.
 - 3.2.4 Type of vehicles involved; the number and type of injuries.
 - 3.2.5 Secondary accident considerations, other hazards involved.
- 3.3 Operations
- 3.3.1 **Disentanglement** - The removal of wreckage from around the victim.
 - A. There are so many variables at an accident with people trapped that no one procedure will work in all cases. The safest and most efficient method should be considered first. Protect victim with materials such as a blanket or sheet before disentanglement procedures start. Members working inside of vehicle shall be cognizant when operating tools close to victim. The least amount of movement of the victim will result in the fewest secondary injuries.
 - 3.3.2 **Extrication** - The physical removal of the victim from the vehicle.
 - 3.3.3 The power unit should be placed in the front or rear of the vehicle. This will allow flexibility to operate on both sides of vehicle without having to reposition. The spreaders and cutters are the tools of choice and should be used to compliment each other at an operation. While one member is operating the spreaders, have other member holding cutters prepared to assist when needed. Always be in control of the tool and **never position any part of your body between the tool and the vehicle**. A coordinated team effort is key when operating the Hurst tool. Every member should be aware of its capabilities and limitations. This will be accomplished through continuous training and actual operations.

4. ASSIGNMENTS

4.1 **Engine Company Operations** - Officer should divide the company into two teams. The Officer and two CFR trained Firefighters (equipped with trauma bag and cervical collars) proceed to the scene of the accident. Firefighters shall gain access to the victim so that critical trauma assessment can be made and treatment initiated/augmented. Be prepared to allow ladder company members inside vehicle for disentanglement evaluation, if not already on scene. The remaining members shall stretch and charge a precautionary handline.

4.1.1 When fire or hazardous condition exists upon arrival, stretching and charging a hose line is paramount. Consider a foam handline.

4.2 **Ladder Company Operations** - These assignments are only a guide and should be evaluated by the company officer at roll call and distributed according to experience and staffing.

4.2.1 Officer and inside team proceed to scene of accident to initiate a perimeter survey, chock the vehicle and gain access to victim. Inside team will ensure car is in park, windows are opened, seats are moved back and seatbelts removed before shutting down ignition. If an engine or EMS is not on scene, members shall stabilize the patient. Once an engine or EMS arrives, the inside team can pass off patient stabilization and assist the outside team with disentanglement.

4.2.2 Roof and OV bring Hurst tool equipment to scene of accident and initiate operation.

4.2.3 Chauffeur initially uses the apparatus to block off traffic and can be used to bring additional equipment to scene.

4.2.4 The Officer should ensure the disconnection of the battery. When disconnecting the battery, remove the negative terminal first.

5. VEHICLE STABILIZATION

5.1 The goal of vehicle stabilization is to prevent rocking of the vehicle. Placing step chocks, shutting down the engine, engaging the parking brake, putting the transmission into park and disconnecting the battery are all part of the stabilization process. Before disconnecting the battery, open power windows and adjust power seats to assist with extrication. Stabilization options will vary depending on the available equipment. Ropes, chains, hooks, and Halligans, in addition to step chocks and wedges, can all be used for this purpose.

- 5.2 Two rules should always be considered:
- Vehicles are stabilized as they are found.
 - **NEVER** right a vehicle with a victim inside.
- 5.3 Check under the vehicle for victims before any stabilization methods are taken.
- 5.4 Vehicles on all four wheels are best-stabilized using step chocks and wedges. Place chocks just behind front wheels and in front of rear wheels, step side down. They should be positioned so as to not interfere with the door swing. Place the chocks so they make a snug contact with the rocker panel. A wedge may be required to fill the gap between the step chock and the rocker panel (Figures 1 and 2).



Figure 1



Figure 2

- 5.5 When further stabilization is required deflate the tires so that the vehicle rests totally on the step chocks. Though this is not always necessary it will afford the best possible stabilization. Keep in mind that once this is done you will be unable to reposition the step chocks when necessary. When deflating tires use vise grips or pliers to remove the valve stems (Figure 3).



Figure 3

- 5.6 Vehicles encountered on their side or roof presents a unique stabilization challenge. Place step chocks and wedges under side of car and tires (Figures 4 and 5). Vehicle shall be secured to a substantial object (apparatus, tree etc.) with utility rope (Figures 5 to 7). Because of the potential for vehicle movement, no member should enter a vehicle until properly stabilized. A good initial choice for entry into these vehicles could be the front or rear window.



Figure 4



Figure 5



Figure 6



Figure 7

6. DOOR REMOVAL

6.1 When removing a door, the first point of attack may vary. There are two options, Nader pin/staple or hinge side. Whatever method is chosen, the victim must be protected from any flying debris, and the window opened or the glass removed. While attacking the Nader pin/ staple first has been successful in the past, the hinge side may be an improved approach with new car construction. Both techniques should be mastered.

6.2 Hinge side

6.2.1 Fender Crush

- A. Crush the wheel well section of the fender in between the spreader arms creating a purchase point between fender and door (Figure 8).
- B. Insert tips of spreaders perpendicular to purchase point, pushing fender forward exposing hinges (Figure 9).



Figure 8



Figure 9

- C. Cut top and bottom hinges using cutters in that order (Figure 10). When a hinge has a spring, it must be removed prior to cutting the hinge. Use a Halligan or Officers tool to remove it (Figure 11).



Figure 10



Figure 11

- D. Cut door stop when present (Figure 12).



Figure 12

- E. Close spreaders on door and force door open, using spreaders for leverage exposing Nader pin/staple (Figure 13).
- F. Cut Nader pin/staple with cutters and remove the door (Figure 14).



Figure 13



Figure 14

Note: Door may break free from Nader pin / staple when forcing it open. Keep the area clear beneath the door being removed.

6.2.2 Vertical Push

- A. In order for this method to be successful the roof must be intact.
- B. Insert tips of spreaders on an angle between A post and top of door (Figure 15).
- C. After exposing hinges, follow the steps listed in Section 6.2.1 for cutting hinges and the Nader pin/staple.



Figure 15

6.2.3 Halligan Tool

- A. Place the adz end of the Halligan tool in the seam between the front fender and door in the vicinity of the top hinge.
- B. Apply a vertical up and down motion creating a gap in the seam exposing the top hinge.
- C. After exposing the top hinge, follow the steps listed in Section 6.2.1 for cutting hinges and the Nader pin/staple.

6.2.4 The spreaders may be used in place of the cutters when attacking the hinge side of the door for complete door removal. Use one of the above methods to establish a purchase (Figure 16).



Figure 16

6.3 Nader Pin/Staple Side



Nader Pin



Staple

6.3.1 Vertical Crush

- A. When room permits, place one arm of the spreaders in the vehicle between the victim and the door and keep the other arm outside of the vehicle. **This method will not work when the victim is too close to the door.**

- B. Keep spreaders in vertical position. The outer arm should fall over the outside door handle or close to it, with the tips about midway down the door.
- C. Close the tool on the door, forcing the outer edge of the door to roll out exposing the Nader pin/staple.
- D. Using the cutters cut the Nader pin/staple.
- E. Push the door away from the car to expose the hinges. When necessary close the spreaders on the door using them for leverage (Figure 17).
- F. Cut the top and bottom hinges, in that order, with the cutters. When a hinge has a spring it must be removed prior to cutting using a Halligan or Officers tool.
- G. Cut door stop when present.



Figure 17

6.3.2 Halligan Tool

- A. Place the adz end of the Halligan tool in the seam between the door and the post just above the midway point of the door (Figure 18).
- B. Apply a vertical up and down motion, creating a gap in the seam exposing the Nader Pin/staple (Figures 19 and 20).
- C. With the spreaders in the closed position, place the tips at a level just above the Nader pin/staple. Inch your way into position by opening and closing the spreaders to avoid tearing or shredding the door. This action may force the door.
- D. When the above does not force the door use the cutters to cut the Nader pin/staple.
- E. Follow steps E - G as listed in Section 6.3.1.



Figure 18



Figure 19



Figure 20

6.3.3 Vertical Push

- A. Using the vertical push to establish a purchase point may force the door from the Nader pin/staple. This method works best on older vehicles. On newer type vehicles (lightweight construction), the possibility exists of the door splitting, losing the integrity of the door. In order for this method to be successful, the roof must be intact.
- B. Insert tips of the spreaders into the window opening close to the B post (Figure 21). Keep top arm of spreaders horizontal with tips inside of vehicle.
- C. When the above does not force the door use the cutters to cut the Nader pin/staple.
- D. Follow steps E - G as listed in Section 6.3.1.

- 6.3.4 The spreaders may be used in place of the cutters when attacking the Nader pin/staple side of the door for complete door removal. Use one of the above methods to establish a purchase.



Figure 21

- 6.4 When any of the methods listed in Section 6 do not provide enough of a gap to insert the tool additional space can be gained in the following manner. Open the spreader tips about one inch.

- 6.4.1 Place the edge of the door on the inside of the spreader tips.
- 6.4.2 Close the spreaders pinching the edge of the door in between the tips (Figure 22).
- 6.4.3 Using the spreaders pry out and away from the vehicle enlarging the gap (Figure 23).
- 6.4.4 This will work on both the Nader pin/staple or the hinge side of the door.



Figure 22



Figure 23

7. THIRD DOOR REMOVAL

- 7.1 This procedure is used when a victim is pinned in the back seat of a two-door vehicle. The third door will provide better access to remove the victim(s).
- 7.2 Make four cuts at the following locations (Figure 24).
 - 7.2.1 Top of B post.
 - 7.2.2 Bottom of B post.
 - 7.2.3 Vertical cut rear of quarter panel.
 - 7.2.4 Horizontal cut rear quarter panel at the rocker panel.



Figure 24

- 7.2.5 Once the four cuts are made, insert the spreaders on an angle, midway on the door and make a crease (Figure 25).
- 7.2.6 Readjust the jaws to grasp the top right corner (Figure 26).



Figure 25



Figure 26



Figure 27



Figure 28

- 7.2.7 Once the jaws are secured onto the top right corner, pry outward and down (Figures 27 and 28).

8. ROOF REMOVAL

8.1 The large majority of the time victims are removed via the doors. Roof removal may be necessary for victim access or possibly even victim removal. The first step in removing the roof of a car is to decide which method of removal to employ.

8.2 Total Roof Removal

8.2.1 Cut low on the A Post and high on the B, C and D Posts with cutters (Figures 29 - 30). When cutting the A and D Posts, cut a portion of the windshield and rear window to allow access to cut the glass, if necessary. Cut all posts on one side before passing the tool to cut the posts on the opposite side of the vehicle.



Figure 29



Figure 30

8.2.2 Cut across the bottom of the windshield using the sawzall with wood cutting blade (Figure 31) or the Beluga Auto Glass Knife. End the cut at the A Post on both sides of the vehicle. The windshield hand saw or axe can also be used to cut windshield.

8.2.3 After completing cuts, slowly carry the roof toward the front of the vehicle. This will prevent dragging the cut windshield over victims in vehicle (Figure 32).



Figure 31



Figure 32

8.3 Roof Removal - Hinged Forward

8.3.1 Make all of the cuts at the same locations as for the total roof removal Section 8.2.1.

8.3.2 The windshield does not have to be cut.

8.3.3 After cutting posts, have members on both sides of vehicle lift roof and walk towards front of vehicle folding roof onto hood of car (Figure 33).



Figure 33

8.4 Roof Removal - Hinged Backward

8.4.1 Cut low on the A Post and high on the B Post with cutters. When cutting the A Post, cut a portion of the windshield to allow access to cut the glass, if necessary.

8.4.2 Make a hinge cut on both sides of the roof at a point just before the last post and place a hook in between the cuts (Figure 34).

8.4.3 With members on each sides of the roof, **slowly** lift it back over the hook placing over trunk of vehicle (Figure 35). Always secure a partially removed roof (Figure 36). Before cutting the roof posts, be sure the support of the roof in not needed to force the doors.



Figure 34



Figure 35



Figure 36

9. DASHBOARD DISPLACEMENT

9.1 In the past rams were the tools of choice for dashboard displacement. Today using cutters and spreaders which are already in operation will usually suffice. The rams are another option.

9.2 Spreaders

9.2.1 Make sure that the vehicle is properly stabilized with a chock under the rocker panel where the cuts are made.

9.2.2 Make two cuts in the bottom portion of the A Post. The lower cut is made below the hinge, parallel to rocker panel. The second cut is made approximately 6-8 inches above first cut (Figure 37). A metal hook should be positioned between the cutters and the rocker panel to prevent the tool from moving in towards the passenger compartment (Figure 38).



Figure 37

9.2.3 Make a third cut, low on the upper portion of the A Post (Figure 39).



Figure 38



Figure 39

- 9.2.4 Grip the section of the A post between the two cuts with the inside of the spreader arms and peel away (Figures 40 - 41).



Figure 40



Figure 41

- 9.2.5 Insert tips of spreaders into void created in A Post ensuring tips rest just inside of rocker panel (Figure 42). Open spreaders and lift dashboard (Figure 43).



Figure 42



Figure 43

- 9.2.6 A relief cut in the front fender may assist the dashboard displacement by relieving front end resistance. When making this cut, avoid cutting through front shock assemblies (Figure 44).



Figure 44

9.3 Rams

- 9.3.1 Make one cut on the bottom portion of the A post.
- 9.3.2 With the ram in the closed position, place the butt end on the rocker panel and the tip of the extending end on an upper portion of the A post.
- 9.3.3 Tightly close the spreaders on the rocker panel just behind the ram. The spreaders will act as a substantial object for the ram. Place a chock under the spreader tips.
- 9.3.4 Open the ram to lift the dash (**Figure 45**).



Figure 45

- 9.3.5 An alternate method in using the rams for a dashboard displacement would be to follow the same steps as listed above except instead of butting the ram against the jaws of the spreaders use the base of the B Post (**Figure 46**). Use of one of the tip attachments may assist the operation.



Figure 46

- 9.3.6 The ram may be removed to allow full access to the displaced dash area. To do this a second step chock should be placed under the rocker panel below the A post (**Figure 47**). A wooden wedge should also be placed in the gap that has been formed at the relief cut on the bottom portion of the A post (**Figure 48**). Exercise care when retracting the ram so the displaced dash does not come down on the victim.



Figure 47



Figure 48

9.4 Bucket Seats

- 9.4.1 In order for a dashboard displacement to be effective in a vehicle that has bucket seats with a center console, the metal straps that are located on each side of the console behind the plastic covering should be cut (**Figures 49 and 50**).



Figure 49



Figure 50

- 9.4.2 The metal straps are bolted to the hump in the floor pan and the underside of the dash and will vary in size and shape.
- 9.4.3 These straps can be accessed from the opposite side of the trapped occupant by breaking the plastic covering the side of the center console.
- 9.4.4 Even cutting one of the straps will assist in the operation. When starting to lift the dash the other strap may break free from the force.

10. SEAT DISPLACEMENT

10.1 Although this procedure is an accepted way to displace a seat backwards, it must be used with caution. Always try to move the seat backwards by normal methods (e.g. manual lever, electric buttons) before committing to hydraulics. To avoid potential problems, seat displacement procedures should only be used for short distances.

10.2 Ram

10.2.1 Place the butt end of the ram on the base of the "A" post.

10.2.2 Place the extending end of the ram on the sliding portion of the seat track (**Figure 51**). Make certain the extending end is not placed on the fixed base of the seat track or on the cushion portion of the seat. The part of the tool that is placed against the "A" post should be slightly higher than the opposite end.

10.2.3 Extend the ram to displace the seat (**Figure 52**).

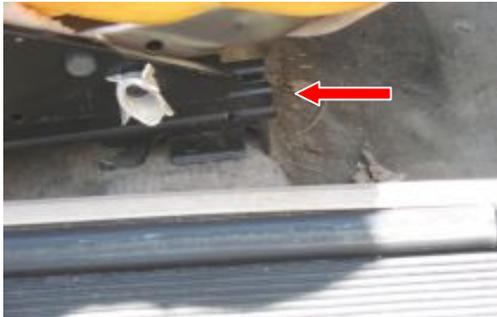


Figure 51



Figure 52

10.3 Spreaders

10.3.1 Place one tip of the spreaders on the base of the "A" post.

10.3.2 Place the opposite tip of the spreader on the sliding portion of the seat track (**Figure 51**). Make certain the spreader tip is not placed on the fixed base of the seat track or on the cushion portion of the seat. The part of the tool that is placed against the "A" post should be slightly higher than the opposite end.

10.3.3 Open the spreaders to displace the seat (**Figure 53**).



Figure 53

11. GLASS REMOVAL

- 11.1 There are two predominate types of glass used for vehicle windows; laminated safety glass which is used for the windshields, and tempered glass which is found on the sides and rear of a vehicle. Tempered glass is being replaced on side and rear windows by laminated glass or rigid plastics due to it being highly resistant to breaking. This new type of glass presents a formidable barrier in gaining access to the occupants inside of the vehicle. As a rule, only the glass necessary to be removed for a certain procedure should be removed. Eyes and hands should be properly protected any time glass removal procedures are being used. Avoid inhaling glass dust and/or particles.
- 11.2 Before any glass removal procedures are started, victims and/or rescuers should be protected from airborne glass debris. Salvage plastic or yellow exposure blankets are a good choice of protection. Fabric blankets are not a good choice as they tend to keep pieces of glass in the fabric which could cause injury later to a victim or rescuer. Also, when they are contaminated with bodily fluids, they must be placed out of service.
- 11.3 **Windshields:** One of four tools may be used when removing a windshield; a windshield saw, a sawzall, Beluga auto glass knife or an axe. Before using the windshield saw, make sure that the blade is installed correctly (the teeth facing the handle of the tool). The axe should be considered as a last resort for this procedure. When using an axe, take firm but not full strokes and strike the windshield with the corner of the axe blade. A cut windshield should always be supported to prevent it from falling in on a victim.
- 11.4 **Side/Rear Windows:** The center-punch or halligan can be used to break tempered glass. When using the halligan, insert the adz end between door frame (**Figure 54**) and glass exerting downward pressure (**Figure 55**). This will generally keep glass from shattering all over victim. Keep in mind that on the newer types of glass these methods may be ineffective.



Figure 54



Figure 55

- 11.5 When encountering a vehicle that has side or rear windows that are laminated or rigid plastic, a sawzall may be used to gain access.

12. VEHICLE ON SIDE

- 12.1 Access to the passenger compartment for a vehicle on its side can usually be made from the front or rear windows when the roof is intact. When the roof is crushed, access and extrication can be achieved by cutting the roof posts and hinging the roof down. The above methods of gaining access to the passenger compartment can only be attempted after the vehicle is firmly stabilized.

- 12.2 An alternate method of gaining access to the passenger compartment would be to cut an opening in the roof of the vehicle. The air chisel would be the tool of choice (**Figures 56 and 57**).

12.2.1 Prior to cutting remove the interior headliner.

12.2.2 Make sure victims are not against the interior of the roof in vicinity of cutting operation.



Figure 56



Figure 57

13. VEHICLE ON ROOF

13.1 Access to the passenger compartment for a vehicle on its roof can usually be made from the front or rear windows when the roof is intact. Door removal can be accomplished when the vehicle is in this position. Attacking the hinge side would be the preferred method of removing the door.

13.2 Fender Crush

13.2.1 Crush the wheel well section of the fender in between the spreader arms creating a purchase point (**Figure 58**).

13.2.2 Insert tips of spreaders perpendicular to purchase point, pushing fender forward exposing hinges (**Figure 59**).



Figure 58



Figure 59

13.2.3 Cut top and bottom hinges using cutters in that order. Be advised the lower hinge would now be the top hinge. When a door spring is present it must be removed prior to cutting using a Halligan or Officers tool (**Figure 60**).

13.2.4 Cut door stop when present.

13.2.5 Close spreaders on door and force door open using spreaders for leverage exposing the Nader pin/staple (**Figure 61**).



Figure 60



Figure 61

13.2.6 Cut Nader pin/staple using the cutters.

13.2.7 Once the front door is removed the rear door hinges, when present, will be exposed for rear door removal when necessary.

13.3 Halligan Tool

13.3.1 Place the adz end of the Halligan tool in the seam between the front fender and door in the vicinity of the bottom hinge.

13.3.2 Apply a vertical up and down motion creating a gap in the seam exposing the bottom hinge.

13.3.3 After exposing the bottom hinge follow steps 13.2.2 – 13.2.6 as listed.

13.4 An alternate method of establishing a purchase point would be to attack the seam between the bottom of the door and the rocker panel of the vehicle using either the spreaders or Halligan tool to expose the bottom hinge (**Figures 62 and 63**).



Figure 62



Figure 63

14. SAFETY

14.1 The operator(s) must wear all required protective clothing. The operator(s) and any member working in close proximity to the operator(s) must wear eye protection (e.g., eye shields, safety glasses, or helmet-mounted eye shields).

14.2 An area of safety measuring the fully opened length and width of the jaws must be maintained. Do not place any portion of the body within this zone when opening or closing the jaws.

14.3 Avoid cutting through hydraulic pistons or rods on hatchback style vehicles. A sudden release of pressurized fluid could cause injury.

14.4 Always treat airbags as if they are live, observe the rule of 5–10–20. The rule of 5-10-20 is at least 5” from side airbags, 10” from driver airbags and 20” from passenger airbags.

- 14.5 When possible, cover cut post or sharp edges of the vehicle with a car mat or other suitable material to prevent injury.
- 14.6 Keep the working area around the vehicle free of loose tools.
- 14.7 Eye and hand protection should always be worn when connecting and disconnecting hose couplings. A good practice would be to point the couplings down when disconnecting.
- 14.8 Whether using the spreaders or cutters always remove the top hinge first.
- 14.9 Rear end collisions might not activate safety systems such as airbags and seatbelt pretensioners. This can even be the case in some side impact collisions due to smart systems that will only deploy/activate due to a persons weight. These systems that have not deployed will still remain live and could possibly activate once the rescuers weight is sensed.
- 14.10 Avoid crushing/cutting areas that might contain live airbags, cylinders and sensors that will activate any of the safety systems. The cylinders may contain up to 9,500 psi of stored gas pressure. Removing the interior trim inside of a vehicle might help in determining the locations of these devices.
- 14.11 Always be aware of the unsupported end when using the cutters.
- 14.12 Never position any part of your body between the tool and the vehicle.
- 14.13 The hydraulic hose lines may be coupled or uncoupled with the power unit running, provided the bypass valve is in the backward or dump position. On the low pressure hose, align the slot with the pin before you connect or disconnect the coupling. These couplings are provided with seals and rings compatible with hydraulic fluid. Because there is a ball check, they can be disconnected under pressure, but caution must be exercised since some fluid may spray out.
- 14.14 Prolonged and repeated contact with the hydraulic fluid may be irritating to the skin. If a member gets hydraulic fluid in their eyes, the member should flush their eyes with clean water for at least 20 minutes and immediately seek medical attention.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

PART TWO

Water Rescue Operations

- 1 Water Rescue Operations**
 - Add. 1 Inflatable Water Rescue Hose**
- 2 Ice and Cold Water Rescue**
- 3 Surf Rescue**

1. INTRODUCTION

- 1.1 The FDNY is accustomed to responding to many kinds of unusual incidents on a daily basis. Ice, cold water and surf rescues although uncommon, can be among our most difficult and dangerous responses.
- 1.2 The untrained and inexperienced potential rescuer could become a victim. Preplanning, proper equipment and training will ensure the safest outcome in these types of incidents.
- 1.3 The FDNY has equipped some ladder and engine companies as well as all special units with ice/cold water and surf rescue equipment. These units have been trained in the proper use of this equipment as well as safe standard operating procedures.
- 1.4 It is the goal of these procedures to familiarize all members with this equipment and to explain the capabilities, limitations and standard guidelines to follow when responding to, and operating at these incidents.

2. LIMITATIONS

- 2.1 It should be emphasized that any entry into the water or onto ice be considered as a last resort. The safety of our members is paramount. The Incident Commander will have to weigh the risk vs. reward when attempting a water rescue.
- 2.2 When it is determined that a water entry rescue is not safe for a surface rescue unit, the Incident Commander will need to request the assistance of a Rescue company dive unit.
- 2.3 All procedures described in this bulletin will deal with **Surface** rescue. The Cold Water Suit (CWS) and Personal Flotation Device (PFD) are not designed for underwater operations.
- 2.4 The CWS has considerable buoyancy. Any attempts at underwater operations will cause the rescuer to immediately surface, possibly trapping the rescuer under an ice shelf, under a pier, or inside a submerged automobile.

3. RESCUER SELECTION

- 3.1 A member who has been trained in the suit and is familiar with its capabilities and limitations should be designated as the Primary Rescuer. A member with lifeguard experience or a trained scuba diver should be considered for this assignment.

- 3.2 It would not be good practice to assign your primary water rescuer as a riding position. Example, nozzle firefighter is always the primary rescuer. This member may not feel comfortable in the water and you may have someone with more training for that duty. Positions should be discussed and determined at roll call.

4. SAFETY

- 4.1 The primary concern is the safety of our rescuers. 10% of drowning victims are would-be rescuers. All members must use extreme caution and good judgment with any ice or water rescue.
- 4.2 There will be times when we should not enter the water. This goes for drill as well as a rescue situation. Some factors that would affect this decision are:
- 4.2.1 Water/weather conditions – factors such as wave height, presence of riptides or sweep tides and lightning storms.
 - 4.2.2 Location of Victim- how far out the victim is and if they can be reached safely.
 - 4.2.3 Skill level of rescuer - can the rescuer reach the victim under the above circumstances or will the rescuer eventually become a victim.
 - 4.2.4 Night operations - Members should not be allowed past the line of sight from the shore. Portable lights should be brought to the scene.
- 4.3 **Bunker gear does not float.** Tests have shown that members wearing Bunker Gear with or without an SCBA will **sink instantaneously.**

5. MEDICAL CONSIDERATIONS

5.1 Treatment

- 5.1.1 Cold water exposure symptoms include intense shivering, loss of coordination, mental confusion, cyanotic (cold/blue) skin, low pulse rate; irregular heart beat and fixed dilated pupils.
- 5.1.2 Remove the victim to a warm shelter to prevent further body cooling. The victim should be transported carefully to avoid heart fibrillation and stress. Do not massage or rub the victim because rough handling could cause cardiac arrest.
- 5.1.3 Remove wet clothing and wrap the person in warm blankets. Perform a patient assessment and treat the patient according to CFR protocols, if EMS is not on-scene.
- 5.1.4 Remember: Cold water victims look dead. However, people have been submerged in cold water for long periods of time and made complete recoveries.

5.2 Hypothermia

- 5.2.1 The loss of body heat occurs 25 times faster in cold water than in air. Hypothermia (subnormal body temperature) begins when the body's core (brain, spinal chord, lungs and vital organs) temperature falls below the level of 98.6 degrees Fahrenheit. Cold water cools the body's skin and outer tissues very quickly. In approximately 7 to 15 minutes, core body temperature begins to drop significantly, affecting utilization of the arms and legs. Blood pressure, pulse and respiration rates all decrease. Muscles tense and shiver. Irrational behavior (resisting help) is a good indicator of hypothermia.
- 5.2.2 When the body's core temperature begins to drop below 90 degrees Fahrenheit, the victim transgresses from non-ambulatory into unconsciousness. Low core temperature, in conjunction with stress and shock, can cause cardiac and respiratory failure.

5.3 Mammalian Diving Reflex

- 5.3.1 There are a considerable number of authenticated cases of drowning victims who were submerged in cold water for 30 to 60 minutes and then resuscitated with no brain damage or other serious health effects. Sudden face contact with cold water (below 70 degrees Fahrenheit) initiates a body reflex known as the Mammalian Diving Reflex (MDR). This oxygen conserving mechanism is common to whales, porpoises and seals and allows these mammals to stay underwater for long periods of time.
- 5.3.2 It reduces the heart rate (bradycardia), increases blood pressure and shuts down blood circulation to all the body's core, resulting in a lower metabolism. MDR also protects the victim from the rapid inhalation of water into the stomach and lungs.
- 5.3.3 MDR is more pronounced in young people and, therefore, they are the best candidates for resuscitation. The colder the water and the younger the victim, the better chance they have of survival.

6. TIDES

6.1 There are 4 tides in 24 hours: 2 tides are coming in (High) and 2 are going out (Low). Slack tide is 45 minutes between High and Low tides.

6.2 **Rip Tides or Currents** - occur when the tide is going out. Rip currents are the primary source of distress in drowning victims. Rip currents pull people into deep water very quickly. This causes the victim to panic which is the leading cause of drowning.

6.2.1 To escape a rip current you should swim parallel to the shore line. Swimming back to shore into the rip will not help and only make victim tired (Figure 1).

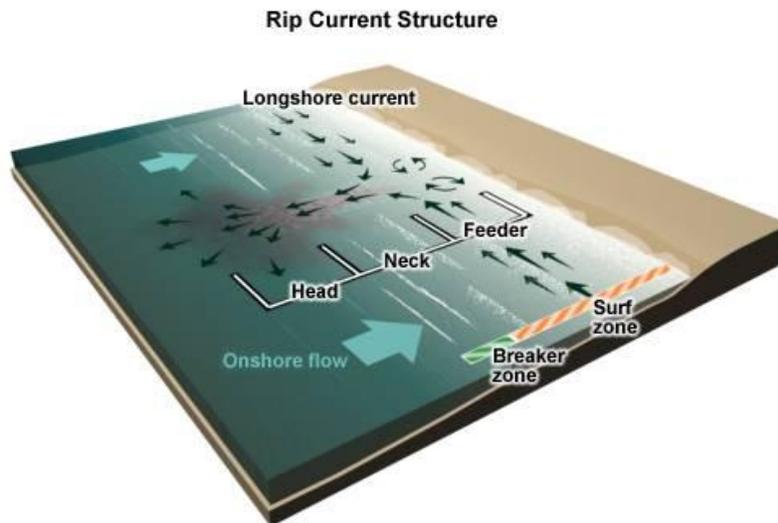


Figure 1

6.3 Sweep Tides

6.3.1 Sweep Tides can also be present in a rescue situation. This tide runs parallel to the beach. It is more pronounced on out-going tides. The waves are diagonal to the beach and can sweep swimmers into a rip current.

6.3.2 Rescuer should enter the water upstream of the sweep. This will pull the rescuer towards the victim. Contact with the victim will be difficult if the rescuer takes a straight on approach because they will be swimming against the sweep to get to the victim (Figure 2).

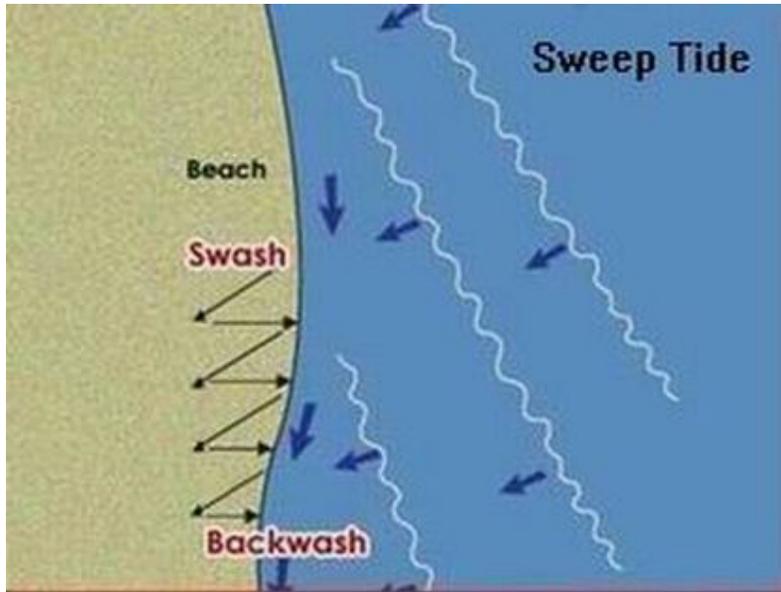


Figure 2

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

Addendum 1

Inflatable Water Rescue Hose

THIS PAGE WAS INTENTIONALLY LEFT BLANK

1. INTRODUCTION

- 1.1 Inflatable water rescue hose may be used during ice and water rescue incidents/emergencies involving any number of conscious victims.

2. EQUIPMENT

- 2.1 The following equipment shall be used to deploy inflatable hose for ice / water rescue:

- Yellow Water Rescue Fittings

One 2 ½” Female Cap w/ Shackle & Snap Bolt. (Photo 1)

One 2 ½” Male Fitting w/ Shackle & Check Valve (Photo 2)

- Lengths of 2½” Hose
- Spanner Wrenches
- Air Supply from either a SCBA, Fast-Pak or apparatus air outlet



Photo 1



Photo 2

3. AIR FILL PROCEDURES

- 3.1 Members shall deploy the required lengths of hose, attach the water rescue fittings and ensure that all connections are spanner tight prior to filling with air.

- 3.2 To fill the hose using a SCBA or Fast-Pak, members shall disconnect the low pressure hose at the Hansen fitting (Photo 3). Attach air hose to male connection of hose fitting (Photo 4). Inflate the hose until it is completely filled and possesses rigidity similar to a charged hoseline. One 45 minute cylinder can fill five lengths of 2 ½” hose in approximately 1 minute.



Photo 3



Photo 4

- 3.3 To fill the hose using the apparatus air outlet, members shall connect the male connection from hose directly to the air outlet on apparatus. The apparatus air outlet can fill five lengths of hose in approximately 1 minute (Photo 5).



Photo 5

4. OPERATIONS

- 4.1 Inflatable water rescue hose can be deployed in either a straight line or loop. Straight line deployment can be used in incidents from a pier or shore involving only a few individuals who are close to shore (Photo 6). The loop deployment increases buoyancy and can be used for multiple victims. (Photo7)



Photo 6



Photo 7

- 4.2 More than two lengths of hose can be used for larger operations. Each length of 2 ½” hose filled with air can keep afloat approximately 10 people.
- 4.3 Units should have air filled hose secured with Life Saving Rope (Photo 8). Take note of water current as it may be necessary to deploy hose into the anticipated path of travel.



Photo 8

5. DEFLATION

- 5.1 Upon completion of operations, spanners should be used to loosen couplings of Inflatable Hose Fittings to allow air to escape. Loosen fitting until the sound of air escaping can be heard. Do not loosen completely at this time. As hose softens, fittings can be removed completely.

6. CLEANING

- 6.1 Rinse all ropes and hose after each use. The Life Saving Rope shall be examined and maintained according to the procedures outlined in Training Bulletin, Rope 1.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

THIS PAGE WAS INTENTIONALLY LEFT BLANK

Ice and Cold Water Rescue

THIS PAGE WAS INTENTIONALLY LEFT BLANK

1. ICE AND COLD WATER RESCUE EQUIPMENT

- 1.1 Each ice/cold water rescue company is issued the following equipment along with two gear bags. Each set of gear is intended for the Primary and Secondary rescue teams. The bags are large enough to hold one complete set of gear for each rescue team including one PFD.

ITEM QUANTITY

Binoculars-waterproof	1
Megaphone	1
Stretcher – stainless steel	1
Stretcher – lifting bridle	1
Stretcher – flotation collar	1
Lifting bridle – Carabineer	1
Cold Water Suit (CWS)	2
Turtle fins (set)	2
Mask	2
Snorkel	2
Survival knife	2
Personal strobe light	2
Waterproof flashlight	2
Ice awls (set)	2
Water rescue torpedo	2
Tether rope 200 feet	2
Rope reel	2
Small carabineer	2
Large carabineer (Ice Rescue)	2
Flotation sling	2
Red gear bag	2
Personal flotation device (PFD)	2

2. EQUIPMENT SET-UP

- 2.1 **Ice Awls** - A set of ice awls should be secured to each suit and used for mobility on the ice.
- 2.2 **200 Foot Tether Reel** – The 200 Foot Tether Reel (Photo 1) shall have the small carabineer (Photo 2) secured at the end of the tether line using a Figure 8 on a Bight (Photo 3). The large ice rescue carabineer (Photo 4) is placed in-line on the tether rope 4 feet from the small carabineer using the Butterfly Knot (Photo 5).



Photo 1



Photo 2

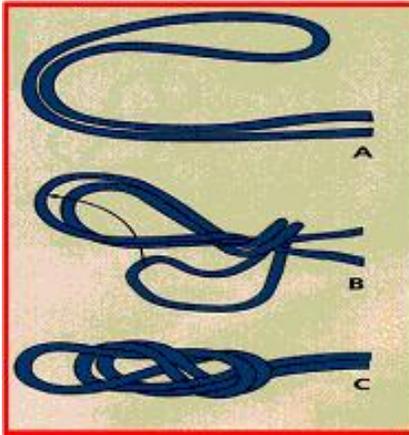


Photo 3



Photo 4

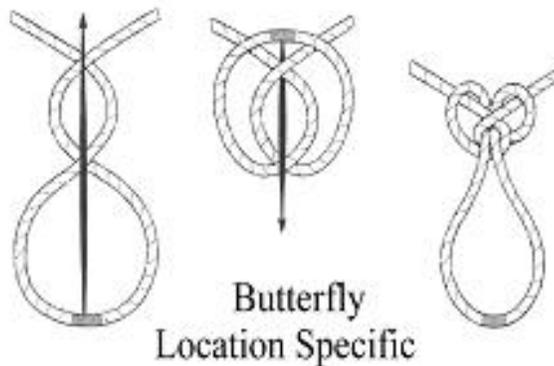


Photo 5

2.3 **Stainless Steel Stretcher and Four-Point Lifting Bridle** – The lifting bridle issued with the stretcher can be used in either the four-point (Photo 6) or two-point position (Photo 7).



Photo 6



Photo 7

2.4 **2-To-1 Mechanical Advantage** - A 2-to-1 mechanical advantage system shall be established using the Life Saving Rope during a victim rescue. One end of the Life Saving Rope shall be tied to an anchor point and the working rope shall be passed through a small carabineer attached to the D-ring at the top of the lifting bridle (Photo 8). Pulling on the working end of the rope will give a 2-to-1 mechanical advantage. **Utility rope shall be used during drills.**



Photo 8

3. POSITIONS

3.1 **Rescue Coordinator** – The Company Officer assumes this position and shall be located where they can observe and direct the whole operation. In a 4-Firefighter Engine Company, the Officer will also assume the responsibilities of the Spotter until an additional unit arrives.

- 3.2 **Spotter** – A firefighter or Company Officer (4-Firefighter Engine Company) will assume this position and shall be positioned where they can keep sight of the victim. This may include using the apparatus as a vantage point. An aerial or tower ladder may be raised to facilitate spotter positioning
- 3.3 **Primary Rescue Team (Team # 1)**
- 3.3.1 **Primary Rescuer** - Member will don the Cold Water Suit (CWS), establish and maintain communication with the victim and implement rescue procedures. This is the only member that will approach the victim.
- 3.3.2 **Primary Tether** - Member will assist the Primary Rescuer in donning the CWS and attach tether line to the suit's harness. Feed and control the tether line. Pull rescuer and victim back to safety.
- 3.4 **Secondary Rescue Team (Team # 2)**
- 3.4.1 **Secondary Rescuer** - Don the second CWS and be tethered to a second line in the stand-by position.
- 3.4.2 **Secondary Tether** - Assist the Secondary Rescuer in donning the CWS and ensure the second tether line is attached to the suit harness.

4. GENERAL PROCEDURES

- 4.1 All members except the Primary and Secondary Rescuers will be equipped with Handie-Talkies. The Primary and Secondary Tethers shall wear PFDs.
- 4.2 When arriving at the scene, communicate with the victim to see if they can rescue themselves. The victim may not be able to due to hypothermia. Once it has been confirmed that there is a victim to be rescued, notify the dispatcher and request additional resources.
- 4.3 Generally, there are three methods used for cold water/ice rescue.
- Reach
 - Throw
 - Go
- 4.4 The Reach method is used when a victim is ambulatory and can assist in their own rescue. The rescuer uses a hook, pole or other device extended to the victim. When the victim has gained a hold on the object, rescuers can pull the victim to safety.

- 4.5 The Throw method is used when the reach method is not feasible. Using a throw rope, the rescuer hurls the rope to the victim. The victim should wrap the rope around their arm to be pulled to safety.
- 4.6 The Go method is used for a non-ambulatory victim (unable to assist in their rescue) or is too far from shore. Victims exposed to cold water will have problems with their motor skills and manual dexterity, making them unable to hold a pole or a rope. This should be the last method tried since it is the most dangerous.
- 4.6.1 During the Go method, rescuer must have properly donned the CWS and be properly tethered.
- 4.6.2 Approach the victim with caution. Most likely, a victim will be extremely anxious and panicky. It's likely that the victim will try to grab a rescuer if the rescuer is too close. This could result in a life and death struggle.
- 4.6.3 The Primary Rescuer should be the only member communicating with the victim.
- 4.6.4 The Secondary Rescuer should be properly dressed with a CWS and ready to assist if the Primary Rescuer gets in trouble. All tether persons should be wearing a personal flotation device (PFD) and rescuers should always be on a tether line. Remember, the safety of the rescuer is paramount.

5. WATER RESCUE PROCEDURES

- 5.1 Tether line is attached to the D-ring on the rear harness of the suit. (Photo 9)



Photo 9



Photo 10

- 5.2 Water rescue torpedo is attached to the front of the suit's harness. (Photo 10)

- 5.3 The rescuer is wearing turtle fins and enters water in a controlled manner. The rescuer holds torpedo with both hands and kicks to victim while keeping victim in sight. (Photo 11)
- 5.4 Upon reaching an ambulatory victim, the rescuer passes torpedo to victim while keeping a safe distance, if possible. (Photo 12)



Photo 11



Photo 12

- 5.5 Upon reaching a non-ambulatory victim, the rescuer reaches under the victims armpits and places torpedo on victim's chest and holds onto the torpedo. (Photo 13)



Photo 13

- 5.6 Rescuer signals to the tether team and both rescuer and victim get pulled to safety.

6. ICE RESCUE PROCEDURES

6.1 Reach Method

- 6.1.1 Rescuer wearing a CWS is equipped with a pole or hook and a throw rope. The tether shall be attached to the front of the suit's chest harness. (Photo 14)

- 6.1.2 Rescuer crawls onto ice and reaches pole out to the victim and instructs the victim to grab onto hook and to kick their legs as if they were swimming (Photo 15). The rescuer helps pull the victim onto the ice.



Photo 14



Photo 15

6.2 Throw Method

- 6.2.1 Remove the loop from bag and place loop onto non-throwing hand. Dominant hand throws bag while other hand holds the rope. (Photo 16)



Photo 16

- 6.2.2 Throw the bag over and past the victim.

- 6.2.3 Have the victim wrap the rope around their arm and hold the rope, pull the victim to safety. (Photo 17)



Photo 17

6.3 **Go Method** (Photo 18)

- 6.3.1 The Primary Rescuer should be the only member to approach the victim unless assistance from the Secondary Rescuer is needed.
- 6.3.2 The Primary Rescuer should approach the victim from the side. Approaching from the front may cause the already weakened ice to break causing the victim to become aggressive and impede the rescue.
- 6.3.3 The Secondary Rescuer is suited up and ready to assist. The Secondary Rescuer should stay off the ice. When needed, the Secondary Rescuer will approach from a different angle, as not to break ice that is already weakened by the Primary Rescuer and victim.

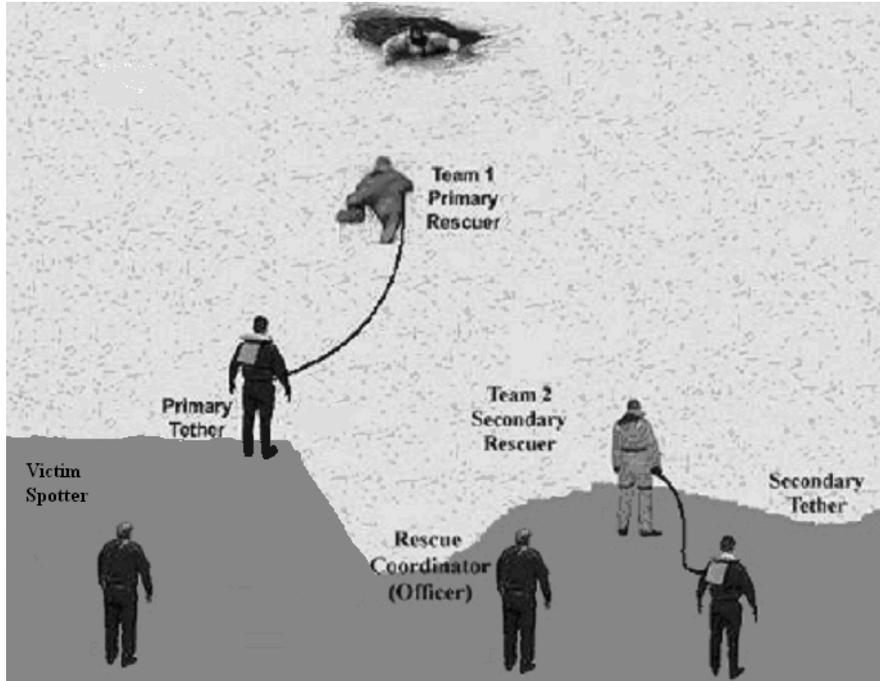


Photo 18

6.3.4 For an ice rescue, the tether is attached by the small carabineer at the end of the rope to the front of the rescuers chest harness. (Photo 19)



Photo 19



Photo 20

- 6.3.5 The flotation sling is used to assist an ambulatory victim. The tethered rescuer crawls across ice with rescue sling attached to the large carabineer.
- A. Upon reaching the victim, the rescuer reaches through sling and grasps victim's hand firmly, while positioning sling under victim's arm and over the shoulder. The rescuer places sling over victim's head then brings victim's other arm through the sling. (Photo 20)
- 6.3.6 For a non-ambulatory victim, the reach around method is used. This method requires the rescuer to enter the water. For this technique, the rescuer should be wearing fins.
- A. The rescuer keeps the large carabineer in one hand with the tether line in the other hand. This will keep rescuer from getting tangled up in the rope.
 - B. The rescuer crawls across the ice and instructs victim to remain on ice shelf. The rescuer enters the water feet first, reassuring the victim, and approaches the victim from the side or back.
 - C. From the back of the victim, the rescuer will reach under the victim's armpits and attach the large carabineer onto the tether line. (Photo 21)



Photo 21

- 6.3.7 Rescuer signals to the tether team and both rescuer and victim get pulled to safety.

7. STRETCHER PROCEDURES

7.1 Members shall use the stretcher to remove victims when other techniques are unsuccessful or may cause injury to the victim. Placing a victim in the stretcher requires both rescuers.

7.1.1 The victim is brought to the stretcher where both rescuers will maneuver the victim so the victim's head is loaded into the end of the stretcher with the floatation collar. The victim shall be secured to the stretcher as follows: (Photo 22)

- A. The top strap gets attached under the victim's armpits, and across chest.
- B. The middle strap gets attached across the waist of the victim.
- C. The bottom strap gets attached under one leg and over the other.



Photo 22

7.2 Retrieving a stretcher from below grade (e.g., pier, jetty, dock) can be a difficult and delicate operation. Extreme caution should be used as not to further injure the victim, and to make the operation as safe as possible to our rescuers and shore personnel. A team effort will be needed to ensure a successful operation.

7.2.1 A portable ladder and utility ropes shall be used to assist in this operation. Ladder hooks shall be used to support the ladder if possible. Securing the ladder in this manner at the start of the operation will ensure control of the ladder.

- 7.2.2 Secure utility rope to top rung of ladder and then to a substantial object.
(Photos 23 and 24)



Photo 23



Photo 24

- 7.2.3 The Life Saving Rope shall be used to establish a 2-to-1 mechanical advantage prior to the stretcher being lowered into position.
- 7.2.4 The stretcher is not intended to be brought out to the victim. It will be more effective to bring the victim to the stretcher. Upon retrieval of the victim, the stretcher can be passed down to the rescuers where the victim will be loaded onto the stretcher.
- 7.2.5 The rescuers should guide the stretcher onto ladder rails while members above grade hoist on the working end of the rope until the victim can be carried off to a safe location. (Photos 25 and 26)



Photo 25



Photo 26

8. COMMUNICATIONS

8.1 Pre-determined hand signals have been established to allow the Rescuer and Tether to communicate. All members of the rescue team should be familiar with these hand signals.

8.1.1 One hand **placed on top of the rescuer's head** indicates the rescuer is ready to be pulled to shore. (Photo 27)

8.1.2 One arm **waving in the air** indicates stop pulling. (Photo 28)



Photo 27

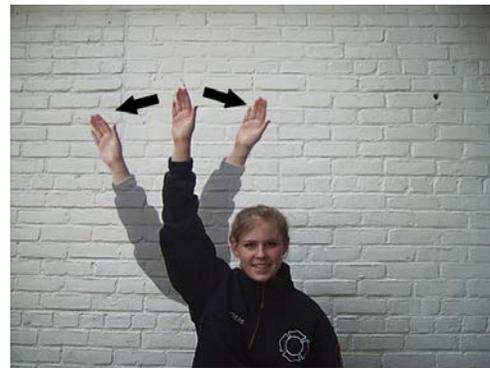


Photo 28

9. EQUIPMENT CARE AND MAINTENANCE

9.1 Rinse and air-dry all ropes and suits after each use. The Lifesaving Rope shall be examined and maintained according to the procedures outlined in Training Bulletin, Rope 1.

9.2 All ice and cold water equipment shall be inspected during January, April, July and October. In January and July, the suit should be removed from the carrying bag and hung on a broad shouldered hanger for at least 48 hours to allow moisture inside the suit to dry out, prevent mildew and help extend the service life of the suit.

9.2.1 Before repacking the suit into its carrying bag, the zipper should be lubricated. Close the zipper and run a lubricating stick (candle wax) up and down the outside of the zipper. Open and close the zipper 2-3 times. Store the suit with the zipper in the open position.

9.2.2 Repack the suit by laying it on a flat surface with the front of the suit upward. Tuck in the hood/head support, cross the arms over the hood/head support, then roll the suit from the feet upwards. Slip the suit into the carrying bag and close.

- 9.2.3 If the suit should become soiled or contaminated with oil, scrub with a mild soap solution (dish soap), rinse with fresh water and allow drying before repacking. **Do not use solvents or dry clean. Some solvents may degrade seams and suit material.**
- 9.3 Damaged equipment can be sent to Tech Services through normal RT-2 procedures.

10. QUICK REFERENCE CHART

Position		Tools	Procedure
Rescue Coordinator 4 FF Engine, assume Victim Spotter position.	Choose point of operation. Decide whether or not to attempt rescue.	Handi-talkie, flashlight, thermal imaging camera at night.	Supervise operation and control members. Keep members off the ice or in a safe location.
Victim Spotter: Keep sight of victim	Serves as a spotter. Establishes an observation point.	Binoculars, handi- talkie, flashlight.	Visually observe victim. Keep track of victim's condition and surroundings.
Primary Rescuer TEAM # 1	Dons CWS. Communicates with victim. Approach victim no closer than to effect rescue.	CWS, tether line, torpedo, hook, throw rope, sling.	<u>Self rescue:</u> get victim to rescue themselves. <u>Reach:</u> use hook and get victim to grab it. <u>Throw:</u> throw rope over and past victim, get victim to wrap it around arm and hold on. <u>Go:</u> LAST RESORT, approach victim on ice or in water.
Primary Tether TEAM # 1	In line with rescuer remains on land or safe area if possible.	Tether line. PFD. Handi-talkie.	Help rescuer don suit. Ensure suits harness is fastened Attach tether line. Operate tether.
Secondary Rescuer TEAM # 2	Dons second CWS. Ready to assist. Approach victim from different route.	CWS, tether line, torpedo, hook, throw rope, sling.	If necessary: Advance on ice taking a different route and stay away until needed.
Secondary Tether TEAM # 2	In line with second rescuer. Remains on land or in a safe area.	Tether line. PFD. Handi- talkie.	Help rescuer don suit Ensure suit's harness is fastened. Attach tether line to harness. Operate tether.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

THIS PAGE WAS INTENTIONALLY LEFT BLANK

Surf Rescue

THIS PAGE WAS INTENTIONALLY LEFT BLANK

1. SURF RESCUE EQUIPMENT

1.1 Each surf rescue company is issued the following equipment (Photo 1)

ITEM QUANTITY

Binoculars-waterproof	1
Megaphone	1
Fins (set)	2
Mask 1	
Snorkel	1
Personal flotation device (PFD)	3
Water rescue torpedo	1
600' Rope and Harness	1
Carry Bag	1
Surfboard (Photo 2)	1



Photo 1



Photo 2

2. POSITIONS

- 2.1 **Rescue Coordinator** – The Company Officer assumes this position and shall be located where they can observe and direct the whole operation. In a 4-Firefighter Engine Company, the Officer will also assume the responsibilities of the Spotter until an additional unit arrives.
- 2.2 **Spotter** – A firefighter or Company Officer (4-Firefighter Engine Company) will assume this position and shall be positioned where they can keep sight of the victim. This may include using the apparatus as a vantage point. An aerial or tower ladder may be raised to facilitate spotter positioning.
- 2.3 **Primary Rescuer** – The member will don a PFD, fins and be equipped with the torpedo. This will be the first member to approach the victim.
- 2.4 **Secondary Rescuer** - The member will don a PFD and fins. The member will be equipped with the tether line only or a tethered surfboard depending on water conditions.
- 2.5 **Tether Firefighter**- Member will assist the Rescuers in donning equipment. Feeds and controls the tether line. Pull rescuers and victim back to safety.

3. PROCEDURE

3.1 Line Rescue

- 3.1.1 The Primary Rescuer enters the water walking backwards and swims out to victim letting torpedo drag behind on the down sweep side. The rescuer should keep the victim in sight.

- 3.1.2 The Primary Rescuer comes to a stop before reaching victim. Keep the torpedo between rescuer and victim. This will allow the rescuer to assess and reassure the victim. An anxious victim will attempt to grab the rescuer and not the torpedo.
 - 3.1.3 If victim is ambulatory, hand the torpedo to victim. If victim is non-ambulatory, grab victim from rear, resting the victim's back on the rescuer's chest and holds the torpedo under victim's armpits.
 - 3.1.4 The Primary Rescuer establishes buoyancy and awaits the Secondary Rescuer with the tether line.
 - 3.1.5 The Secondary Rescuer enters water with tether line and harness swims out to Primary Rescuer and victim. The Tether Firefighter feeds the tether line from shore.
 - 3.1.6 Upon arrival at Primary Rescuer and victim, the Secondary Rescuer removes the harness and hands it to Primary Rescuer. Both rescuers hold victim under the arms position with one hand and the other hand holding the harness.
 - 3.1.7 Both rescuers and victim get pulled to shore by the Tether Firefighter.
- 3.2 **Surfboard Rescue**
- 3.2.1 The Surfboard rescue procedures for the Primary Rescuer remain the same as the Line Rescue procedure.
 - 3.2.2 The Secondary Rescuer enters water with tether line attached to the surfboard and paddles out to Primary Rescuer and victim. The Tether Firefighter feeds the tether line from shore.
 - 3.2.3 Both rescuers load the victim onto the surfboard. Both rescuers and victim get pulled to shore by the Tether Firefighter.

4. OPERATIONAL CONSIDERATIONS

- 4.1 Once it has been confirmed that there is a victim to be rescued, notify the dispatcher and request additional resources.
- 4.2 All members entering water are to wear life preservers. If the surf board is used it must be tethered.
- 4.3 Members pulling in the tether line are to time the waves when pulling victim and rescuers to shore.

- 4.4 The victim should be removed from the waves before beginning medical treatment including spinal immobilization.
- 4.5 IF an NYPD helicopter is on-scene, the Incident Commander or their designee shall utilize the TAC “U” channel to communicate directly with the helicopter. Special care should be used to ensure that all members are removed from the area underneath the helicopter due to the danger of the rotor downwash pushing the member underwater.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

Part 3

Steam System Emergencies

1. INTRODUCTION

- 1.1 Con Edison supplies high pressure steam to nearly 2,000 buildings from 96th Street to the Battery in Manhattan through more than 100 miles of buried high pressure steam pipe. It is generated in plants located in Manhattan, Brooklyn and Queens and is piped underground to the end users in Manhattan. Steam pipes run under streets and sidewalks with manholes providing access to the underground steam system. (Photo 1)



Photo 1
Concrete slabs typically cover steam vaults with access manholes placed in pairs.

- 1.2 Con Edison is not the only entity generating high pressure steam in New York City. High pressure steam, generated for use in housing complexes, hospitals and various commercial locations, can be found in any borough. These District Steam systems will have the same hazards as the Con Edison system but will not be run or maintained by the Con Edison. When discovered, district steam systems shall be entered into the CIDS Program.

2. HIGH PRESSURE STEAM

- 2.1 Steam is invisible. The white mist seen is the condensate that forms when steam cools.

- 2.2 Steam pressures in generating plants can be as high as 2,000 psi with temperatures reaching 900°F. Steam pressures in the buried supply piping and in supplied buildings can be as high as 170 psi and temperatures as high as 350°F.
- 2.3 High Pressure steam is used in buildings for a number of purposes e.g., to provide heat and hot water, to heat food, run air conditioners.

3. STEAM PIPE RUPTURE

3.1 When water comes into contact with the outside of a high pressure steam pipe, the water boils and steam is generated. This water may come from a heavy rain or a leaking water main. If enough water contacts the pipe, it can cool the steam inside the pipe, causing it to condense into water. Normally, this water is drained off by a series of drains called "Traps." If not drained off, a water slug will form which can damage piping in a number of ways. Water slugs can be pushed through the piping by the steam at speeds as high as 200 mph. If this steam slug encounters a bend in the piping, the impact can cause the pipe to rupture, resulting in a release of high pressure steam. It is also possible for the slug of water to suddenly flash to steam resulting in a damaging concussion that can rupture the steam pipe, again releasing the high pressure steam. Another possible cause for pipe rupture is a contractor or some other physical damage to the pipe. Con Edison workers refer to a steam pipe rupture as a High Energy Line Break (HELB).

4. HIGH ENERGY LINE BREAK

- 4.1 High Energy Line Break (HELB) in a Generating Plant

Hazards

High temperature and high pressure steam.

Leaking steam will condense quickly filling the plant, obscuring vision.

Asbestos release. Asbestos pipe insulation can be found in the plant, on pipes buried under the street and in buildings supplied with steam.

A high pressure steam leak will make verbal communications difficult.

A pinhole leak in a high pressure steam pipe, though invisible near the source, is capable of instantly cutting through a steel bolt.

General Hazards

Heavy machinery and moving equipment.

Sumps filled with near boiling water.

High pressure natural gas lines, other flammable gases under pressure and compressed gas cylinders including oxygen, acetylene and hydrogen.

High voltage electric, up to 345,000 volts.

Fuel oil.

Acids and caustics.

Tactics

Never enter a Con Edison generating plant without Con Ed personnel. Instead, respond to the designated mustering site outside the plant.

Plant personnel will mitigate the emergency. FDNY should only enter the plant to perform search and rescue for missing plant personnel.

- a) When entering the plant, stay close to the provided escort and be guided by their advice.

Contact the Con Edison White Hat who can:

- a) Provide critical information and an escort if FD entry is necessary.
- b) Provide a personnel accountability report to see if anyone is missing.
- c) Remain at the Command Post as a Technical Specialist.

4.2 High Energy Line Break (HELB) in the Street

Hazards

Underground steam pipes are most commonly wrapped in asbestos insulation and a HELB will likely result in an asbestos release that spreads over a large area. A steam main break is a haz-mat incident.

- a) Asbestos has been removed from Con Edison steam manholes but remains on most of the underground piping.
- b) Asbestos may be drawn into structures by a building's ventilation system.

The pressure released in a HELB is high enough to cause an intact street to collapse or explode outward as the high pressure steam escapes from the ruptured pipe.

- a) Escaping high pressure steam can hurl debris at 200 mph. Anyone in the vicinity of the break is in danger of being struck by flying, high velocity debris.
- b) Slugs of hot water released from the rupture and hot water on the pavement may cause burns to firefighters and civilians.
- c) Debris released from the HELB may break glass in surrounding buildings. This will allow asbestos to contaminate the interior of the building and its occupants.
- d) Debris in the street may make it difficult to move Department or civilian vehicles. **(Photo 1a)**



Photo 1a

Debris covers the street in the aftermath of a steam pipe rupture.

Anyone in the vicinity of the escaping steam will be exposed to high temperatures and may sustain serious burn injuries.

Breathing superheated steam can result in respiratory burn injuries.

A ruptured underground steam pipe can expose and damage underground high voltage electric cables and natural gas and water mains.

- a) The result may be a natural gas leak ignited by arcing from damaged electric lines.
- b) If water mains are damaged, the hydrants in the area may not be serviceable.

The noise of escaping steam will make radio and verbal communication ineffective in the immediate vicinity of the release.

Condensing steam will obscure the vision of escaping civilians and responding firefighters.

- a) The force of escaping steam can project manhole covers into the air. Missing manhole covers and the crater and debris resulting from the HELB may not be visible.

People may be trapped in vehicles, buildings and subways by the escaping steam.

Tactics

Approach an outdoor HELB from upwind and stay clear of the vapor plume.

Establish the Staging Area where units will not become contaminated by asbestos and where communications are effective.

Consult with the Con Edison White Hat. They may be supervising the shutting of numerous steam valves.

Limit the number of firefighters exposed to probable asbestos contamination.

Isolate exposed responders, civilians and equipment in order to limit the spread of asbestos contamination.

- Prevent occupants from exiting buildings into the Exclusion Zone.
- Consider evacuating buildings from the rear or side entrances to avoid the Exclusion Zone.
- Prepare for decontamination of civilians, firefighters, bunker gear, tools, equipment and vehicles.
- Consider shutting the HVAC systems of nearby buildings.

4.3 Steam Leak in the Street

The steam frequently seen rising from the ground and from steam manholes is usually not the result of a HELB. More often, it is the result of water from a heavy rain or a leaking sewer or water main, contacting the steam pipe and turning to steam. Con Edison may place vent stacks over minor steam leaks, to direct the steam up over the roadway. If a vent pipe has a blue stripe on top of it, this indicates that the steam is the result of a water leak, not a leaking steam main. (Photo 2)



Photo 2

This vent pipe over a steam manhole directs steam up above the roadway.

4.4 High Energy Line Break (HELB) in a Building

These incidents can range from a leaking radiator to a life threatening high pressure steam riser rupture.

Hazards

High pressure steam risers can be found in the walls on all floors of supplied buildings. The failure of a high pressure steam pipe inside of a building can be deadly to anyone in the vicinity of the release. It can force sheetrock and plaster off of the wall, move furniture and fill rooms with superheated steam that scalds

occupants and makes the atmosphere oxygen deficient. Occupants in the vicinity of a steam release may not have the opportunity to escape. High pressure steam pipes inside of buildings are typically insulated with asbestos and a HELB in a building will likely release asbestos inside the building.

Tactics

The high heat may make it impossible to enter the affected area for search and rescue until the steam is shut and the area vented.

Operating in live steam is debilitating and relief will be necessary to minimize member exposure time.

Buildings supplied with steam will have a steam control room filled with pipes. There will be a number of valves to control the supply of steam. Do not randomly shut steam valves inside of a supplied building. Shutting the wrong valve can cause damage to the system creating other hazardous conditions. **(Photo 4)**

- a) In an emergency, members may shut the Inside Service Valve. It will be labeled and sealed. If possible, wait for Con Ed steam personnel to shut the necessary valves. **(Photo 5)**
- b) Once a steam valve is shut, do not reopen it. The system will have to be drained before reopening the valve.
- c) Notify Con Edison if a valve is shut. Failure to do so can result in damage to the system and injury to Con Edison personnel working to restore the system.
- d) There is a building steam shutoff located outside the building. FD members should not attempt to shut this valve. This valve should **only** be shut by Con Edison steam personnel.

Adjoining areas to the steam leak must be searched, as steam can infiltrate these areas.



Photo 4
Do not randomly close valves



Photo 5
Inside Service Valve



Probationary Firefighters Manual Chapter 25

BISP WORKBOOK

OBJECTIVE:	<ul style="list-style-type: none">• To familiarize the firefighter with basic building inspections.
CONTENTS:	<ul style="list-style-type: none">• NOV• VO• C-Summons• Residential Inspection<ul style="list-style-type: none">A-119A-118IF-1• Mercantile Inspection<ul style="list-style-type: none">A-119CIDSIF-1IF-6
FDNY REFERENCE:	<ul style="list-style-type: none">• BISP Manual



FDNY SUMMONS • FOR CIVIL PENALTIES ONLY



11557501N

SUMMONS NUMBER: 11557501N

ENFORCEMENT AGENCY NAME: NEW YORK CITY FIRE DEPARTMENT DIVISION: FP Unit: Admin CO
AGENCY ADDRESS AND PHONE NUMBER: 9 MetroTech Center, 1st Flr, Bklyn, NY 11201-3657, (718) 999-2392

RESPONDENT: DBA:
MAILING ADDRESS: ACCOUNT NUMBER:
CELL PHONE: UNIT PHONE NUMBER:

DATE OF OCCURRENCE: TIME OF INSPECTION: AM PM
PLACE OF OCCURRENCE: BOROUGH:

You must respond to this Summons. You can appear at the hearing date and location below or choose another option. For other options on how to respond, see the back of this page.

HEARING DATE: AT: AM PM
HEARING LOCATION: OFFICE OF ADMINISTRATIVE TRIALS AND HEARINGS
[Borough] (See reverse side for address) Phone: (844) 628-4692

REFER TO THE SUMMONS NUMBER ABOVE ON ALL CORRESPONDENCE.

WARNING: If you do not respond to this summons, the City will decide the Summons against you and penalties will be imposed. Failure to pay a civil penalty could lead to the denial of an application for, or the suspension, termination or revocation of a City license, permit or registration. In addition, the City may enter a judgment against you in court.

ORDER TO CORRECT AND CERTIFY CORRECTION: PLEASE TAKE NOTICE that the premises cited above is in violation of the requirements of law. It is further ORDERED by the FIRE COMMISSIONER that these violations be corrected and certified to be in compliance with the requirements of law within 35 days of the date of issuance. See back of summons for further instructions.

COMPLIANCE DATE:

Upon investigation, the New York City Fire Department has determined that the respondent is in violation of the following requirements of the New York City Administrative Code and/or the rules of the City of New York. These requirements have been grouped into violation categories (VC) for enforcement purposes. This grouping is allowed by Fire Department rule 3 RCNY §109-02

- VC1 Portable Fire extinguishers and Fire Hoses: Failed to provide and/or maintain required (portable fire extinguishers/fire hoses/other) at
VC2 Combustible Waste Containers: Failed to provide required container(s) for combustible waste and/or store combustible waste in a container at
VC3 Permits: Failed to (obtain/new/possess) a permit for
VC4 Unlawful Quantity or Location of Regulated Material: (Manufacture/Storage/Handle/Use) of in violation of permit/quantity/location restrictions.
VC5 Recordkeeping: Failed to (maintain/produce) records for at
VC6 Signs, Posting, Notices and Instructions: Failed to provide and/or maintain required (signs) (postings) (notices) (instructions) for at
VC7 Labels and Markings: Failed to provide and/or maintain required label, or the other marking for at
VC8 Storage, Accumulation and Removal of Combustible Material and Waste: Failed to remove combustible waste and/or allowed the storage/accumulation of combustible material, waste and/or vegetation at
VC9 Rooftop Access and Means of Egress: Failed to provide access/egress free from obstructions or impediments, and/or failed to maintain required egress at
VC10 Overcrowding: Failed to limit number of persons in to
VC11 General Maintenance: Failed to maintain in (good working order/clean condition) or in compliance with (general maintenance/housekeeping) requirements.
VC12 Fire Protection Systems: Failed to provide and/or maintain required at and/or prevent unnecessary/unwarranted alarms.
VC13 Flame-Resistant Materials: Failed to provide and/or maintain required flame-resistant materials at
VC14 Fire-Rated Doors and Windows: Failed to (provide/protect/maintain) required (fire-rated/self-closing/access) door or window at
VC15 Fire-Rated Construction: Failed to provide and/or maintain required fire-rated construction of at
VC16 Ventilation: Failed to provide and/or maintain required ventilation at for
VC17 Certificates of Fitness and Certificates of Qualification: Failed to obtain and/or produce required (Certificate of Fitness/Certificate of Qualification) for
VC18 Certificates of Approval, Certificates of License and Company Certificates: Failed to obtain and/or produce required Certificate of Approval for Certificate of License, or Company Certificate for
VC19 Affidavits, Design and Installation Documents and Other Documentation: Failed to (prepare/produce/submit) required documentation:
VC20 Inspection and Testing: Failed to conduct required (initial/periodic) inspection or test of at
VC21 Portable Containers: Failed to (provide/use) required container for at
VC22 Stationary Tanks: Failed to provide required stationary tank storage system for at
VC23 Storage Facilities: Failed to provide required storage (cabinets/enclosures/rooms/vaults) at
VC24 Storage of Hazardous Materials/Commodities: Failed to provide required racks and/or shelf storage, and/or failed to store at
VC25 Electrical Hazards: Failed to provide and/or maintain required electrical devices/equipment and/or allowed electrical hazards to exist at
VC26 Heating and Refrigeration Equipment and Systems: Failed to provide and/or maintain required (heating/refrigerating) system for at
VC27 Electrical Lighting Hazards: Failed to provide, protect, and/or maintain required lighting devices or equipment at
VC28 Open Fires, Open Flames and Sparks: Unlawfully (lit/maintained/operated/used/failed to protect) (open fire open flame/sparking device) at
VC29 Designated Handling and Use Rooms Areas: Failed to provide required (room/area) for (handling/use) of
VC30 Emergency Planning and Preparedness: Failed to comply with emergency planning and preparedness requirements

Description of Violation:

Supplement Attached Maximum penalty for each First Offense: \$1,000. Maximum penalty for each Repeat Violation: \$5,000.

NYC Charter Sections 1048 and 1049-a and the Rules of the City of New York authorize the NYC Office of Administrative Trials and Hearings (OATH) to hold hearings

I, an employee of the agency named above, affirm under penalty of perjury that I personally observed the commission of the violation(s) charged above and/or verified their existence through a review of departmental records. False statements made herein are punishable as a Class A Misdemeanor pursuant to section 210.45 of the Penal Law.

Signature: Print Name/ID: Title:

11667601N



AFFIDAVIT (CERTIFICATE*) OF SERVICE

STATE OF NEW YORK)
) ss.
COUNTY OF _____)

The undersigned being duly sworn, deposes and says, that s/he is not a party to the action and is over eighteen (18) years of age, that on _____, 20____ at _____ p.m./a.m. at [address] _____, s/he

served the attached Summons on the Respondent named herein, as follows:

1. Individual Respondent

by delivering a true copy to [insert name:] _____, who is the respondent.

2. Partnership Respondent

by delivering a true copy to [insert name:] _____, who is the [insert position:] _____ of said respondent.

3. Corporate Respondent

by delivering a true copy to [insert name:] _____, who is the [insert position:] _____ of said respondent.

4. Affixing of Summons and Hearing

A I attempted to personally serve the attached Summons on the respondent named herein but was unable to do so because, having entered the premise and having identified myself, I was:

- 1. advised by [insert name:] _____ that the respondent was not present;
2. advised by [insert name / relationship to building:] _____ that an appropriate representative of the partnership respondent or corporate respondent was not present;
3. unable to locate anyone within the premise to inform me whether an appropriate representative of the respondent was present. No one responded to any bells, knocks or calls and there were no signs visibly posted reflecting any contact information;
4. advised by [insert name / relationship to building:] _____ that no officer, director, managing agent, agent, or partner of respondent partnership/corporation was present.

B. Thereupon, I affixed the Summons at the foregoing location in the following place: _____

[The following is to be completed if a person was served with the Summons.]

Description of Individual. Deponent describes the individual served as follows:

- Male, Female, Hair, Complexion, Black Hair, Brown Hair, Blond Hair, Gray Hair, White Hair, Red Hair, Bald, 14-20 yrs, 21-35 yrs, 36-50 yrs, 51-65 yrs, Over 65 yrs, Under 5', 5'0" - 5'3", 5'4" - 5'8", 5'9" - 6'0", Over 6', Under 100 lbs., 100-130 lbs., 131-160 lbs., 161-200 lbs., Over 200 lbs.

Other identifying characteristics:

Signature: _____ Date: _____

Printed Name: _____

Inspector's Identification Number: _____

*If not sworn, this statement shall constitute a certificate of service.

Sworn to before me on _____, 20____

Signature of Certifying Officer

Violation Order



CROSS STREETS

12

CITY OF NEW YORK
FIRE DEPARTMENT

BATTALION

A-100(0) 05/09

12

D.O. n/a for field units

13

VIOLATION ORDER

E 000000

To 1&2

3

4

5

ROOM # OR FLOOR

TYPE OF OCCUPANCY

BIN #

An inspection this date of the above premises indicates the existence of the following violations under the enforcement jurisdiction of this Department. You are hereby directed to correct such violations by compliance with the following order:

SFO#	Item #	Description
C-16	6	Failure to obtain and/or produce required certificate of fitness to supervise the testing, inspection, and servicing for (sprinkler/standpipe/foam fire extinguishing/fire alarm/private fire hydrant/yard hydrant) system, in violation of C901.6.3. Remedy: Obtain and/or produce such certificate of fitness.
EG-1		Failure to maintain a required (means of egress/ exit/ exit access/ exit discharge) at _____ free from obstructions, in violation of FC1027.2. Remedy: Maintain such (means of egress/ exit, exit access/ exit discharge) free from obstructions. (Comply Forthwith)
EG-7		Failure to maintain the premise in such a manner so as not to allow it to become overcrowded, in violation of FC1027.3.4. Remedy: Reduce the amount of persons to (number of people), a level which will not allow their presence and/or location to obstruct or impede access to any means of egress. (Comply Forthwith)
EG-12		Failure to provide and/or maintain signs for (exit/exit access door/exit which is not immediately recognizable) at _____, in violation of FC1027.1. Remedy: Provide/maintain such signs.
FE-1		Failure to provide (number) portable fire extinguisher(s) at _____, in violation of FC906.1 and/or FC906.3 Remedy: Provide such portable fire extinguisher(s) with a minimum _____ rating
FPS-3		Failure to maintain (standpipe/sprinkler fire alarm) system in good working order at all times, in violation of FC901.6 Remedy: Restore such system to good working order. (Comply Forthwith)
GP-14		Failure to maintain (fire escape/exterior screened stairway) at _____ in good working order, in violation of NYS Labor Law § 273-274/ NYS MD Law § 53(8)(b). Remedy: Replace all defective portions of the (fire escape/exterior screened stairway). NYS Labor Law § 268/NYS MD Law §53(8)(b).
HA-3		Failure to provide and/or maintain enclosure around boiler with a fire-resistive rating of not less than 1 hour at _____, in violation of NYS MD Law § 65. Remedy: Provide enclosure around boiler with a fire-resistive rating of not less than 1 hour, vertically and horizontally from surrounding spaces.
HA-4		Failure to provide and/or maintain boiler room with a fireproof self closing door at _____, in violation of NYS MD Law § 65. Remedy: Provide boiler room with a fireproof self closing door.
HK-1		Failure to maintain area free of accumulations of rubbish/combustible waste at _____, in violation of FC304.2. Remedy: Remove all accumulations of rubbish/combustible waste in such area. (Comply Forthwith)
SPK-4		Failure to maintain and/or produce records for monthly inspection of sprinkler system by a Certificate of Fitness holder, in violation of FC901.6.2.1. Remedy: Maintain and/or produce such records.
STP-3		Failure to maintain and/or produce records of standpipe system monthly inspections by a Certificate of Fitness holder, in violation of FC901.6.2.1 Remedy: Maintain and/or produce such records.
SP-1	7	Failure to provide/maintain/repair _____ at _____, in violation of (Section of Law) Remedy: Provide/maintain/repair _____.

8 If this order has not been complied within _____ days of issuance date, a SUMMONS will be served for violations of the Administrative Code of the City of New York.

This is to certify that I have made inspection of said premises and have issued the above order to:

NAME OF PERSON WHO RECEIVED THIS ORDER: _____ TITLE: _____ PHONE #: _____

INSPECTOR: _____ DATE: _____ UNIT: _____ UNIT ADDRESS: _____ UNIT TELEPHONE: _____

BY ORDER OF THE FIRE COMMISSIONER.

Violation Order



CROSS STREETS _____

12

CITY OF NEW YORK
FIRE DEPARTMENT

A-10(B) 05/09

BATTALION 12

D.O. n/a for field units 13

VIOLATION ORDER

E 000000

To 1&2

3

4

5

ROOM # OR FLOOR

TYPE OF OCCUPANCY

BIN #

An inspection this date of the above premises indicates the existence of the following violations under the enforcement jurisdiction of this Department. You are hereby directed to correct such violations by compliance with the following order:

SFO#	Item #	Description
C-16	6	Failure to obtain and/or produce required certificate of fitness to supervise the testing, inspection, and servicing for (sprinkler/standpipe/foam fire extinguishing/fire alarm/private fire hydrant/yard hydrant) system, in violation of FC901.6.3. Remedy: Obtain and/or produce such certificate of fitness.
EG-1		Failure to maintain a required (means of egress/ exit/ exit access/ exit discharge) at _____ free from obstructions, in violation of FC1027.2. Remedy: Maintain such (means of egress/ exit, exit access/ exit discharge) free from obstructions. (Comply Forthwith)
EG-7		Failure to maintain the premise in such a manner so as not to allow it to become overcrowded, in violation of FC1027.3.4. Remedy: Reduce the amount of persons to (number of people), a level which will not allow their presence and/or location to obstruct or impede access to any means of egress. (Comply Forthwith)
EG-12		Failure to provide and/or maintain signs for (exit/exit access door/exit which is not immediately recognizable) at _____, in violation of FC1027.1. Remedy: Provide/maintain such signs. 1968 BC27-389 2008 BC1011.1 Labor Law § 272
FE-1		Failure to provide (number) portable fire extinguisher(s) at _____, in violation of FC906.1 and/or FC906.3 Remedy: Provide such portable fire extinguisher(s) with a minimum _____ rating
FPS-3		Failure to maintain (standpipe/sprinkler/fire alarm) system in good working order at all times, in violation of FC901.6 Remedy: Restore such system to good working order. (Comply Forthwith)
GP-14		Failure to maintain (fire escape/exterior screened stairway) at _____ in good working order, in violation of NYS Labor Law § 273-274/ NYS MD Law § 53(8)(b). Remedy: Replace all defective portions of the (fire escape/exterior screened stairway). NYS Labor Law § 268/NYS MD Law §53(8)(b).
HA-3		Failure to provide and/or maintain enclosure around boiler with a fire-resistive rating of not less than 1 hour at _____, in violation of NYS MD Law § 65. Remedy: Provide enclosure around boiler with a fire-resistive rating of not less than 1 hour, vertically and horizontally from surrounding spaces.
HA-4		Failure to provide and/or maintain boiler room with a fireproof self closing door at _____, in violation of NYS MD Law § 65. Remedy: Provide boiler room with a fireproof self closing door.
HK-1		Failure to maintain area free of accumulations of rubbish/combustible waste at _____, in violation of FC304.2. Remedy: Remove all accumulations of rubbish/combustible waste in such area. (Comply Forthwith)
SPK-4		Failure to maintain and/or produce records for monthly inspection of sprinkler system by a Certificate of Fitness holder, in violation of FC901.6.2.1. Remedy: Maintain and/or produce such records.
STP-3		Failure to maintain and/or produce records of standpipe system monthly inspections by a Certificate of Fitness holder, in violation of FC901.6.2.1 Remedy: Maintain and/or produce such records.
SP-1	7	Failure to provide/maintain/repair _____ at _____, in violation of (Section of Law) _____. Remedy: Provide/maintain/repair _____.

8 If this order has not been complied within _____ days of issuance date, a SUMMONS will be served for violations of the Administrative Code of the City of New York.

This is to certify that I have made inspection of said premises and have issued the above order to:

<div style="display: flex; justify-content: space-between;"> 9 9 </div>	<div style="display: flex; justify-content: space-between;"> 10 11 </div>	
NAME OF PERSON WHO RECEIVED THIS ORDER	TITLE	PHONE #
INSPECTOR	DATE	UNIT ADDRESS
	UNIT	UNIT TELEPHONE

BY ORDER OF THE FIRE COMMISSIONER

Criminal Court Summons

CRC-3206 (7/09)

Complaint/Information The People of The State of New York vs.

Name (<i>Last, First, MI</i>)						
Street Address					Apt. No.	
City			State		Zip Code	
ID/License Number			State	Type/Class	Expires (<i>mm/dd/yy</i>)	Sex
Date of Birth (<i>mm/dd/yy</i>)		Ht	Wt	Eyes	Hair	Plate/Reg
Reg State	Expires (<i>mm/dd/yy</i>)	Plate Type	Veh Type	Make	Year	Color

The Person Described Above is Charged as Follows:

Time 24 Hour (<i>hh:mm</i>)		Date of Offense (<i>mm/dd/yy</i>)			County	
Place of Occurrence					Precinct	
In Violation of Section	Subsection	VTL <input type="checkbox"/>	Admin. Code <input type="checkbox"/>	Penal Law <input type="checkbox"/>	Park Rules <input type="checkbox"/>	Other

Title of Offense:

Factual Allegations (*describe offense*):

SPRINT #:

Defendant stated in my presence (*in substance*):

--

I personally observed the commission of the offense charged herein. False statements made herein are punishable as a Class A Misdemeanor pursuant to section 210.45 of the Penal Law. Affirmed under penalty of law.

Complainant's Full Name Printed		Rank/Full Signature of Complainant		Date Affirmed (<i>mm/dd/yy</i>)
Agency	Tax Registry #		Command Code	
The person described above is summoned to appear at NYC Criminal Court located at:			Summons Part	County

Date of Appearance (*mm/dd/yy*) At 9:30 a.m.

ORIGINAL



Criminal Court Summons

CRC-3206 (7/99)

Complaint/Information

The People of The State of New York vs.

Name (Last, First, MI)									
Street Address								Apt. No.	
City				State		Zip Code			
ID/License Number			State	Type/Class	Expires (mm/dd/yy)		Sex		
Date of Birth (mm/dd/yy)		Hi	Wt	Eyes	Hair	Plate/Reg			
Reg State	Expires (mm/dd/yy)	Plate Type	Veh Type	Make	Year	Color			
The Person Described Above is Charged as Follows:									
Time 24 Hour (hh:mm)			Date of Offense (mm/dd/yy)				County		
Place of Occurrence								Precinct	
In Violation of Section	Subsection	VTL	Admin. Code	Penal Law	Park Rules	Other			
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>									
Title of Offense:									
Bronx Criminal Court - 215 E 161 st Street, Bronx, NY 10451									
Kings Criminal Court - 346 Broadway, New York, NY 10013									
Redhook Community Justice Center - 88-94 Visitation Place, Brooklyn, NY 11231									
New York Criminal Court - 346 Broadway, New York, NY 10013									
Midtown Community Court - 314 W 54 th Street, New York, NY 10019									
Queens Criminal Court - 120-55 Queens Boulevard, Kew Gardens, NY 11415									
Richmond Criminal Court - 67 Targee Street, Staten Island, NY 10304									
Defendant stated in my presence (in substance):									
<p>I personally observed the commission of the offense charged herein. False statements made herein are punishable as a Class A Misdemeanor pursuant to section 210.45 of the Penal Law. Affirmed under penalty of law.</p>									
Complainant's Full Name Printed			Rank/Full Signature of Complainant				Date Affirmed (mm/dd/yy)		
Agency		Tax Registry #			Command Code				
The person described above is summoned to appear at NYC Criminal Court located at:					Summons Part		County		
Date of Appearance (mm/dd/yy)					At 9:30 a.m.				

DEFENDANT'S COPY

Residential Inspection

BUILDING RECORD CARD		Inspection Classification	A	Administrative Unit Block #	58
		Location 29-08 31 Ave.		NYC Univ. Bl. #	588
Construction Class 3		Height 75		Stories 5	Area 200x150
Date of Erection 1928		Cert. of Occ. # N/A		CIDS Program <input checked="" type="checkbox"/>	
Occupancy:	Pub	Com	MD XXX	PD	Other
Standpipe <input type="checkbox"/>		Sprinkler <input type="checkbox"/>		Alarm <input type="checkbox"/>	
SPECIAL CONDITIONS, ALTERATIONS, ETC.					
Store 1 st Floor					
OWNERSHIP					
DATE	NAME	ADDRESS		TELEPHONE	
1928	Josiah Wells	41-27 14 St NY, NY		212 543 2708	
1989	Donald Trump	1508 W 81 St NY, NY		212 360 4455	
MANAGEMENT (If Different From Above)					
MGMT. CO.	CONTACT PERSON	ADDRESS		TELEPHONE	

Residential Inspection

Premises Location <u>29-08 29 Ave</u>		BLOCK #13	
Floor <u>1</u>		Room No. _____	
COM			
Special Conditions & Bd. of S.& A. Resolutions _____		BSA 607/58	
OPENING IN THE WALL			
MAJOR ALTERATION			
7-10-82			
ANNUAL			
ACCOUNT NO	TYPE OF PERMIT	INSP. NO.	EXP. MONTH
P	24601	REFRIGERATION>5HP	7
Date Occupied	Name of Occupant	Mailing Address	Type of Business
<u>1974</u>	<u>Juan's Bodega.</u>	<u>657 E. 42 St.</u>	<u>Deli</u>
		<u>N.Y., N.Y. 10019</u>	
		<u>212-762-4400</u>	
<u>MANAGER</u>	<u>- Jose Batista</u>		
<u>OWNER</u>	<u>Donald Trump</u>		
FIELD RECORD CARD (OCCUPANCY)			
A-118			



Div: ____ BN: ____ Unit: ____ Date: _____

FDNY INSPECTION FORM

IF-1 (09/15)

If the building/occupancy contains Fire Protection Systems, use the Fire Protection Systems Supplement Sheet and attach it to the inspection form.

BIN# _____

Building Address: _____

Occupancy Name: _____

Inspected Building **Inspected Occupancy**

Are address numbers plainly legible and visible from the street fronting the property?

Compliant N/A Non-Compliant

Action: **Refer to SFO (M-1)**

Certificate of Occupancy:

C of O #: _____

Compliant N/A Non-Compliant

Action: **Refer to SFO (M-7)**

Buildings built before 1938 are not required to have a C of O. See Chapter 5 for more details.

Is the C of O in compliance with the use of the building? _____
(Type of use)

Compliant N/A Non-Compliant

Action: **Forward DOB Referral Report (Normal Priority)**

Roof:

Bulkhead door unlocked. **Note: Door should be provided with slide bolt, hook and eye, or panic bar. Door can not be locked with a key; if found locked ensure door is unlocked immediately.**

Compliant N/A Non-Compliant

Action: **Serve Immediate Summons (FC 1027.2)**

It shall be unlawful to store rubbish or other combustible waste in a manner that creates a fire hazard.

Compliant N/A Non-Compliant

Action: **Refer to SFO (HK-1)**

All fire escapes shall be maintained in good order or repair and structurally safe.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-13 or 14)**

Note: If the structural stability of the fire escape is in question, request DOB to the scene or forward a DOB Referral Report (High Priority)

Exit Requirements:

Every exit shall be maintained in an unobstructed condition.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-1)**

Door hardware and other devices of the means of egress shall be maintained in good working order at all times.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-4)**

Exit signs should be provided at the means of egress.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-12)**

Fire doors and smoke barrier doors shall not be blocked or obstructed or otherwise made inoperable, if present.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-4)**

All stairways should be labeled with an alphabetical letter on the occupancy side of the stair.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-26)**

CO and Smoke Detectors:

- For information, See Chapter #5. Also refer to the Standard Form of Order's for Smoke Detectors and CO Detector actions.

Housekeeping:

Combustible material shall not be stored in a manner that obstructs egress from any building, structure or premises.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-1)**

It shall be unlawful to store rubbish or other combustible waste in a manner that creates a fire hazard.

Compliant N/A Non-Compliant

Action: **Refer to SFO (HK-1)**

Extinguishers:

If portable fire extinguishers are provided they should be serviced annually and have a current service tag attached. See Fire Code guide for requirements.

Compliant N/A Non-Compliant

Action: **Refer to SFO (FE-11)**

Boiler Room:

Note: Boiler rooms are not always required. Refer to Chapter 5 in order to determine when boiler room is required.

Boiler rooms are required to have a fireproof self-closing door.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-8)**

Boiler rooms are required to be segregated, vertically and horizontally, from surrounding spaces by a fire-resistive rating and maintained in good order.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-9)**

Combustible material shall not be stored in boiler rooms.

Compliant N/A Non-Compliant

Action: **Refer to SFO (HK-5)**

Extinguisher should be provided outside heating room, **(2-A: 40-B:C)** dry chemical extinguisher shall be ordered. **(Pails of sand are not acceptable)**

Compliant N/A Non-Compliant

Action: **Refer to SFO (FE-1)**

Potential CIDS Information:

Siamese & OS&Y not easily found, Standpipe Riser locations:
Machinery on Roof, Light Weight Construction, Number of Fire Escapes, Courts, Shafts, Cell Sites:
HVAC system locations, Machinery Room locations, Fire Command Stations, Fire Pumps, Elevator Machinery Rooms, Cellar Access:
Window bars, Number and Type of Stairways, Labeling of Stairways, Access Stair locations, Fire Towers:
Haz-Mat/ Miscellaneous:

Additional Violations:
Please list the violation type, location, and enforcement action on any items found in violation and not preprinted on this form.

Remarks:
If enforcement action is not taken on any item not compliant with the provisions on this form, please indicate the special circumstances and/or reasons which prevented the appropriate action:

Endorsements:
I certify that the above information is true and accurate to the best of my knowledge and ability.
Was a Fire Protection Supplement Sheet prepared? <input type="checkbox"/> Yes <input type="checkbox"/> No; if yes what type of Fire Protection System(s) does the building/occupancy have? _____

Inspector/Officer's Name (print) ↑	Rank	Unit	Date
Inspector/Officer's Signature ↑		Total Violations:	

Mercantile Inspection

BUILDING RECORD CARD		Inspection Classification	A	Administrative Unit Block #	22
Location 20-35 25 Ave		NYC Univ. Bl. #	221	Lot #	12
Construction Class 3		Height	30	Stories	1
Date of Erection 1985		Cert. of Occ. #	90878835	CIDS Program	ⓧ
Occupancy:	Pub	Com XXX	MD	PD	Other
Standpipe		Sprinkler	XXX	Alarm	XXX
SPECIAL CONDITIONS, ALTERATIONS, ETC.					
OWNERSHIP					
DATE	NAME	ADDRESS		TELEPHONE	
1985	Home Depot Corp.	41-27 14 St NY, NY		212 543 2708	
MANAGEMENT (If Different From Above)					
MGMT. CO.	CONTACT PERSON	ADDRESS		TELEPHONE	

Mercantile Inspection

CD-201 (06/10)

CRITICAL INFORMATION DISPATCH SYSTEM (CIDS)

BLOCK #

22

ADMIN UNIT

E324

BORO	HOUSE NO.	PREFIX	SPECIAL NAME/PLACE IF APPLICABLE	STREET TYPE ENDING	SUFFIX
5-QN	20-35		Home Depot	Ave	
			STREET NAME		
			25		

TRANSMITTED DATA

Limit lines to 40 characters each
RETAIL STORE 1 STY 200X200 CL2 LW
SPRINKLER ON 108 ST SIDE
MINRES 2&2

Each line above will accept up to 40 characters, for a total of 160 characters. When you complete a line, use the tab key to proceed to the next line. After filling out this form online, please print, sign and forward it to the Battalion and Division

Action to be taken

A-8

Vacate

Original

Revised

Revoked



Div: ____ BN: ____ Unit: ____ Date: _____

FDNY INSPECTION FORM

IF-1 (09/15)

If the building/occupancy contains Fire Protection Systems, use the Fire Protection Systems Supplement Sheet and attach it to the inspection form.

BIN# _____

Building Address: _____

Occupancy Name: _____

Inspected Building **Inspected Occupancy**

Are address numbers plainly legible and visible from the street fronting the property?

Compliant N/A Non-Compliant

Action: **Refer to SFO (M-1)**

Certificate of Occupancy:

C of O #: _____

Compliant N/A Non-Compliant

Action: **Refer to SFO (M-7)**

Buildings built before 1938 are not required to have a C of O. See Chapter 5 for more details.

Is the C of O in compliance with the use of the building? _____
(Type of use)

Compliant N/A Non-Compliant

Action: **Forward DOB Referral Report (Normal Priority)**

Roof:

Bulkhead door unlocked. **Note: Door should be provided with slide bolt, hook and eye, or panic bar. Door can not be locked with a key; if found locked ensure door is unlocked immediately.**

Compliant N/A Non-Compliant

Action: **Serve Immediate Summons (FC 1027.2)**

It shall be unlawful to store rubbish or other combustible waste in a manner that creates a fire hazard.

Compliant N/A Non-Compliant

Action: **Refer to SFO (HK-1)**

All fire escapes shall be maintained in good order or repair and structurally safe.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-13 or 14)**

Note: If the structural stability of the fire escape is in question, request DOB to the scene or forward a DOB Referral Report (High Priority)

Exit Requirements:

Every exit shall be maintained in an unobstructed condition.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-1)**

Door hardware and other devices of the means of egress shall be maintained in good working order at all times.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-4)**

Exit signs should be provided at the means of egress.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-12)**

Fire doors and smoke barrier doors shall not be blocked or obstructed or otherwise made inoperable, if present.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-4)**

All stairways should be labeled with an alphabetical letter on the occupancy side of the stair.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-26)**

CO and Smoke Detectors:

- For information, See Chapter #5. Also refer to the Standard Form of Order's for Smoke Detectors and CO Detector actions.

Housekeeping:

Combustible material shall not be stored in a manner that obstructs egress from any building, structure or premises.

Compliant N/A Non-Compliant

Action: **Refer to SFO (EG-1)**

It shall be unlawful to store rubbish or other combustible waste in a manner that creates a fire hazard.

Compliant N/A Non-Compliant

Action: **Refer to SFO (HK-1)**

Extinguishers:

If portable fire extinguishers are provided they should be serviced annually and have a current service tag attached. See Fire Code guide for requirements.

Compliant N/A Non-Compliant

Action: **Refer to SFO (FE-11)**

Boiler Room:

Note: Boiler rooms are not always required. Refer to Chapter 5 in order to determine when boiler room is required.

Boiler rooms are required to have a fireproof self-closing door.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-8)**

Boiler rooms are required to be segregated, vertically and horizontally, from surrounding spaces by a fire-resistive rating and maintained in good order.

Compliant N/A Non-Compliant

Action: **Refer to SFO (GP-9)**

Combustible material shall not be stored in boiler rooms.

Compliant N/A Non-Compliant

Action: **Refer to SFO (HK-5)**

Extinguisher should be provided outside heating room, **(2-A: 40-B:C)** dry chemical extinguisher shall be ordered. **(Pails of sand are not acceptable)**

Compliant N/A Non-Compliant

Action: **Refer to SFO (FE-1)**

Potential CIDS Information:

Siamese & OS&Y not easily found, Standpipe Riser locations:
Machinery on Roof, Light Weight Construction, Number of Fire Escapes, Courts, Shafts, Cell Sites:
HVAC system locations, Machinery Room locations, Fire Command Stations, Fire Pumps, Elevator Machinery Rooms, Cellar Access:
Window bars, Number and Type of Stairways, Labeling of Stairways, Access Stair locations, Fire Towers:
Haz-Mat/ Miscellaneous:

Additional Violations:
Please list the violation type, location, and enforcement action on any items found in violation and not preprinted on this form.

Remarks:
If enforcement action is not taken on any item not compliant with the provisions on this form, please indicate the special circumstances and/or reasons which prevented the appropriate action:

Endorsements:
I certify that the above information is true and accurate to the best of my knowledge and ability.
Was a Fire Protection Supplement Sheet prepared? <input type="checkbox"/> Yes <input type="checkbox"/> No; if yes what type of Fire Protection System(s) does the building/occupancy have? _____

Inspector/Officer's Name (print) ↑	Rank	Unit	Date
Inspector/Officer's Signature ↑		Total Violations:	



FIRE SAFETY DURING CONSTRUCTION, ALTERATION, DEMOLITION, AND ABATEMENT

IF-2 (12/16)

BIN# _____ **Name of CDA Inspector:** _____

Building Name/Address: _____

Owner/Contractor Name: _____

Note: Abatement inspections should only be conducted from safe areas. Do not enter hazardous areas where active abatement procedures are in the process.

Work Permit and Signs:

Units shall ensure that the required written permit from the Department of Buildings (DOB) authorizing construction, demolition or alteration is present at the site. It shall be unlawful to construct, alter, repair or demolish any building in the city until a written permit from the Commissioner of DOB has been issued.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Forward DOB Referral Report

Signs must be posted at site containing Name, Address and Phone Number of General Contractor and Owner.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-1)

Site Safety:

See the Construction Guide to determine when a Site Safety Manager/Coordinator and a Construction Site Fire Safety Manager is required, or call the BISP Hotline.

Site Safety Manager/Coordinator and Construction Site Fire Safety Manager Name(s)

The Site Safety Manager/Coordinator must be present at the site at all times during working hours. If the Site Safety Manager/Coordinator is not present, a certified alternate must be present in case of his/her absence and log entries made indicating same.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

**Action Serve Immediate Summons,
Refer to SFO (FSC-2) and/or (FSC-30)
Notify DOB to respond**

When a Construction Site Fire Safety Manager is required, they shall conduct an inspection of the construction site and all fire safety measures on at least a daily basis, and maintain a record of same in a bound log book or other approved means.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Serve Immediate Summons,
Refer to SFO (FSC-29) and/or (FSC-30)
Notify DOB to respond.**

Note: The owner shall designate a person to be the Construction Site Fire Safety Manager. It is possible that this person can also be both the Site Safety Manager and Site Safety Coordinator.

A telephone not requiring a coin to operate, or other approved clearly identified means to notify the department, shall be provided at an approved location. The street address of the construction site and the emergency telephone number of the Fire Department shall be posted in a conspicuous area.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Refer to SFO (FSC-3)**

Approved vehicle access for fire apparatus shall be provided at all construction sites. Vehicle access shall be provided to within 100 feet of temporary or permanent Fire Department connections.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Refer to SFO (M-3)**

Precautions Against Fire:

Smoking shall be prohibited at all construction sites.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Serve Immediate Summons to person smoking.
When evidence of smoking is found, Issue an FDNY Summons (Other
FC/Rule Violation to the DOB Work Permit Holder or the owner of
the building. (FC 1404.1)**

See Construction/ Demo Guide for more information, if needed or call the BISP Hotline.

No Smoking Signs should be posted throughout the construction site.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Refer to SFO (GP-1)**

Combustible waste, including rubbish and construction and demolition material, shall not be accumulated within **buildings** and shall be removed from **buildings** at the end of each work shift, but at least once a day.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Refer to SFO (HK-1)**

Combustible waste, including rubbish and construction and demolition material, shall be removed from the site or stored in noncombustible containers.

Note: Combustible waste material in excess of 15 cubic yards shall be removed daily from the site before the close of the day's work, no exceptions.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (HK-1) and/or (HK-6)

It shall be unlawful to ignite or maintain an open fire at a construction site.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Serve Immediate Summons (FC 1404.3)

Means of Egress and Elevators:

All enclosed stairways and enclosed shafts (elevator, dumbwaiter etc.) shall be maintained enclosed on all floors except the uppermost floor being demolished.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-4)

At all times, there shall be safe access to and egress from every building and every floor in every building in course of construction or demolition by means of unobstructed hallways, stairways or ladder runs so enclosed or so located as to protect persons using them from falling materials.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-5) and/or (FSC-6)

If construction **work** reaches a height **greater than 75 feet**, at least one elevator or hoist shall be kept in readiness at all times for use by the Fire Department.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

**Action: Refer to SFO (FSC-8)
Request Battalion Chief to respond
Notify DOB to respond**

Water Supply for Fire Protection:

Any water source intended for firefighting operations, including standpipe outlets, street hydrants and yard hydrants, shall not be used for construction, alteration or demolition purposes, unless approved, proof must be provided.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-7)

Standpipe Systems

Standpipes are required when in the course of **construction or alteration** the **work** reaches a height **greater than 75 feet**, the standpipe risers should be capped. The system can be dry if subject to freezing.

Note: Concrete Construction: Standpipe must be capped and maintained up to one floor below the stripping floor (3 floors below recently poured floor).

Example: Floor being poured (10th fl.)>Frame work (9th fl.)>Stripping Floor (8th fl.)> Standpipe maintained Capped (7th fl)

Steel Construction: Standpipe capped and maintained on floor below the walking floor. This could be considered tacked Q-Decking.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Refer to SFO (FSC-26)**
 Request Battalion Chief to respond
 Notify DOB to respond

When **demolition** is started the standpipe risers should be capped on the floor immediately below where the work is being performed. The standpipe shall be maintained as a dry system until demolition is complete.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Refer to SFO (FSC-9)**
 Request Battalion Chief to respond
 Notify DOB to respond

A metal sign reading “**STANDPIPE SIAMESE CONNECTION**” must be present at the Siamese connection for the standpipe, with a **red light** over the sign. The red light must be lit at night.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **Refer to SFO (FSC-10) and/or (FSC-10A)**

Note: Fire Units should pay particular attention to the condition of piping in below grade areas, siamese connections, section valves on each floor, and the riser in general.

All exposed standpipe and sprinkler piping, except branch piping, must be painted red. Dedicated standpipe valve handles must be painted red. Combination standpipe valve handles must be painted yellow. Dedicated sprinkler valve handles must be painted green.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: **No pre-printed SFO - Issue FDNY Summons (VC-12)**

Sprinkler Systems

In structures undergoing **demolition** that have **existing sprinkler systems** with Siamese connections, such systems shall be maintained as a non-automatic sprinkler system.

Note: Existing systems are any systems with a Siamese, because a Siamese is required when any fire area requires more than 36 heads. Partial systems are not required to be maintained during demolition. Partial systems will not have a Siamese. See Chapter 5 for additional information.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

**Action: Refer to SFO (FSC-11)
Request Battalion Chief to respond
Notify DOB to respond**

When demolition starts, the sprinkler risers shall be capped immediately below the floor being demolished to maintain the sprinkler system on all lower floors for Fire Department use until demolition is complete.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-9)

A metal sign must be present at the Siamese connection for the sprinkler system reading **“SPRINKLER SIAMESE CONNECTION”** with a **red light** over the sign. The red light must be lit at night.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-12) and/or (FSC-12A)

Note: List the name of the Site Safety Manager/Coordinator or responsible person on site (owner, general contractor, construction foreman) that confirmed the standpipe and/or sprinkler system is in service.

Name/Title: _____

Portable Fire Extinguishers

Buildings or structures under construction, alteration or demolition shall be provided with not less than one approved portable fire extinguisher and sized for not less than ordinary hazard as follows:

- At each stairway on all floor levels where combustible materials are being stored or combustible waste is being generated.
- At the entrance of each storage and construction shed.
- Additional portable fire extinguishers shall be provided where flammable and combustible liquids are stored, handled and used.

If fire extinguishers are provided they should be **serviced annually** and have a current service tag attached.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FE-1) and/or (FE-11) for servicing

Note: For ordinary hazards (combustible materials such as wood, cloth, paper, rubber, and many plastics) one 2A extinguisher is required in the above locations. One 2A extinguisher can cover a maximum floor area of 1,500 square feet. 2A = one 2.5 gallon water extinguisher, the 2A should be indicated on the extinguisher label.

Fire Guards for Torch Operations:

A fire guard with a **Certificate of Fitness** is required to monitor all torch operations. The fire guard must pay particular attention to the sparks generated when the torch is in use.

For further information on Fire Guards and/or Torch Operations see the Fire Code Guide.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-22), and/or (FSC-23), and/or (FSC-21)

Heating Devices used for Curing and Drying:

It shall be unlawful at a construction site to store, handle or use portable fueled heating devices or equipment:

- For purposes of human comfort or any other purpose other than construction-related curing and drying.
- Utilizing a flammable liquid as a fuel. (**Ex: Gasoline**)

Note: LPG and Natural Gas are gases and Kerosene is a combustible liquid due to its flash point. That is why these are acceptable as fuels for heating devices.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (FSC-14)

The handling and use of portable fueled space heaters shall be under the personal supervision of a person holding a **Certificate of Fitness**. The storage of portable fueled space heaters and the fuel therefore, shall be under the general supervision of a **Certificate of Fitness** holder.

Compliant Non-Compliant N/A Not Inspected-Abatement Area

Action: Refer to SFO (C-21), and/or SFO (C-22)

Note: **Personal supervision** = must be on site at all times when heaters are being handled or used.
General supervision = not required to be on site at all times.

Flammable Gases and Liquids:

For information on Flammable gases and liquids refer to either the BISP hotline or the appropriate Construction/Fire Code guide.

Additional Violations:			
Please list the violation type, location, and enforcement action on any items found in violation and not preprinted on this form.			
CIDS			
Is a CIDS entry required: Yes <input type="checkbox"/> NO <input type="checkbox"/> DATE ENTERED: _____			
Example: lightweight construction, Standpipe risers/Siamese locations, key box locations:			
Remarks:			
If enforcement action is not taken on any item not compliant with the provisions on this form, please indicate the special circumstances and/or reasons which prevented the appropriate action:			
Endorsements:			
I certify that the above information is true and accurate to the best of my knowledge and ability.			
Inspected Construction/Demo <input type="checkbox"/> Inspected Alteration <input type="checkbox"/> Inspected Abatement <input type="checkbox"/>			
Inspector/Officer's Name (print) ↑	Rank	Unit	Date
Inspector/Officer's Signature ↑		Total Violations:	



**PROBATIONARY FIREFIGHTERS DEVELOPMENT
PROGRAM (AUC 323)**

1. INTRODUCTION

- 1.1 The Probationary Firefighters Development Program ensures that apprentice firefighters continue their education after graduation from Probationary Firefighter School. Field training that utilizes reading assignments, training videos, company drills, fire critiques, cross unit details and the input of senior firefighters is an essential component of the probationary firefighter professional development.
- 1.2 Company officers play a vital role in the ongoing educational process. Their guidance is indispensable in helping probationary firefighters obtain the knowledge and skill needed to become proficient.
- 1.3 Company officers should be flexible and take advantage of training opportunities as they arise. Training can take place during hydrant inspection, after an incident or anytime the officer feels there are lessons to be learned.

2. PROCEDURES

- 2.1 Probationary firefighters are provided with monthly training modules consisting of reading assignments and training videos that emphasize the fundamentals of firefighting. The Probationary Firefighter can access the training modules by going to the “Probie Corner” section on the DiamondPlate Home Page. At the end of each monthly training module is a twenty (20) question quiz that must be completed. When practical, reading assignments should be coordinated with discussion periods, hands on drills and familiarization drills. While company officers generally lead the drill periods, the participation of all members, in particular senior members, is necessary to pass on the lessons learned and the considerable experience of these members.

Probationary firefighters get three (3) attempts to pass each quiz. If a passing mark is not attained after the third attempt, the program will be temporarily locked and will require the company officer to contact the Probationary Firefighters Development Program Group via email to 323PDPGrp@fdny.nyc.gov to re-activate.

- 2.2 Company commanders should continue to assign additional reading assignments that emphasize familiarization of their unit type (Engine or Ladder), Apparatus (Tiller, Rearmount, TL) and predominant building construction for that company's response area. This will afford the firefighter an opportunity to apply the knowledge gained during training sessions.

- 2.3 There are several addenda to the program to assist the company commanders when new firefighters are assigned to their units:
- Probationary Firefighter Control Sheet.....Addendum 1
 - Probationary Firefighter Training NotebookAddendum 2

- 2.4 The following entries shall be made in the training notebook:

Probationary Firefighter- Enter and date in blue or black ink when subject matter has been read and/or video has been viewed. When Probationary Firefighters have successfully completed the quiz at the end of the module they will print their completion receipt and staple it in their notebook.

Officer on Duty - Initial and date in red ink when the subject matter has been reviewed or drilled on.

Company Commander - Initial and date in red ink once a month. Company Commanders must ensure that modules and quizzes are being completed in a timely manner. This process guides probationary firefighters through the training program and ensures each topic is covered and reviewed. Each tour, probationary firefighters shall make an entry in the training notebook relating to lessons learned, experience gained, or information gathered from senior members during their tour. (See Addendum 2)

- 2.5 The Probationary Firefighter Control Sheet shall be affixed to the inside cover of the Probationary Firefighters folder (BP-90) when received for continuity within unit. (See Addendum 1)

- 2.6 Cross unit details of Probationary Firefighters shall be initiated by the Company Commander, in consultation with the Battalion Training Coordinator, after the Probationary Firefighter has completed 90 days of service in the firehouse. Probationary Firefighters assigned to engine companies shall be detailed to ladder companies, and those assigned to ladder companies shall be detailed to engine companies. Prior to commencement of the detail, Company Commanders shall ensure Probationary Firefighters have familiarized themselves with FDNY Firefighting Procedures/Bulletins relevant to the area in which they will be detailed. Cross unit details shall be for a period of 90 days. During this period, Probationary Firefighters shall not be detailed out of the cross training unit unless absolutely necessary. OSA-2 (Detail More Than 30 Days) shall be forwarded to the Bureau of Operations.

3. SUMMARY

- 3.1 The Probationary Firefighters Development Program ensures the initial training provided by the Bureau of Training continues after the probationary firefighter is assigned to the field. The ability to establish a positive attitude, encourage adherence to safety standards and promote a culture of learning are best accomplished early in a firefighter's career.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT



PROBATIONARY FIREFIGHTER CONTROL SHEET

SUBJECT	DATE	INITIALS
1. New Locker w / number affixed		
2. Work Calendar and Group Number		
3. Firehouse Key / combination		
4. Add to House Tax		
5. Firehouse Telephone Number		
6. Reading Schedule		
7. Training Notebook for Drills		
8. Drill Schedule		
9. Leave Record Card		
10. Emergency Notification Card / ENS		
11. Uniform Inspection Card		
12. Vacation Dates		
13. RSOT Dates		
14. WNYF		
15. Surgical Assistance		
16. Office Record Journal: Personnel Info., Hepatitis Shot, Helmet, Harness Serial #		
17. Personnel Folder		
18. Update Roster and info on Desk		
19. Establish Clipboard for control		
20. Update Summons Book		
21. BP-91 Folder from Bureau of Training		
22. Evaluations end of month 9 (#2), 13 (#3), 17 (#4)		
23. Cross unit detail for 90 days (After 90 days in firehouse)		
24. Asst. HW for 90 days, then regular HW		
25. No details for 6 months		
26. 5th grade photo		
27. 5th grade medical		
28. Review every compartment on the rig and all tools		
29. Apparatus Tool List		
30. Issue Company Guidelines		
31. Helmet Front Piece Marked		

NAME: _____



PROBATIONARY FIREFIGHTER TRAINING NOTEBOOK

1. PROCEDURES

1.1 Every member upon completion of Probationary Firefighter School is issued a composition notebook to document their training. Notebooks shall be maintained until the end of the probationary period. The training notebook should be used by members to record:

- Questions they have concerning fire tools, equipment and operations
- Lessons learned and lessons reinforced during operations
- Information obtained at drills and training exercises
- The input and tips provided by senior members
- Knowledge gained from training videos and reading assignments

1.2 Notebook entries shall be made in the following format.

MONDAY 9/15/2007 9X6

Size-up L-3

Q-What are the 13 points of size-up?

A-

Q-When does size-up begin?

A-

TUESDAY 9/16/07 6X9

Company Drill

The senior member gave me some tips on how to maneuver a portable ladder.

(LIST THEM)

1.3 **Members shall ensure a tool list from their current unit is attached to the first page of the notebook.** The list provides a ready reference and ensures familiarization with the tools carried on the apparatus.

1.4 The training notebook is intended to be used as a positive motivational tool in the development of firefighting skills. Company officers should address any errors or inconsistent entries made in the book by conducting constructive reviews with the firefighter. To maximize the effectiveness of the training notebook, members should:

- Bring the training notebook to all drills held in quarters.
- Make entries in the training notebook either during the drill or as soon as possible after the knowledge has been obtained.

- Review their training notebooks weekly to ensure that their questions are answered and that the new information is fresh in their minds. An entry should be made at the time of this review.
 - Keep their training notebooks in the company office when not in use.
- 1.5 Monthly training module receipt should be printed and stapled to current training notebook page at time of completion. A training module is finished when all material has been read, videos viewed and monthly quiz successfully completed.
- 1.6 If the training notebook is lost or destroyed, the company commander must forward a report through the chain of command to the administrative Division within 30 days, outlining the details of the loss or destruction of the training notebook. The training notebook must be replaced at the members' expense and a notation of the replacement must be made in the report forwarded to the administrative Division. The loss or destruction of the training notebook will be noted in the subsequent evaluation report of the member and may result in disciplinary action.
- 1.7 Probationary firefighters shall document all leaves, other than regular leaves in their training notebook. An entry shall be made in the notebook listing the date the leave started and ended. On the first tour after the leave has concluded, the officer-on duty will verify the dates and sign the entry.
- 1.8 Officers reviewing or evaluating training notebooks shall initiate corrective action whenever deficiencies are noted. Examples of deficiencies that would result in a notebook being considered unsatisfactory include, but are not limited to:
- Long, unexplained time gaps between entries
 - One word answers or extremely brief entries
 - Insufficient number of entries for the time span
 - Failure to change format or correct deficiencies noted by company or chief officers.
- 1.9 Members, who have had their probationary period extended, shall continue to maintain their training notebooks for a period of time equal to their extended probation.

2. REVIEW AND EVALUATION

- 2.1 Probationary firefighters shall ensure the training notebook is **reviewed** on a regular basis according to the following schedule:
- Probationary Firefighter- Review weekly. Initial and date in blue or black ink.
 - Officer on Duty- Review each tour the member works. Initial and date in red ink.
 - Company Commander- Review monthly. Initial and date in red ink.
 - Chief Officers- Review during company drill visits. Initial and date in red ink.

- 2.2 Company commanders shall ensure Training Notebooks are forwarded for evaluation as follows:
- 13th Month- Forward Training Notebook to the Battalion and Division Training Coordinator. Books will be returned to the member upon completion of evaluation.
 - 17th Month- Forward Training Notebook to the Battalion and Division Training Coordinator. Books will be returned to the member upon completion of evaluation.
- 2.3 Battalions shall maintain an accurate and up to date list of all firefighters with notebooks to assist in monitoring compliance.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT