Facades: Safety + Green Construction

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2015 BUILD SAFE | LIVE SAFE CONFERENCE

NYC Buildings

American Institute of Architects Continuing Education System

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

This course will be a comprehensive review of the latest NYC Building Code requirements for maintaining safe building facades in accordance with the NYC Administrative Code Section 28-302.1 RCNY 103-04. This course will provide participants with guidelines on how to navigate the new digital Cycle 8 filing requirements that serve to protect the public who live and work around the large population of buildings in New York City that may have falling pieces of façade. There are approximately 1 million buildings in New York City, over 13,000 of which fall into the Façade Inspection Safety Program (FISP) universe. Additionally, we will provide a history of the Rules of the City of New York and NYC Building Code over the last 5 decades as they relate to building facades and current requirements in relation to sustainability.

We will educate our audience on how to recognize the 28-302.1 population of buildings. In particular, to help identify when the buildings are not maintained in good order and the risks associated with a “Failure to Maintain” violation. We will also point out common flaws in incorrect filings with the DOB. Additionally, we will provide participants with guidelines on sidewalk shed requirements, the filing process, and removal as they relate to unsafe facades.

Learning Objectives

1. Participants will study the history of how our current Code requirements for façade safety came into being and what contributed to their evolution.

2. Participants will learn what makes a building's façade safe or unsafe and how that affects the procedure for filing with the NYC DOB.

3. Participants will learn what is required if their building's façade is deemed unsafe to the public and what is required to remediate the condition.

4. Participants will discover what is required to be in conformance with NYC Administrative Code 28.302.1 and RCNY 103-04 Cycle 8 Façade Inspections for 2015-2020.

DOB – Who owns the FISP/LL Portfolio ?

1. FISP Unit: Plan Examiners, administrators and inspectors
2. C and D: Hanging Scaffold, CD-5, Filing
3. Scaffold Safety Team: Inspectorial
4. Borough Operations:
   a) Alt 3 Sidewalk Shed Filing
   b) Alt 2 Sheds and Scaffolds, Façade Repairs
5. BEST: Buildings 15+ stories
6. ERT/FEU: Unsafe/ Incident. Requires immediate action and engages all of above.

Timeline of Development of FISP/LL

1978
- Koch elected mayor

1979
- Grace Gold dies from falling terra cotta

1980
- Cycle 1 of LL10/80

1981 to 1998
- Amended with rules, memos, PPNs

1998
- LL11/98

2002
- Bloomberg elected mayor

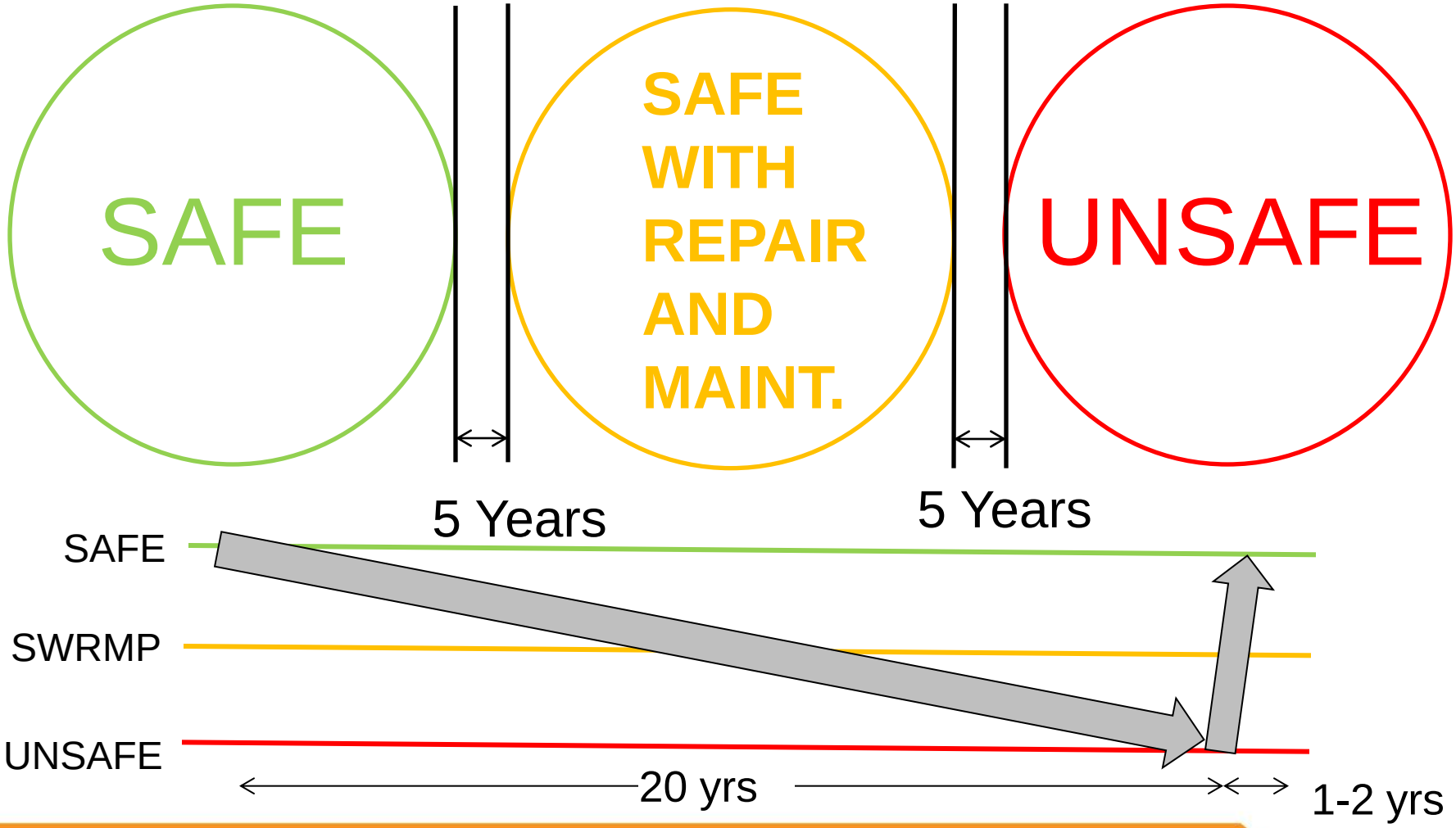
2003
- Last major edition of 1968 BC published

2008
- 2008 BC published

2014
- de Blasio elected mayor

2014
- 2014 BC published

FISP Categories



NYC Building Code: Maintenance of Buildings

ARTICLE 301
GENERAL

§28-301.1 Owner's responsibilities. All buildings and all parts thereof and all other structures shall be maintained in a safe condition. All service equipment, means of egress, materials, devices, and safeguards that are required in a building by the provisions of this code, the 1968 building code or other applicable laws or rules, or that were required by law when the building was erected, altered, or repaired, shall be maintained in good working condition. Whenever persons engaged in building operations have reason to believe in the course of such operations that any building or other structure is dangerous or unsafe, such person shall forthwith report such belief in writing to the department. The owner shall be responsible at all times to maintain the building and its facilities and all other structures regulated by this code in a safe and code-compliant manner and shall comply with the inspection and maintenance requirements of this chapter.

NYC Building Code: Facades

ARTICLE 302
MAINTENANCE OF EXTERIOR WALLS

§28-302.1 General. A building's exterior walls and appurtenances thereof shall be maintained in a safe condition. All buildings greater than six stories shall comply with the maintenance requirement of this article.

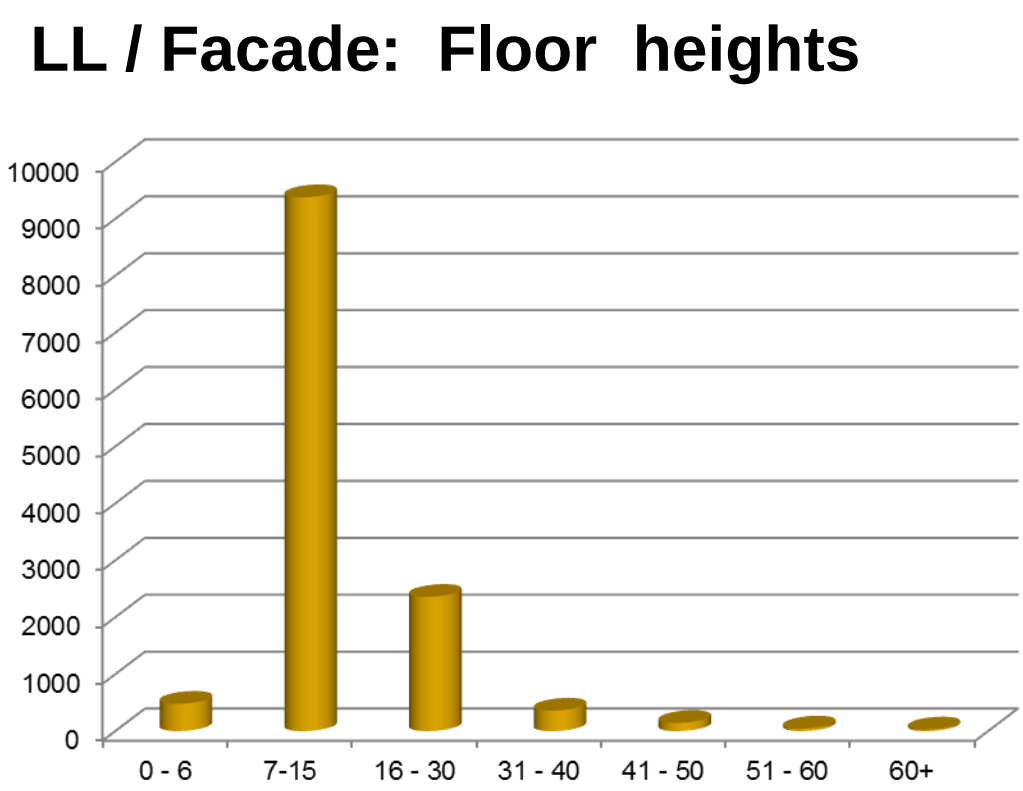
Exception: The requirements imposed by this article shall not apply to any part of an exterior wall that is less than 12 inches (305 mm) from the exterior wall of an adjacent building.

Other Requirements:

1 RCNY § 101-07

1 RCNY § 103-04

Height Distribution FISP/ LL Building Population



Late 19th century bearing wall Building - 7 stories (rare)

Early 20th century bearing wall Building - 7 stories and above

1900’s to 1930’s - 15 to 30 story steel framed Buildings with solid masonry walls

Post-war reinforced concrete flat slab Apartment Buildings (numerous)

Contemporary high rises with curtain walls (Residential and Commercial)

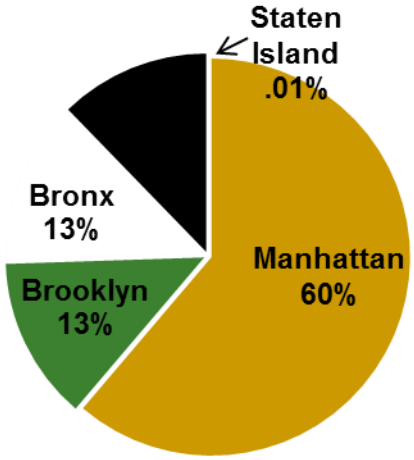
Not in FISP universe of buildings
< 6 story 19th century URM

FISP/ LL Properties

From a total of 1,050,000 buildings citywide, 13,126 must comply with FISP

Total Buildings and FISP Buildings by borough

Borough	Total Buildings	Local Law Facade Buildings	%
Manhattan	47,718	7,913	16.6%
Bronx	106,798	1,735	1.6%
Brooklyn	320,400	1,694	0.5%
Queens	440,311	1,654	0.4%
Staten Island	137,890	130	0.09%

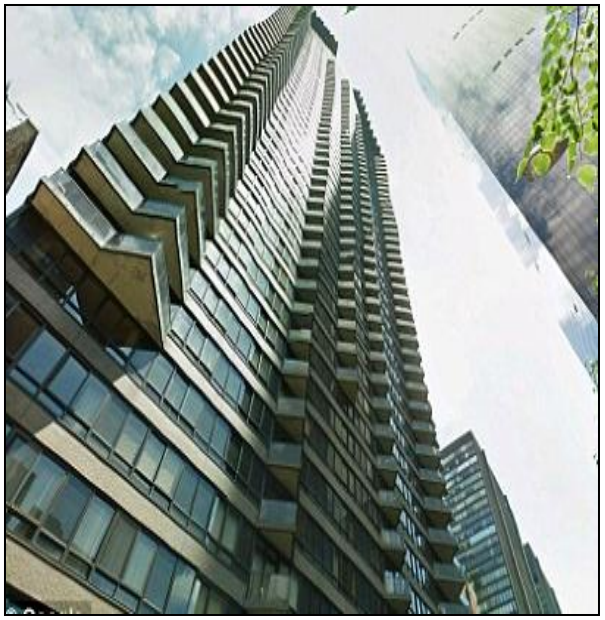


New Buildings must file FISP report five years after receiving a TCO or Certificate of Occupancy

Number of Buildings in FISP/ LL

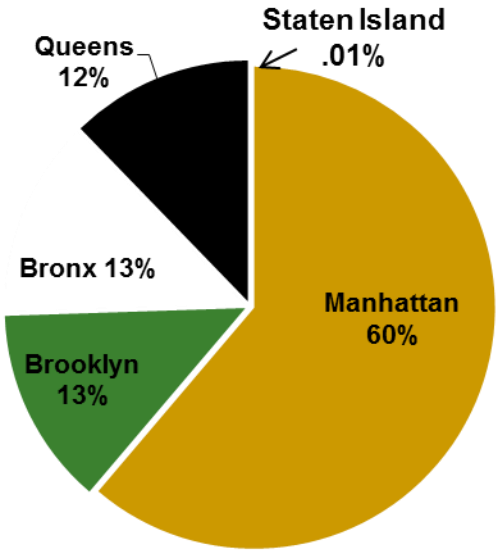
Total number of Buildings = 13,126

Number of buildings
14 stories and below
≈9,604



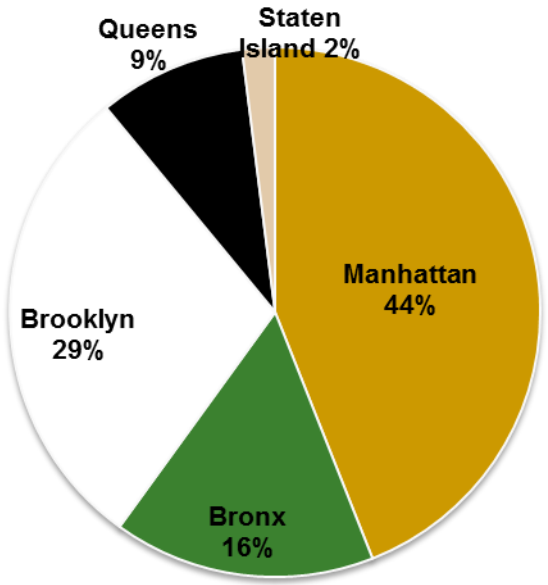
Number of buildings
15 stories and up
≈3,524

TOTAL FISP/ LL buildings / borough



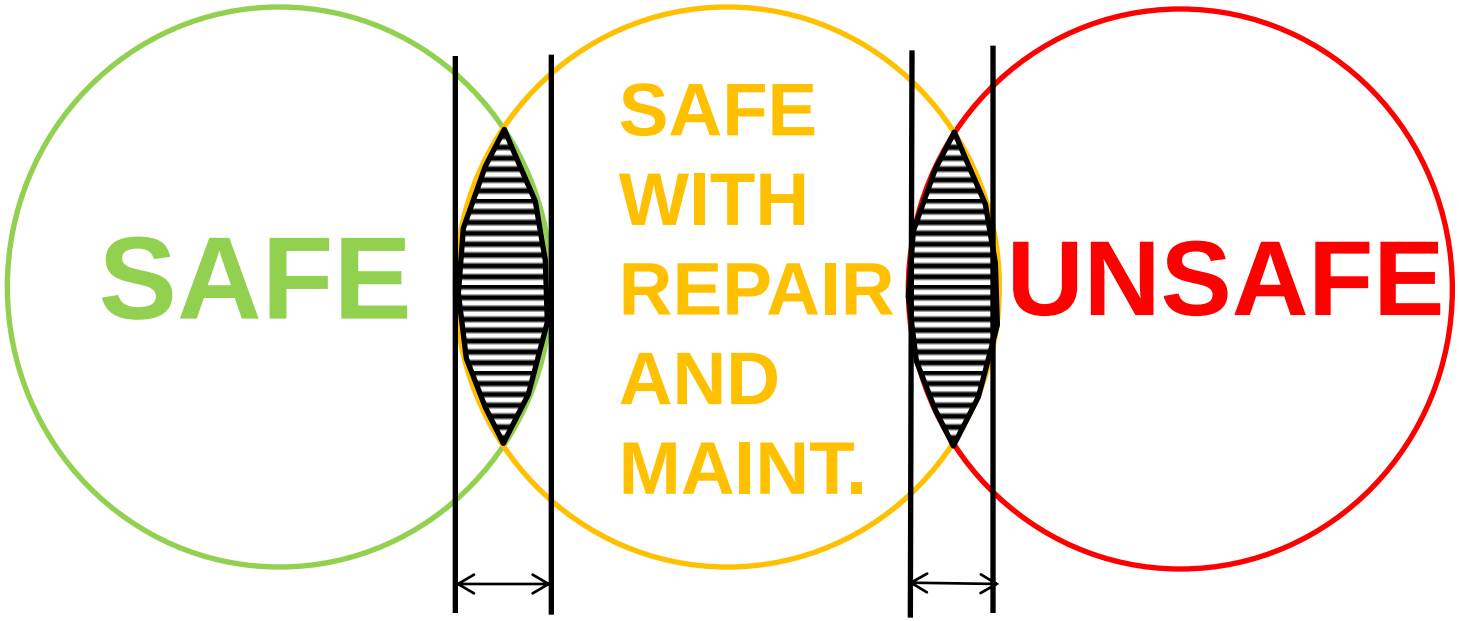
Boro	Totals
MN	7913
BX	1735
BK	1694
QN	1654
SI	130
Grand Total	**13126**

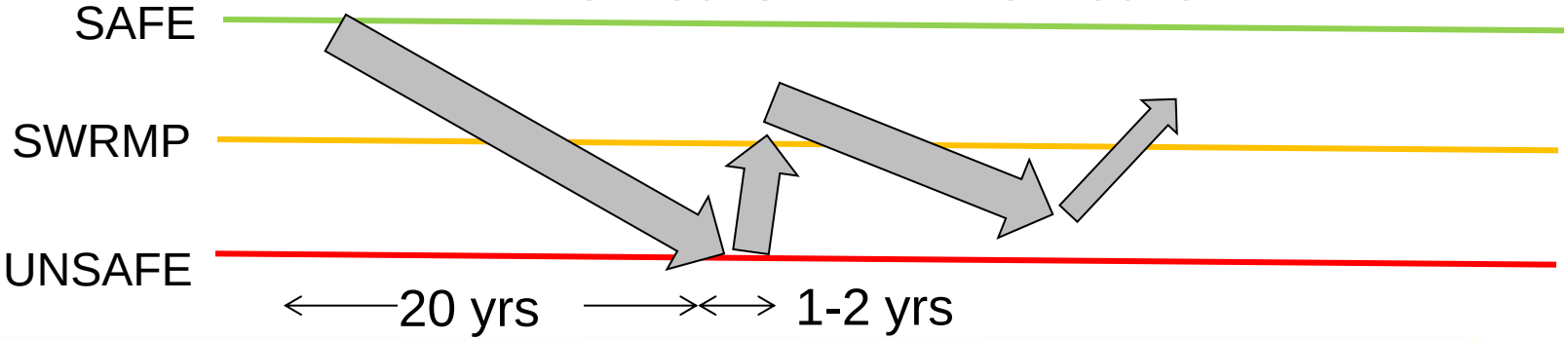
"UNSAFE" status by borough



Boro	Totals	% of total
MN	647	44
BX	231	16
BK	409	29
QN	135	9
SI	44	2
Grand Total	**1466**	

FISP Cycles In Reality





Cycle 7 Amnesty!

NYC Buildings

April 2015

SERVICE UPDATE

Façade Inspection and Safety Program:

Cycle 8 Early Filing Amnesty Program for Non-Compliant Owners (No Report Filed Cycle 7 Owners Only)

In the interest of public safety, the Department of Buildings is offering an Amnesty Program to owners who failed to file (No Report filed - NRF) a Façade Inspection Safety Report (FISP) during Cycle 7. The FISP Cycle 7 reporting period ended on February 20, 2015.

Owners in NRF status during Cycle 7 that are interested in filing an early Cycle 8 report may do so within this amnesty period. Early filing will allow owners to administratively close Cycle 7 with the Cycle 8 report and avoid further violations and fines. All late fees, civil penalties or ECB fines accrued for a failure to file during any previous cycles must be made prior to or at the time of filing.

Program Rules:

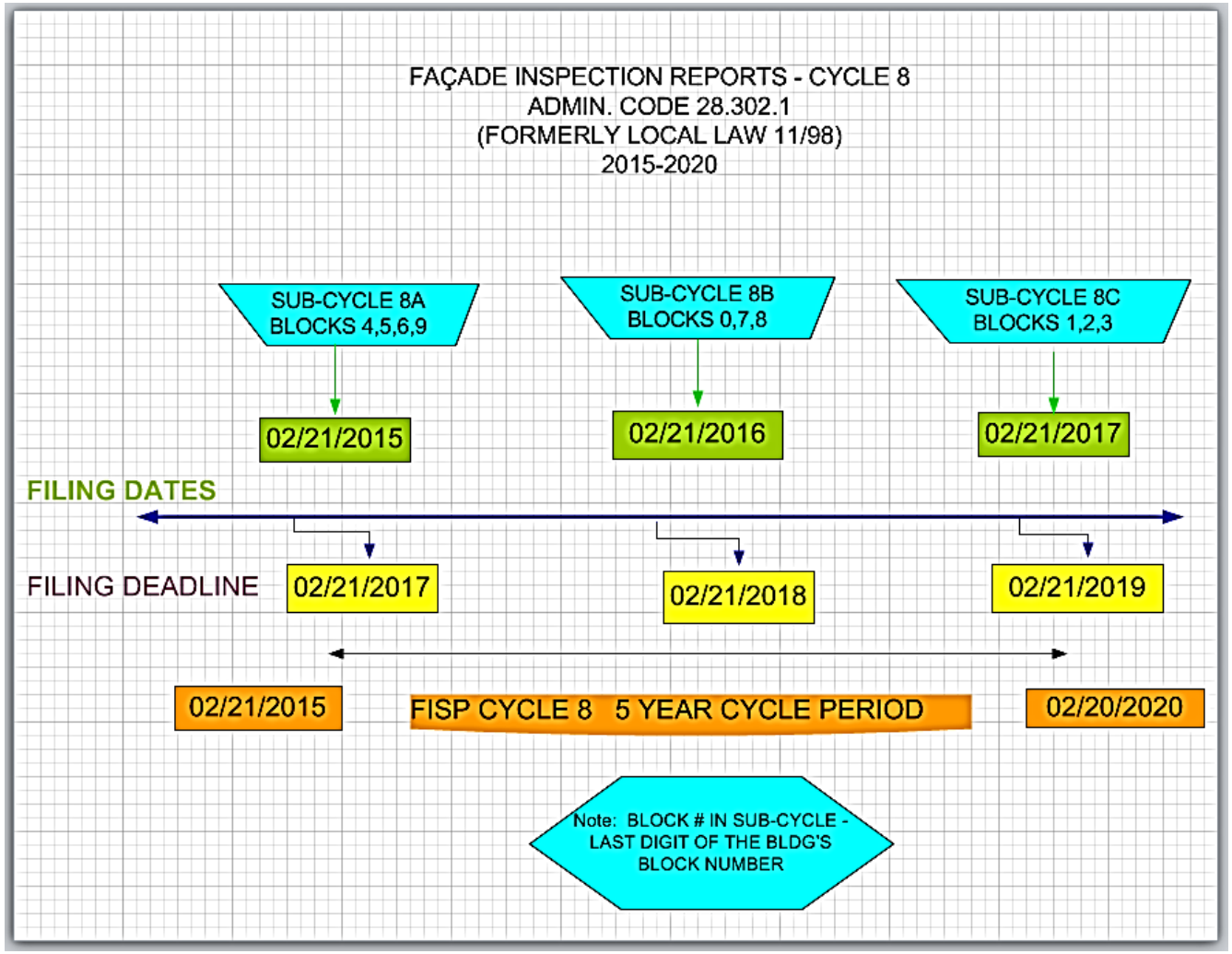
- **The amnesty period will be effective May 1, 2015 through June 30, 2015.**
- The program is open for non-compliant (NRF) Cycle 7 owners only.
- Cycle 7 NRF owners may file during the amnesty period regardless of their assigned Cycle 8 Sub-Cycle (A,B, or C) filing period.
- The standard filing fee is required for the submission of this report.
- No filing fee is required for the administrative closure of Cycle 7.

Fee Schedule – Cycle 8

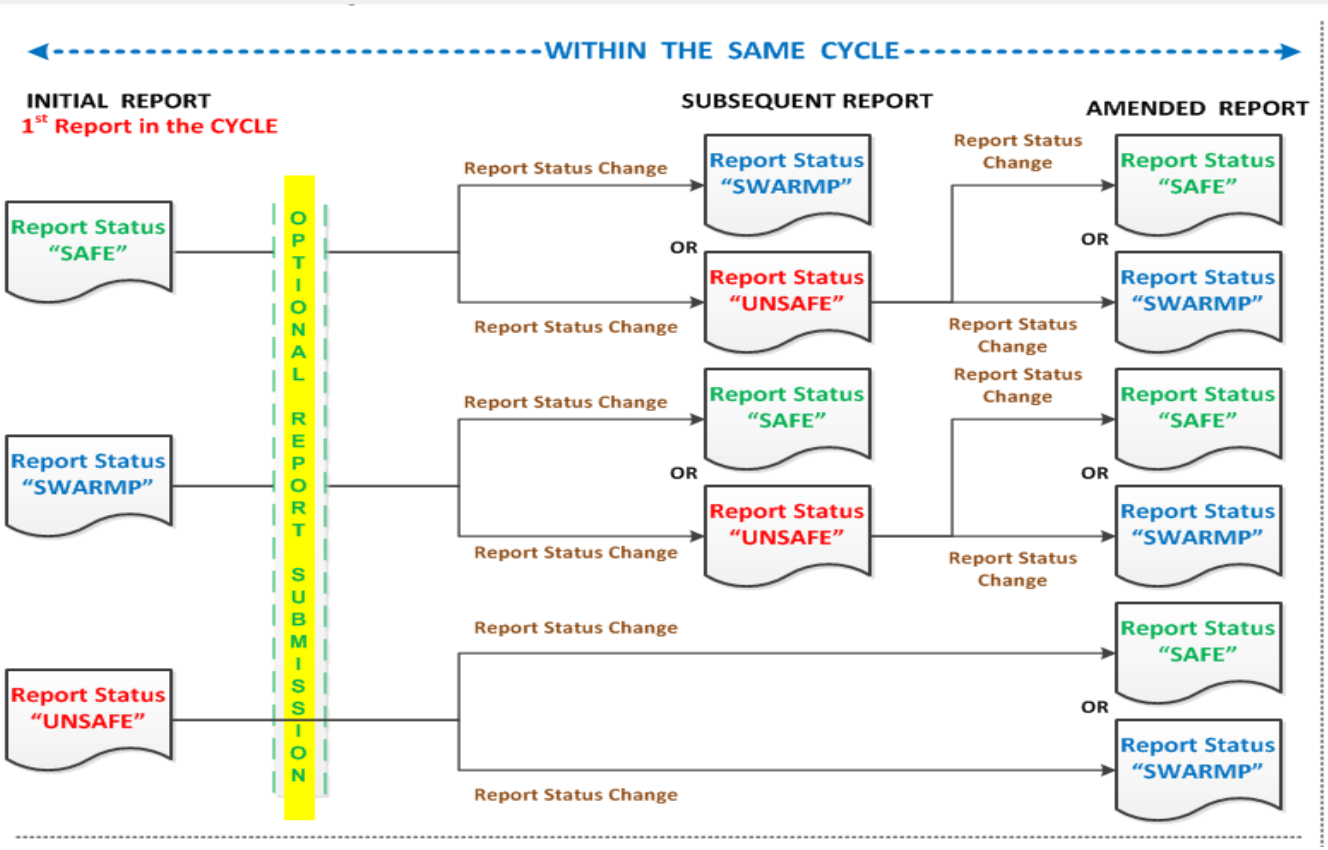
- Initial Filing (Report+TR6)- $265.00
- Subsequent Report- $100.00
- Amended report- $100.00
- Time Extension (FISP1, FISP2)- $135.00
  - Late Penalty (Civil) – ($250.00/ month)
  - Late Filing - $1,000.00 (annually)
  - Failure to correct unsafe condition- $1,000.00 (monthly)

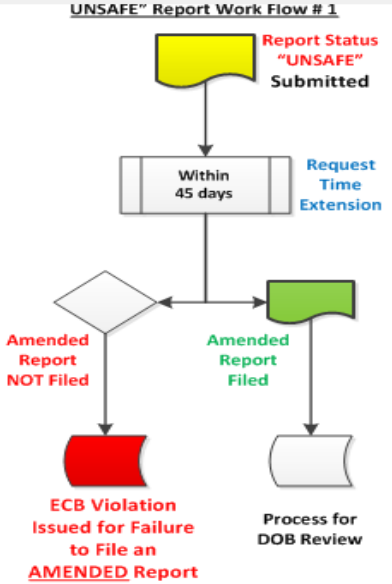
Failure to provide a report during one cycle period can result in a total of $20,000 in fines!

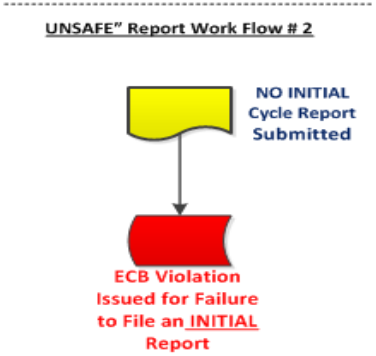
Chronology/Overview of Façade Program - Cycle 8



FISP/LL Report Status Change and Filing Process







Draft 8/24/2012

Shed Removals

Shed removal process per Rule 103-04 (5)(iii)

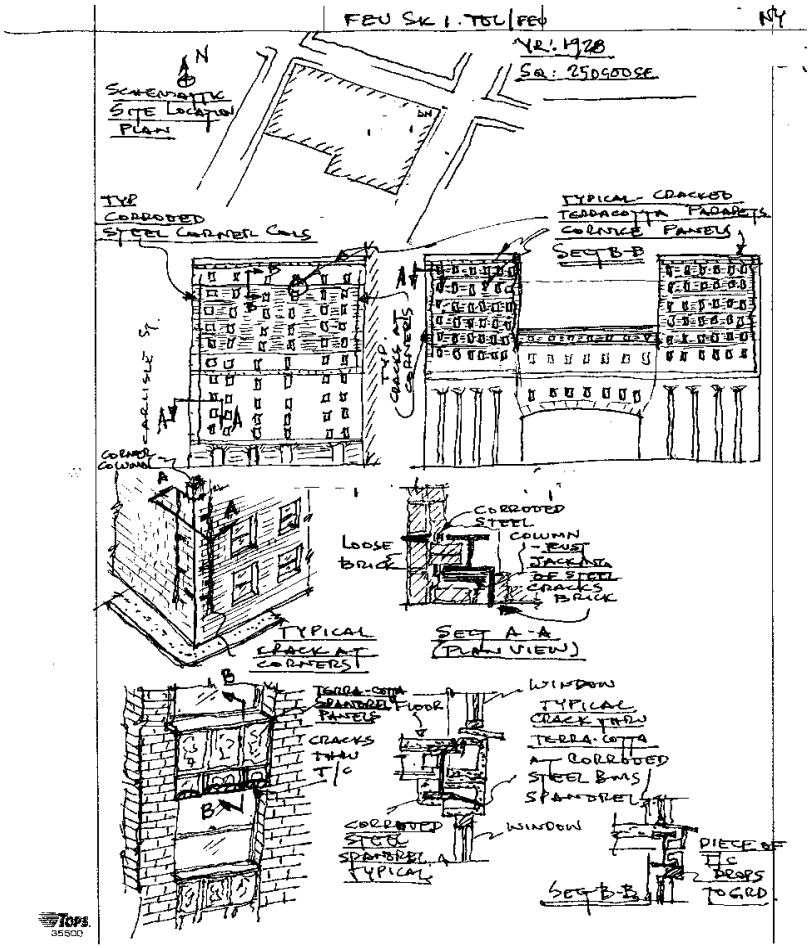
- Step 1 (for unsafe buildings 6+stories)
  - Amended per rule LL11 report is accepted and building is no longer unsafe

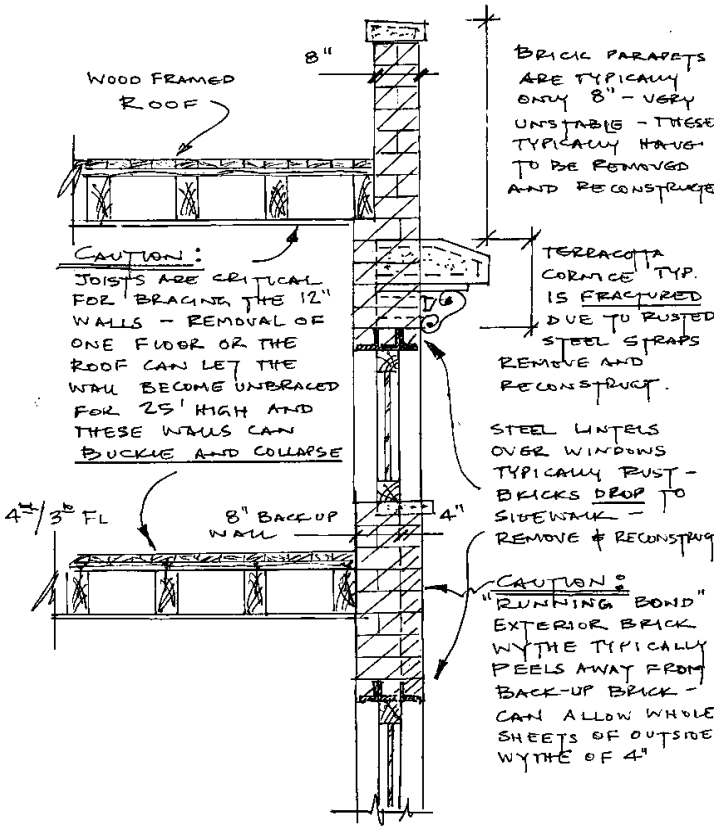
    This is for **total shed removals;** *or*
  - Submit shed removal request to FISP with explanation why amended report cannot yet be submitted

    This is for **partial shed removals**

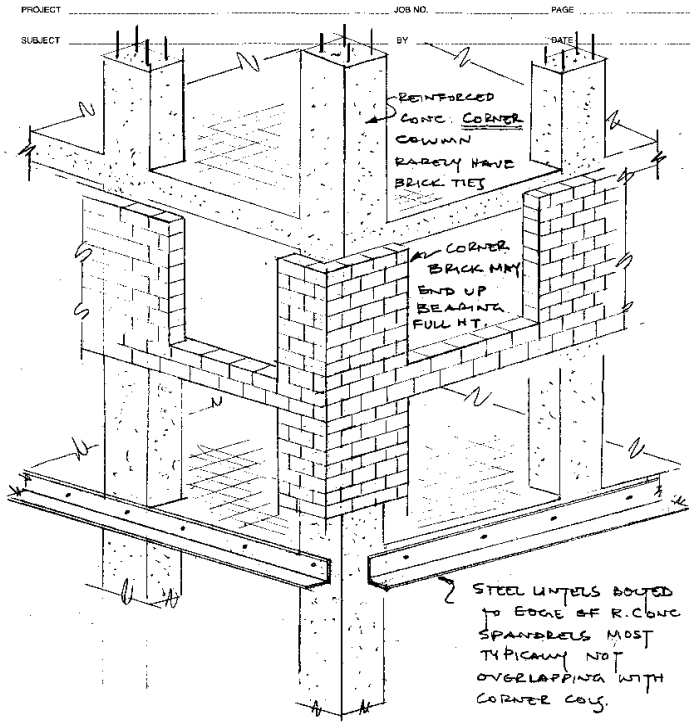
- Step 2 Process shed sign-off Alt 3 through
  - BEST Site Safety (if building is 15+ stories); *and*
  - Borough Ops

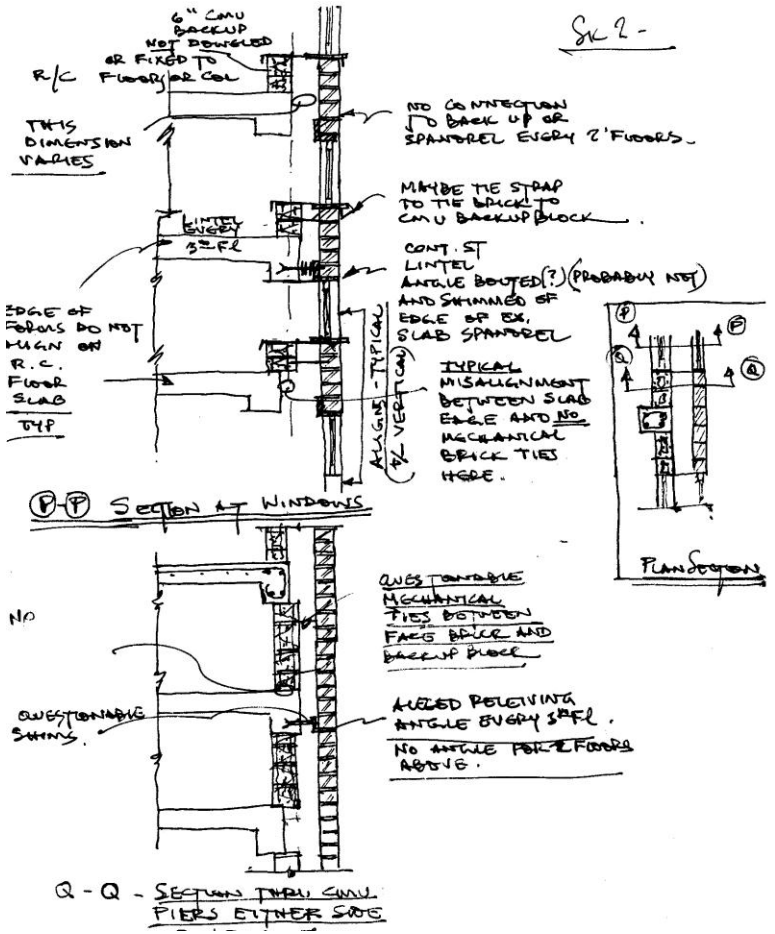
Analyzing the failure





Analyzing the failure





Summary

- History of Façade Laws and Code Requirements
- Age of FISP Building Population
- Cycle 8 Reporting Requirements
- Some examples of Façade Failures

The Safety and Sustainability Connection

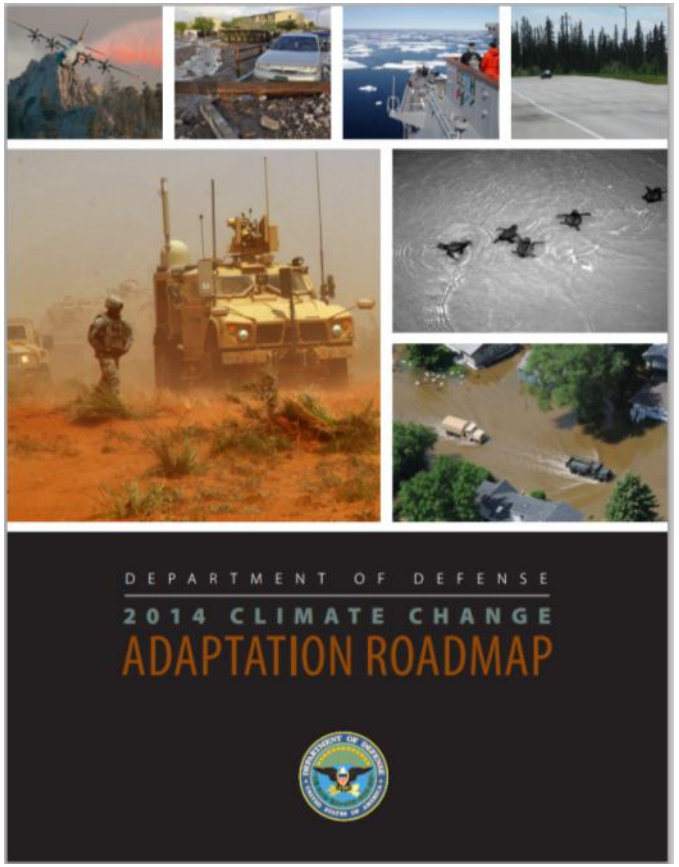
- Building Codes and Public Safety
  - NYC Energy Conservation Code

- Risks
  - Design Phase
  - Construction Phase
  - Post-Construction

Credit: Anders Sandberg, UK, Wikipedia Creative Commons

The Safety and Sustainability Connection

- October 13, 2014 - Secretary of Defense, Chuck Hager, releases the US Department of Defense report, *2014 Climate Change Adaptation Roadmap.*
- Climate Change is a long-term safety and security issue that we must address now.



The Safety and Sustainability Connection

Safety Issues During Design of Sustainable Design Features

“The purpose of this code is… for the regulation of building construction in the city of New York in the interest of public safety, health, welfare *and the environment…*”

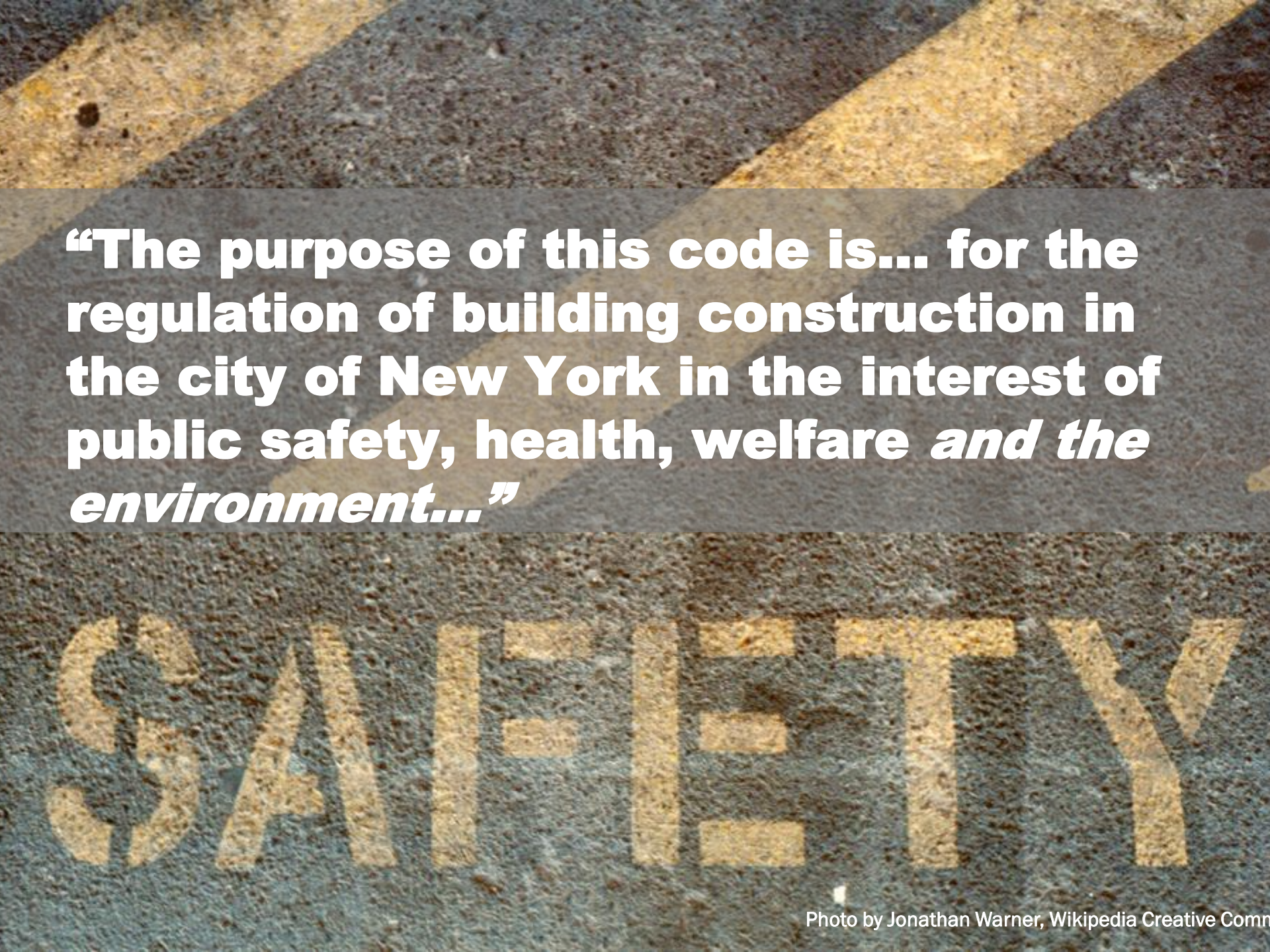


Photo by Jonathan Warner, Wikipedia Creative Comm

The Safety and Sustainability Connection

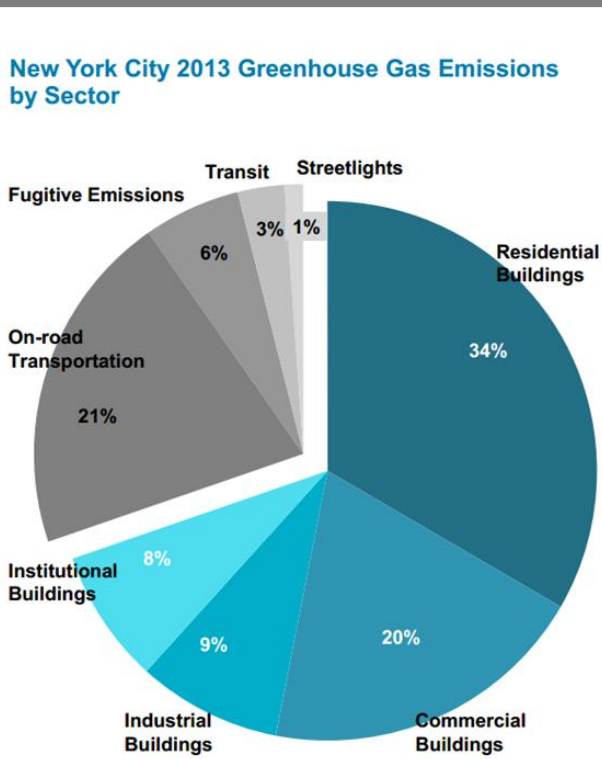
Why do we have an energy code?

41%
Energy Consumption

73%
Electricity Consumption

38%
CO^2e Emissions

The Safety and Sustainability Connection



NYC 71%

CO^2e Emissions

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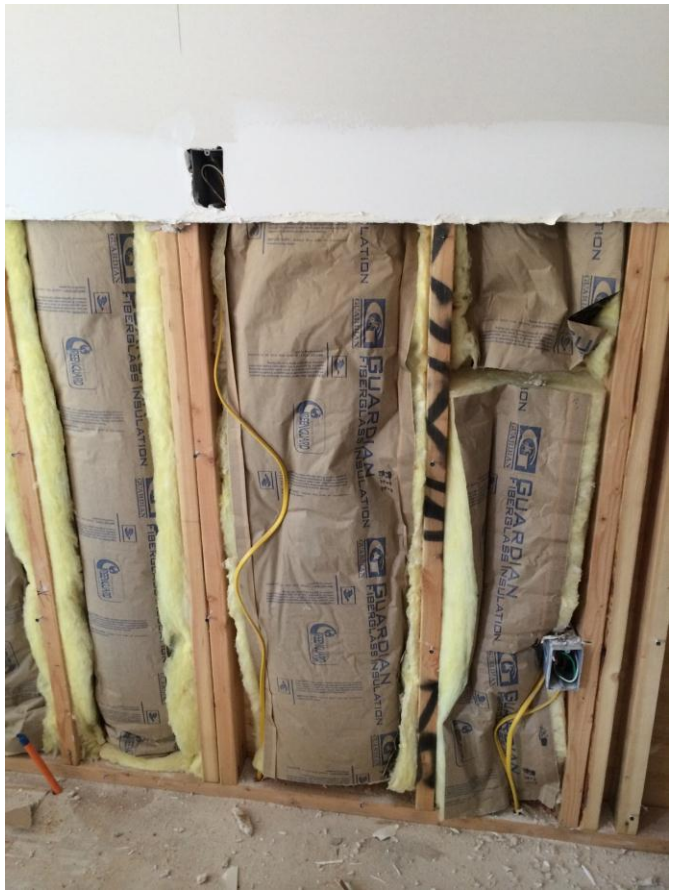
Façade assemblies are regulated by the 2014 NYC Energy Code

- Thermal Performance
- Area of glazing
- Infiltration



The Safety and Sustainability Connection

Energy Code Plan Examinations and Inspections:

- Compliance and Enforcement programs started in January 2014.
  - Applies to all New Building, Alt 1, and Big Alt projects
  - All energy code objections must be resolved prior to approval
  - Energy Code inspections are unscheduled and random
  - Issuing Notices of Deficiency which must be resolved to avoid a partial or full stop work order, no fines

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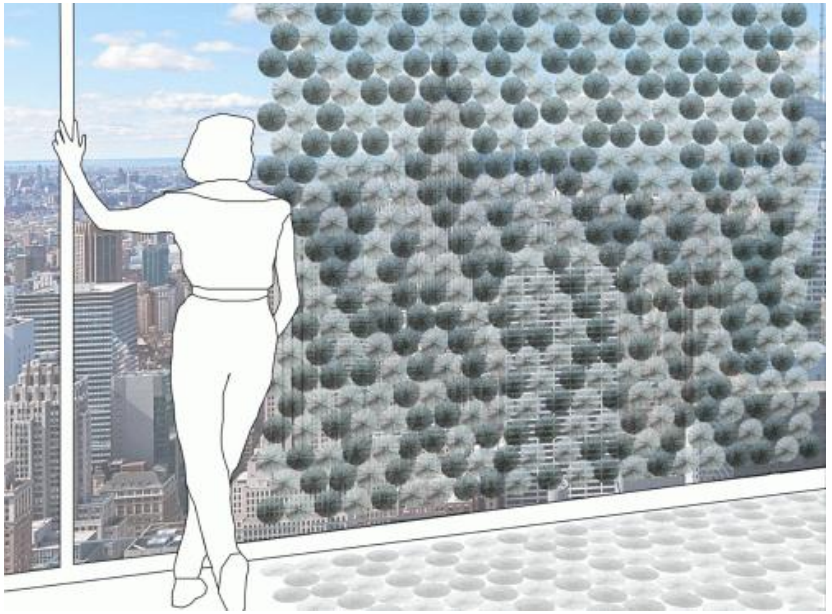
Energy Code Plan Examinations and Inspections:

- Resources:
  - NYC Energy Conservation Code
  - NYC Energy Code Bulletins
  - Energy Code Filing Guide
  - Reach the DOB Sustainability Team:
    - energycode@buildings.nyc.gov

The Safety and Sustainability Connection

Codes do not keep pace with innovation and technology

- Innovation Review Board
- Buildings Sustainability Board
- Office of Technical Certification and Research



Thermal reactive solar screen fabric, developed by Fraunhofer Institute for Machine Tools and Forming Technology IWU

Permission granted to DOB for use.
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LL 87 of 2009- Energy Audits and Retro-commissioning of buildings 50,000 Sq. Ft. and greater:

- Requires an energy audit and retro-commissioning once every ten years.
  - Applies to base-buildings systems that affect energy consumption, including the building envelope
  - Requires submission of an Energy Efficiency Report
  - Fines up to $48,000 for not submitting

Do-it-yourself Balancing (photo by DOB)

The Safety and Sustainability Connection

Safety Issues during Construction of Sustainable Design Features

Chrysler Building crown, by Postdlf (Wikimedia Commons)

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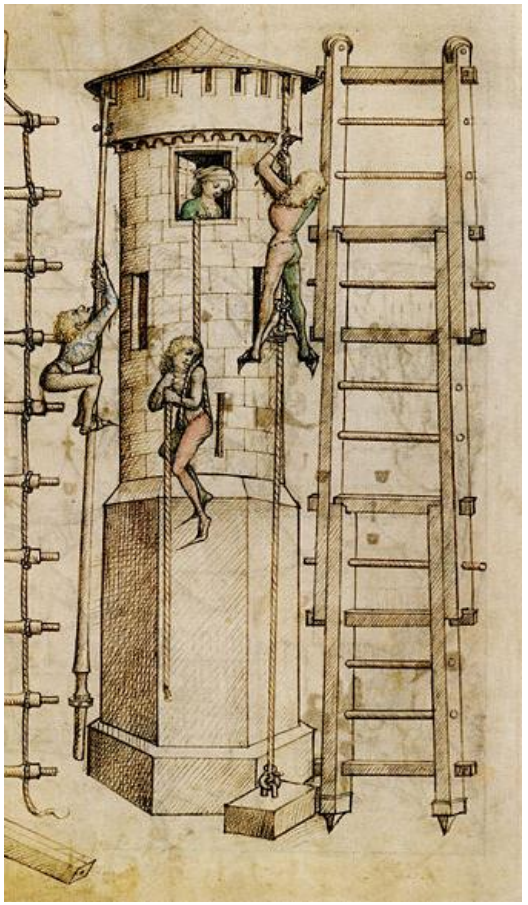
"Perceived" risks of sustainable design for builders:

- Skylights and solar panels increase fall events
- Lighting controls means more time on ladders, which means more injuries
- Sorting waste materials leads to more injuries (cuts and lacerations)
- Reflective roofing causes eye-strain in workers



Source: EHS Today, *"Green" Construction Workers May Face Additional Safety Risks,* November 30, 2011

The Safety and Sustainability Connection

- Safety is just as important on “sustainable” construction sites as it is for conventional construction, *there is no difference*.
- Different trades and types of installations call for proper safety equipment, protection, and protocol.
  - Follow OSHA requirements
  - Follow safety plans and protocol
  - Chapter 33

"Fall protection Leblanc Construction 2012" by National Institute for Occupational Safety and Health (Wikimedia Commons)

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Safety Issues Post-Construction and in Existing Buildings

Real risks- sustainable design features and energy efficiency measures can impact safety if not executed with due care

- Complexity and increased stringency of the New York City Energy Code
  - Shading devices
  - Analysis of existing walls before alterations
  - Façade replacement challenges

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Shading Devices

- NYCECC Code allows use of a projection factor in the performance path under ASHRAE 90.1
- NYC Zoning Resolution allows solar shading devices as-of-right within certain limitations
- Many buildings are beginning to take advantage of these components to control solar heat gain

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Concerns

- Energy code has increased the requirements for continuous insulation and better solar control
- Encourages the use of solar shading devices, which are more effective on the exterior of the building

Photo by Eden, Janine, and Jim (wikimedia commons)

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Snow and Ice Hazards

- 15 people in the US die each year from injuries related to snow and ice falling from buildings
  (Death in Society Research Foundation)
- Ice has always been a problem and is difficult to predict or control
- Improved thermal performance in buildings means there is more opportunity for ice to form rather than melt, as surface temperatures of the building skin are lower

Source: Editor, Chicago Architecture Blog, Dec. 2011

The Safety and Sustainability Connection

Insulation of existing walls in alterations

- 2014 NYCECC now requires:
  - R-9.4 ci (not group r)
  - R-11.4 ci (group r) in mass walls
- 2007 ECCCNYS required:
  - R-5 ci or R-11 in framing
- When is insulation of existing walls required?

Image by Nashville neighbor, Wikimedia Commons

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Insulation of existing walls in alterations undergoing a change of use

- Exposed cavities that are not insulated require insulation, but must be evaluated
- Insulation has a significant impact on thermal performance, but won't perform as expected if compromised by air-flow or moisture migration

Image by Mok9, Wikimedia Commons

The Safety and Sustainability Connection

Insulation of existing walls in alterations undergoing a change of use

- Exposed cavities that are not insulated require insulation, but must be evaluated
- Insulation has a significant impact on thermal performance, but won't perform as expected if compromised by air-flow or moisture migration

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Thermal performance of existing mass masonry walls

- Energy Code does *not* mandate that insulation be added to solid masonry construction
- Older brick must be analyzed before adding insulation
  - Visual and destructive testing to determine structural integrity
  - Identify and remedy any moisture problems
  - Review all structural connections

Photo by Oula Lehtinen (wikimedia commons)

The Safety and Sustainability Connection

Buildings Bulletin 2011-015- Envelopes

Part 3: "…However, in accordance with Section 101.4.3 of the NYCECC, certain types of alteration, renovation or repair work related to the building thermal envelope need not comply with the provisions of the NYCECC if the applicant can demonstrate that such NYCECC compliance would create a hazardous or unsafe condition or would overload an existing building system."

The NYCECC allows trade-offs to achieve efficiency by other means.

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Dealing with low-performance envelopes

- Many Mid-century mid- and high-rise buildings have low-performance façades that will be costly to replace, nearing the end of their life-span
- Re-fitting vs. Over-cladding vs. Re-cladding
  - Zoning envelope restrictions
  - Loss of lease income
  - Structural limitations
  - Code challenges

Photo by (wikimedia commons)

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Dealing with low-performance envelopes:

- Single-paned glazing compromises energy performance and thermal comfort of the occupants
  - Structural system may not be sufficient to resolve increased loads of modern curtain wall with insulated glazing units
- Compare the pros and cons of over-cladding with demolition of old curtain wall systems
- Tall structures provide an opportunity to utilize double-skin configurations

Photo by "United Nations, New York". Licensed under CC BY 3.0 via Wikipedia

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FISP/LL11 is an opportunity to improve energy performance and evaluate the safety of a façade

- Evaluate and replace deficient sealants
- Evaluate and replace poorly performing windows and storefront
- Re-point masonry as necessary and review for moisture problems

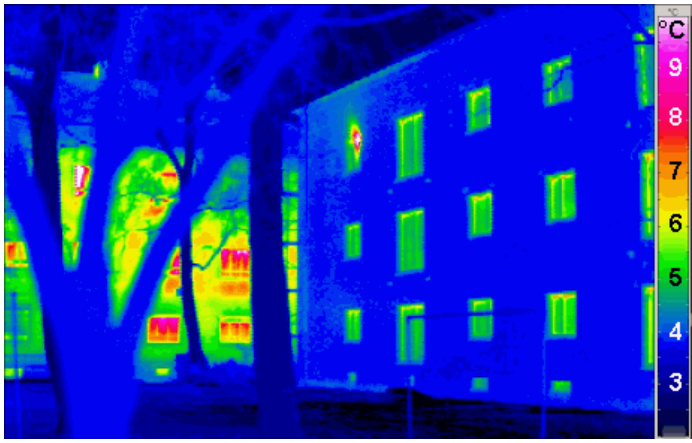

Photo by Passivhaus Institut (wikimedia commons)

Questions?

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