

Memorandum

To: NYC Department of Sanitation
From: *Sam Schwartz*
Date: April 18, 2016
Re: Private Carting Study – Final Safety Findings & Conclusions

The safety component of this effort focused on three sources: publicly available safety data, interviews, and a review of training materials. The safety data analysis was intended to provide a foundational understanding of the breadth and depth of safety incidents, while the interviews and training materials review would provide additional qualitative information in an effort to develop a well-rounded understanding of safety challenges and opportunities in private hauling. Initially, the project sought to identify potential relationships between challenges identified through the data analysis and training/adherence to policy. However, the low frequency of private hauler incidents found in any of the datasets and limited availability of training materials made this difficult. The results did, however, identify some opportunities for improved safety efforts and raise some questions about the reliability of these publicly available safety datasets as a tool for understanding private hauler safety.

It is important to note that given the size and scope of this effort, these results should be viewed as initial information with the potential to develop a more detailed understanding primarily through additional interviews.

PRIVATE CARTING SAFETY DATA ANALYSIS

This analysis considers private carting safety from two perspectives – traffic safety and labor safety. Traffic safety focuses on incidents occurring between a vehicle (truck) and other road users (vehicle occupants, pedestrians, and bicyclists) as well as single-vehicle incidents. Labor safety focuses on incidents that do not necessarily involve a vehicle in any capacity. Labor safety includes issues such as injuries sustained when emptying containers, dismounting from the vehicle, etc. It is important to recognize that the datasets used for these analyses include only reported incidents. It is also important to note that they include incidents that occur at transfer stations owned by the private hauling businesses in addition to incidents associated with roadway travel.

TRAFFIC SAFETY ANALYSIS

The initial analysis plan included consideration of both crash and citation data. However, due to limitations on the availability of citation data and the timeline for this project, this report includes only an analysis of crash data. Citation data may be available for future analysis through a Freedom of Information Law (FOIL) Request to the New York State Department of Motor Vehicles.

Crash Data Analysis

This analysis considered The subset of NYC Crash Data involving private carters between January 1, 2010 and December 31, 2014 provided by NYC Department of Transportation (21 crashes). Although this is the most reliable crash data available, it should be noted that the interviews discussed later in this memorandum indicate that minor crashes are more commonplace than the crash data indicate.

In an effort to better understand the nature of these private carting crashes and their severity, the fields in Table 1 were considered. It is also important to note the small number of crashes in the private carting subset; this makes it somewhat difficult to draw broad conclusions about these crashes since there are relatively few to analyze.

Table 1. Crash Data Analysis Fields

Crash Factors	Temporal Factors	Driver Factors	Roadway/Environmental Factors
Action prior to crashes Accident type Second harmful event Collision type Number of vehicles Pedestrian involvement Contributing factors	Crash month Crash day Crash time	Driver age Driver sex	Intersection related Traffic control type Road owner (state or city) Roadway characteristics Road surface condition

Below are the findings from the analyses that yielded meaningful results. Analyses of the other fields yielded results that did not provide any additional insight (e.g., crashes were evenly distributed across options within the field) or where there were too many crashes with unknown information for the field to be adequately considered.

Crash Circumstances

The most noteworthy finding of this analysis is related to injury severity.

- Eighteen (86 percent) private carter crashes were fatality or injury crashes, meaning at least one person involved in the crash was killed or injured.

- Considering only the most serious crashes (fatal crashes), 5 (24 percent) private carting crashes resulted in a fatality.
- These findings related to severity are interesting when considered along with the interview results (discussed in greater detail on page 11). All of the drivers interviewed indicated they had been involved in at least one minor crash. Given the lack of these minor crashes in the crash database, it is possible that they are not being reported, resulting in an increased percentage of serious crashes for private carters.

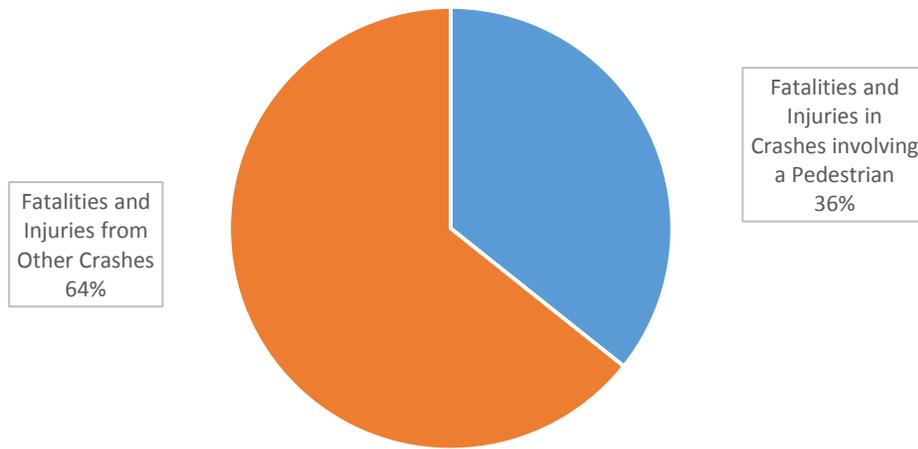
Eleven (52 percent) private carting vehicles were “Going Straight Ahead” prior to the crash. Six (29 percent) were turning left (5) or right (1) prior to the crashes. Three (14 percent) were parked and action prior to the crash was unknown for one crash. More than one-half (57 percent) of crashes occurred at an intersection. Of those, 10 of the 12 crashes occurred at signalized intersections.

Crash Involved Parties

Nearly one-third of private carting crashes were collisions with a pedestrian. It is not possible from the data to determine specifically that it was the pedestrian who was killed or injured in the private carting pedestrian crashes resulting in an injury or fatality, however given the mismatch between a private carting vehicle and a pedestrian it is fair to believe it was the pedestrian who was killed or injured.

- Ten (36 percent) private carting crash fatalities and injuries were from pedestrian-involved crashes, as shown in Figure 1. Three (50 percent) private carter pedestrian crashes involved a pedestrian crossing with the signal. Two of the remaining private carter pedestrian crashes involved a pedestrian crossing against a signal or taking other actions in the roadway. Pedestrian action was unknown for the remaining crash.

Figure 1. Private Carting Crash Fatalities and Injuries – Pedestrian Involvement



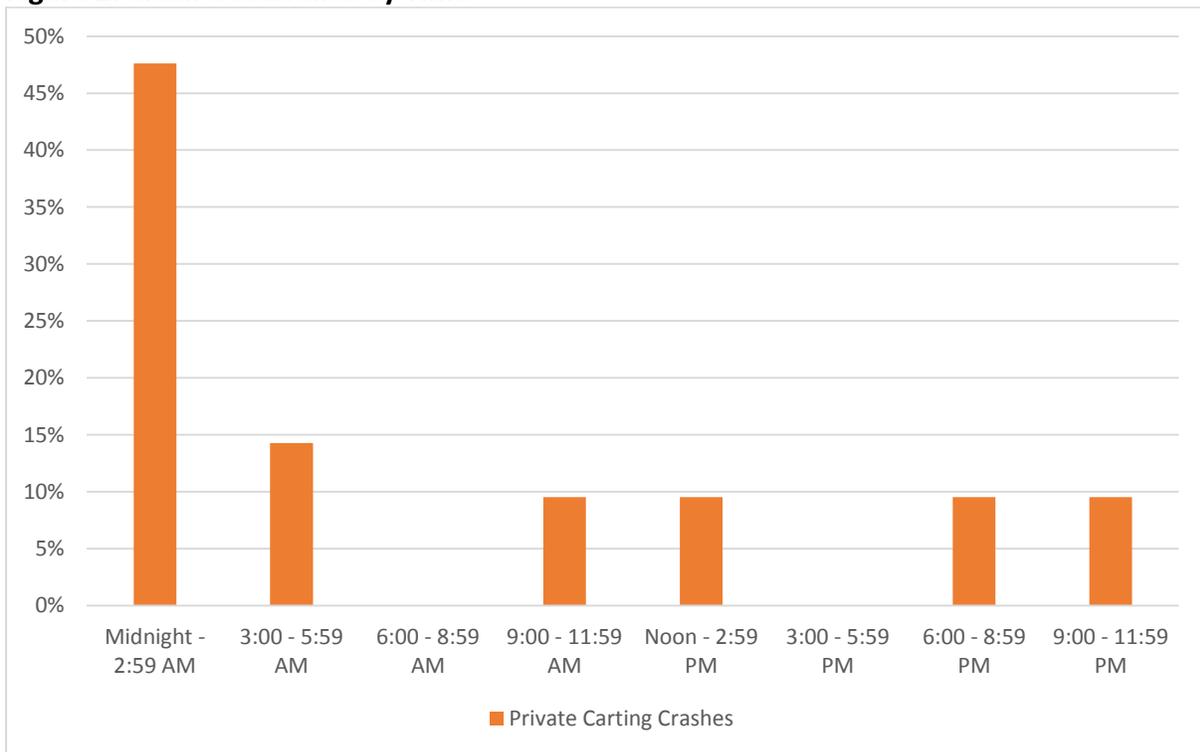
The remaining two-thirds of the private carting crashes involved a collision with another motor vehicle.

Private carting drivers involved in crashes ranged in age from 20 to 60 years old and all were males.

Temporal Factors

Thirteen (62 percent) private carting crashes occur between midnight and 5:59AM, which coincides with the most common hours for private carting operation. Sixteen (76 percent) private carting crashes occurred on dark roads with lighting. This associates closely with 71 percent of private carting crashes taking place between 9:00PM and 5:59AM. This temporal distribution for private carter crashes is shown in Figure 2.

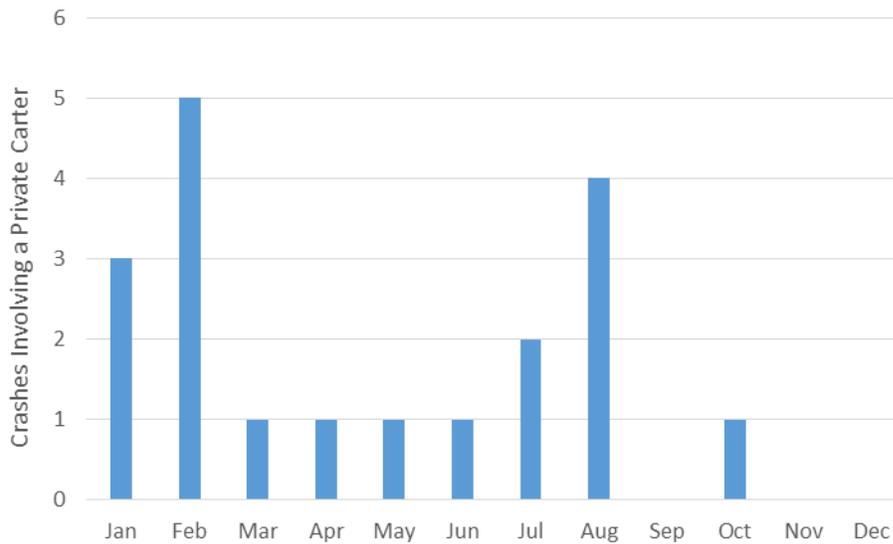
Figure 2. Crash Occurrence by Time



When considering day of week in combination with time of day, five (24 percent) private carting crashes happen on weekend nights defined as Friday 9:00PM through Saturday 5:59AM and Saturday 9:00PM through Sunday 5:59AM.

Over the course of the five year study period, February had the most private carter crashes (5) followed by August (4), January (3), and July (2). March, April, May, June and October each had one crash and none occurred in September, November or December, as shown in Figure 3.

Figure 3. Private Carter Crashes by Month, 2010-2014



Traffic Safety Analysis Conclusions

Key takeaways from the crash analysis are the following:

- **Crash severity:** Although the frequency of reported private carting crashes is small, the associated severity of these crashes is notably higher than for all NYC crashes. For private carting crashes, fatal and injury crashes accounted for 86 percent of private carting crashes.
- **Pedestrian Involvement:** Fatalities and injuries in private carting crashes involving a pedestrian accounted for 36 percent of all fatalities and injuries in private carting crashes.
- **Time and Day of Week:** Most private carting crashes happen at night, with 52 percent taking place between midnight and 5:59 AM. Furthermore, nearly 25 percent of private carting crashes occurred on weekend nights (Friday 9:00PM through Saturday 5:59AM and Saturday 9:00PM through Sunday 5:59AM).

LABOR DATA

The US Department of Labor Occupational Safety and Health Administration (OSHA) has two primary datasets of potential interest for this project: OSHA Data Initiative (ODI) data and Enforcement Data.

- ODI data provides information on days missed or on restricted duty due to injury or illness. For each data collection cycle, OSHA only collects data from a small portion of all private sector establishments in the United States (80,000 out of 7.5 million total establishments). Therefore, it can be difficult to draw broader industry conclusions from these data and a comparison of private carting to DSNY is not possible. Results from the ODI analysis are included below.

- Enforcement data includes Accident, Inspection, and Violation data. Accident data does not include establishment name so it was not possible to differentiate between the Private Carters of interest for this study and all other geographies/industries. It should also be noted that this data includes both the carting and transfer station components of these business operations, as there was no way to separate the two. The violation data file was corrupt and therefore not usable. The results included below focus on the inspection data which included the necessary information.

ODI Establishment Specific Injury and Illness Data

This analysis examined OSHA's Establishment Specific Injury and Illness Data, work related injury and illness data from employers within specific industry and employment size specifications from 1996 through 2011. For the purposes of this project, the analysis focused on the most recent ten years of data (2002 through 2011). Fields in this dataset include the establishment name and address, as well as three variables of interest to this project:

- Total Case Rate (TCR);
- Days Away Restricted or Transferred (DART); and
- Days Away from Work, Injury and Illness (DAFWII).

The analysis divided the total population available in the dataset into two categories: 1) Master Haulers based on the list used for the other project analyses, and 2) all other establishments. There were 86 records for Master Haulers and 646,365 records for all other establishments.

The analysis considered average days of TCR, DART and DAFWII for the total 10-year period as well as average days each year to identify potential trends.

When considering the average days for the entire 10-year period, there is little difference between the average days DART for Private Carting – Master Haulers and all other establishments. Private Carting – Master Haulers had a smaller average total case rate but a higher average days DAFWII, as shown in Table 2.

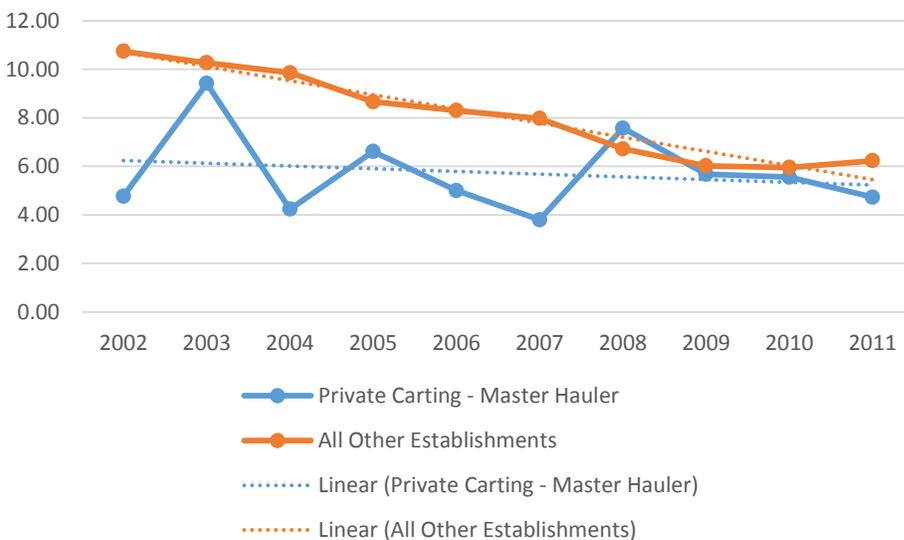
Table 2. Average TCR, DART, and DAFWII Days (2002-2011)

	Average Days TCR	Average Days DART	Average Days DAFWII
Private Carting – NYC Master Haulers	5.53	4.47	4.24
All Other Establishments	8.06	4.78	2.49

The analysis then considered averages for each year over the course of the 10-year period to identify potential trends. The following graphs are a visual representation, including a linear trend line to help understand the general direction of the lines, which is especially important with the Master Hauler line as it varies more dramatically from one year to the next for all three fields. It is important to note the substantial differences in the sample sizes for each of these populations. The larger size of the All Other Establishments population is likely to display less dramatic changes annually and allows for smoothing of trends that might be more visible with a smaller size group.

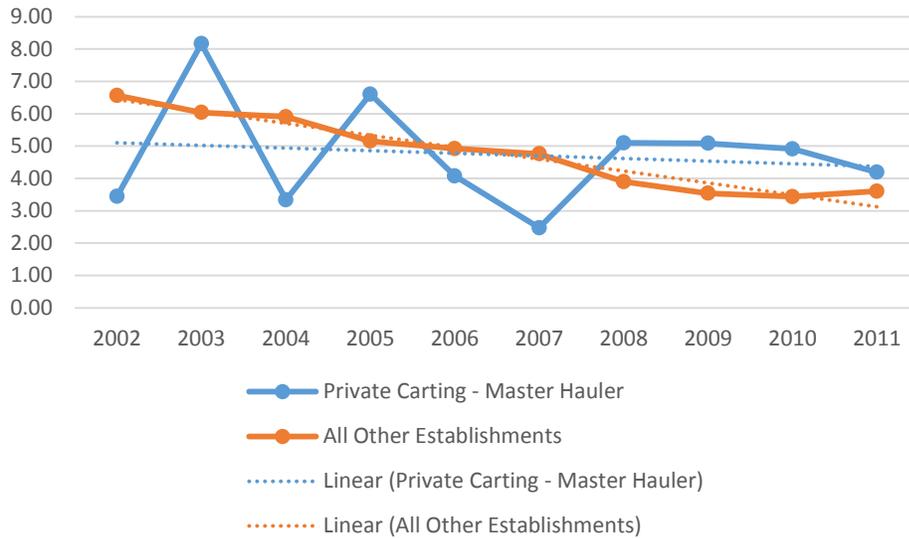
When considering average annual TCR, the Private Carting – Master Hauler and All Other Establishments both have trend lines that indicate a decrease in average annual TCR between 2002 and 2011, as shown in Figure 4. The decrease for All Other Establishments trendline is visible from just above 10.0 to just below 6.00 while the decrease for Private Carting - Master Haulers is slight. This graph also shows that with the exception of 2008, the TCR for Private Carting – Master Haulers was lower than for All Other Establishments.

Figure 4. Average Annual Total Case Rate



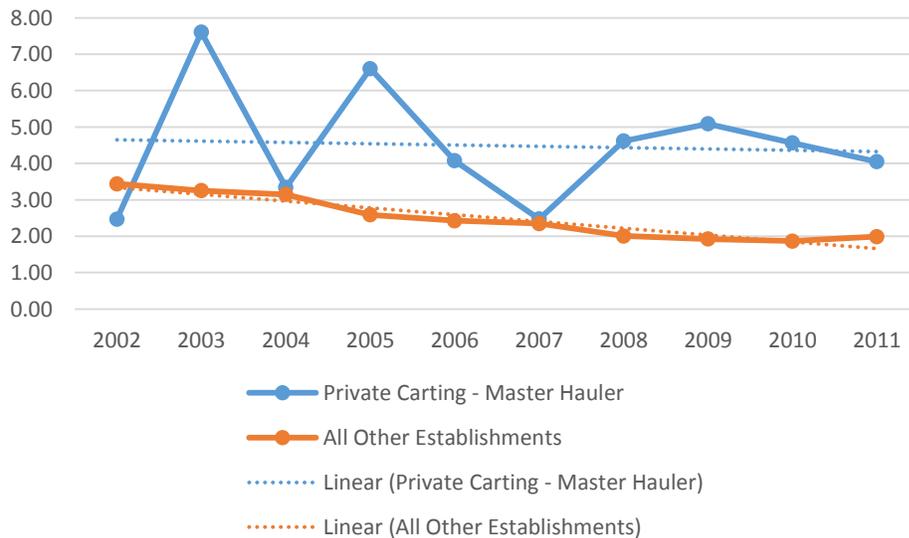
Similarly, there was a similar downward trend in average annual days DART for both Private Carting – Master Hauler and for All Other Establishments, shown in Figure 5. Again, the decrease is greater for All Other Establishments than for Private Carting – Master Haulers.

Figure 5. Average Annual Days Away, Restrictions and Transfers



Lastly, average annual days DAFWII also shows downward trends for both the Private Carting – Master Hauler and the All Other Establishments groups, as shown in Figure 6. This graph also shows the greater average annual days DAFWII for Private Carting – Master Haulers than All Other Establishments.

Figure 6. Average Annual Days Away From Work



Enforcement Data – Inspection

This data covers inspections dating back to the mid-1970s. For this analysis, data was limited to 2011 to 2015. This five-year data included 473,986 inspection records in this dataset, of which ten were for private carting companies on the same Master Hauler list used for the ODI analysis. Given the small number of records, especially in relation to the total number of records in the dataset, the results of this analysis should be considered as informational, with no value as representative of the broader private carting industry. Again, it should be noted that this data includes both the carting and transfer station components of these business operations, as there was no way to separate the two.

- None of the private carters received advanced notice of the inspection
- Nine of the 10 inspections were for safety, one for health.
- Four of the inspections were planned regular inspections, three were the result of a fatality or catastrophic event, two were the result of referrals and one was the result of a complaint.
- Six of the inspections were completed and three were partial. In one case a planned inspection was not conducted because the establishment had 10 or fewer employees.
- Union representation was present during three of the inspections.

Labor Safety Analysis Conclusions

It is difficult to draw broad conclusions from the available labor data but there are some observations of interest.

- Private Carting – Master Haulers had a smaller average TCR but a higher average days DAFWII.
- General trends indicate that the average annual TCR, DART and DAFWII decreased between 2002 and 2011 for both private carting and other establishments. The trend line for all other establishments indicates a greater decrease over the 10-year period than the trend line for Private Carting – Master Haulers for TCR, DART and DAFWII.

PRIVATE CARTING SAFETY INTERVIEWS

Recognizing that the data analysis includes only reported incidents and focuses on potential safety challenges, this project included a series of interviews. These interviews were intended to provide a snapshot understanding of private carting safety issues from a variety of perspectives. A total of 8 interviews were conducted with the following representation:

- Large private hauling company driver;
- Large private hauling company supervisor;
- Mid-size private hauling company driver;
- Mid-size private hauling owner;
- Small private hauling company driver; and
- Labor advocates.

Questions focused on safety training, the importance of safety at all levels within the company/industry, most common injuries and associated days off, and an opportunity to share any other relevant information. Responses have been aggregated to provide an overview of interview results.

Training

Both private carting employees and labor advocates indicated that safety training is offered primarily at larger companies. Small and mid-size companies are less likely to have standardized safety training and may rely on current drivers and helpers to train new employees. Small and mid-size companies also indicated that many of their personnel are coming from other private hauling companies and therefore have some safety experience at the outset. Labor advocates indicated that in some cases, not only do the smaller companies not have safety training, they may not be providing safety equipment such as reflective vests and other protective garments for their employees. One of the large company employees also indicated that as the company has grown in size, the safety program has expanded and been formalized.

The large company employees, both of whom work for the same company, indicate that they receive video-based safety training as part of their orientation. They may also be required to ride with a senior driver for a week depending on their experience prior to joining the company. Employees are also required to attend monthly safety meetings that are approximately an hour in length. These monthly meetings address incidents that have occurred in the preceding month as well as key safety topics. They have also recently introduced a safety university designed for seasoned drivers as well as newer drivers.

One of the mid-size companies also indicated that they have safety update meetings every one to two months. At these meetings, safety updates are provided by company management as well as external speakers from OSHA and other similar organizations. These meetings address changes/updates in safety practices as well as incidents that have occurred since the last meeting.

This large company also has supervisors follow drivers on their routes without notice. The supervisor uses the truck GPS to determine where they are and will follow them for approximately 30 minutes to identify any potential safety issues which are then discussed with the drivers. These routine spot checks consider not only driver and helper actions but also documentation. Drivers are written up for safety infractions; after two write-ups, the union is notified. The supervisor indicated that second write-ups are uncommon as the first one serves as an effective reminder/deterrent.

This project also included a review of some available safety training materials. Results of that are available on page 15.

Safety Culture

All of the interviewees indicated that safety was of utmost importance. There was some variation, however, in the importance they felt their peers and supervisors place on safety. The employees of the large company, where safety training is mandatory and regular, indicated that safety is also of utmost importance to peers and supervisors. Other employees and labor advocates indicated varying levels of importance on safety, replaced primarily by importance

placed on efficiency. Labor advocates noted that in many cases, employees are paid a set amount for a route, regardless of how long it takes to complete. Completing the route more quickly results in a higher hourly rate for the employee and efficient teams have the potential to earn their supervisors a bonus for being able to complete more work in a shorter period of time.

One driver spoke of a previous company where retaliation was an issue. Workers were deterred from reporting safety incidents by being given the most difficult routes if they did. He said he stayed with the company because the job market was difficult and he needed to work to feed his family. When the opportunity to take a similar position for another company was offered, he took it. He said that leaving after 10 years with that company has given him perspective and he realizes now how he had been affected by that environment; he was willing to look the other way and was adopting their poor safety attitude because he needed the job.

The mid-sized and smaller companies who also expressed a commitment to safety indicated that this is conveyed to their small staff on a regular basis through requirements such as vehicle inspections and appropriate safety equipment, even if there is no formalized training.

Several of the drivers indicated an understanding that safety impacts the people around them as well. One specifically mentioned the interaction with other road users – motorists and pedestrians.

Safety Challenges

When asked about the most dangerous aspects of the job, responses varied.

- The large company supervisor, mid-size driver, mid-size owner, and labor advocates all discussed challenges with dumping containers. Damaged containers with sharp edges lead to injuries ranging from cuts to severed fingers. Helpers are “exposed” and can be the victim of rollovers if not careful. Even when equipment is in good condition, there are many ways the helper can be injured. The mid-size owner indicated he had moved away from the larger containers (six and eight yard) because there is greater potential for injury with those.
- The large company driver and mid-size owner focused on traffic safety, indicating challenges with nighttime driving, hazardous weather and interacting with pedestrians (especially intoxicated pedestrians on weekend nights).
- The small company manager suggested that preventing injuries from backing up into or over people including the public is important. The potential to injure someone who is outside the driver’s field of vision is great and it is important to rely on assistance from the helper, not only mirrors, when backing up.
- The labor advocates also cited challenges with projectiles from the hopper as it compresses trash. The large truck driver also mentioned a time when the friction from the compression ignited a box of discarded matches in a truck that also had paper products.
- General long term physical wear was also discussed by the labor advocates who cited the frequency of rotator cuff and back injuries as well as arthritis. The mid-size owner also indicated the general physical demands of the job as being a challenge.

All of the drivers interviewed had been involved in at least one collision, ranging in severity. None resulted in injury to other parties. In one instance, when working as a helper the interviewee was struck by an opening taxi door as they drove by resulting in 5 days out of work. The small company manager indicated that they had not had a compensation case in many years, noting that they only have one truck. They did have one incident where a motorcyclist tried to pass the truck on the right, clipping the rear of the truck; there were no serious injuries to anyone involved.

Some of the interviewees were out of work for work-related injuries ranging from one day to five days. The supervisor said the average length out of work varies largely based on the employee and the injury; some employees will stay out of work longer than others for a comparable injury.

The large company also has a light duty program where employees may be cleared by a doctor to return to work that doesn't involve collection. These employees may be charged with painting containers, cleaning trucks, etc., until they are cleared to return to full duty. The labor advocates noted that some employers only allowed light duty for favored employees; others were required to miss work and the related paycheck even if they were cleared to return for limited responsibilities.

The labor advocates noted that many employees will fail to report injuries and continue to work through them because they cannot afford to miss their paycheck.

Safety Opportunities

When asked about opportunities for improving safety, respondents largely agreed on the need for training and safety oversight.

- The large company driver was interested in additional route supervisors for more frequent spot checks to ensure employees are following safety protocol. The supervisor also cited these spot checks as key to a successful safety program.
- The mid-size owner discussed a heavy focus on updating vehicle fleet as frequently as possible and regular vehicle maintenance to ensure his personnel had access to the safest trucks possible.
- The mid-size owner and a mid-size driver both cited driving techniques as being key to safety. The mid-size owner discussed the defensive driving courses available to his drivers. The driver noted that he often parks at an angle to protect themselves when emptying containers. When the truck is parked at the angle, vehicles speeding past the truck will strike the truck rather than the driver or helper.
- Labor advocates cited the need for additional training that begins on location prior to being allowed to drive such as how to conduct an appropriate pre-trip inspection and how to ensure they have the necessary safety equipment. Training should also include how to properly lift trash and where to stand when the truck is backing up.
- Labor advocates also cited the need for training on how to handle hazardous or difficult materials such as sawdust which can be inhaled if not using masks.

- The large company employees and labor advocates cited alternate or light duty as an opportunity to allow continued work until receiving full doctor's clearance following an injury. The large company supervisor noted light duty generally lasts one to two weeks.
- The large company driver noted that as the company has grown through the purchase of smaller companies, there have been challenges with employees from those companies who may not have been trained before or have not worked in an environment with a strict commitment to safety. Training has been key to addressing those challenges.
- The large company driver suggested a second monthly safety meeting might be helpful to minimize the lag time between incidents occurring and when they are discussed as well as introducing new safety policies or best practices more frequently.
- The small company manager noted that the size of their company allows them to be very selective in who they hire and to develop long lasting relationships with their staff. This facilitates a shared commitment to safety.

Safety Interview Conclusions

While it is difficult to draw industry-wide conclusions from a fairly limited number of interviews, several consistent themes were noted.

- A corporate commitment to safety is key to ensuring safety is important at all levels. While an individual may understand the importance of safety practices, if there is not peer or management support, that individual commitment may be minimized by the corporate safety culture. The safety culture can be demonstrated through the following:
 - Formalized/documented safety training at the start of employment followed by regular safety updates helps.
 - Regular safety oversight practices such as routine spot checks and vehicle safety inspections with ramifications for failure to comply.
- The desire for efficiency can overshadow the importance of safety for drivers, helpers, and supervisors who are financially compensated for completing the work as quickly as possible.
- The need for the paycheck and the fear of retaliation may deter some employees from reporting injuries. As a result, some datasets may not be an accurate representation of the full spectrum of safety incidents associated with private hauling.

SAFETY TRAINING REVIEW

Safety training information was gathered from the interviewees as well as a request to the National Waste Recycling Association (NWRA) for broader information on the training efforts of their membership. All of the interviewees and NWRA agreed that the larger the company, the more likely they are to have formal safety training programs. The NWRA representative noted that companies of all sizes generally conduct weekly safety training for collection drivers and personnel. However, all of the small or medium company employees who were interviewed said that none of their current or previous employers held regular safety meetings/trainings.

NWRA noted that most companies provide new drivers with on the road training with an experienced company driver. They also noted that a handful of companies have dedicated regional or national driver training facilities.

NWRA indicated that their membership generally engaged in some combination of the following training programs:

- On the job training with an experienced driver;
- Company policies on collection;
- Physical warm up training;
- Training on equipment safety policies and procedures;
- Defensive driving courses/techniques.

This information may be conveyed using the following materials:

- Safety Monday (a member-only weekly, one-page safety newsletter distributed by Solid Waste Association of North America (SWANA) in partnership with NWRA);
- American National Standards Institute (ANSI) Standards;
- Company safety manuals;
- OSHA regulations;
- Department of Transportation (DOT) regulations; and
- Web based learning management systems.

The large company interviewed for this project also provided information regarding their safety training program which includes initial training when an employee is hired followed by mandatory monthly hour-long safety meetings. Their new employee training curriculum covers the topics outlined in Table 3.

Table 3. Safety Topics Addressed During Large Company New Employee Orientation

<p>Equipment</p> <ul style="list-style-type: none"> • Battery switch operation and start up and shut down procedures-battery disconnect • Location and use of control handles • Location and operation of inside cab controls • Use and operation of tag axles (if applicable) • Tail gate operations and hazards • Blade operations – push out, sweep and hazards • Proper dumping and handling of containers/bins/cans/bags etc. • Instruction, use, and inspection of the cable and hook (if applicable) • Turn buckles use - explanation and inspection • Hazards with hydraulics - locations, potential problem areas, spills • Proper use of electronic equipment- distracted driving • PTO operations
<p>Safety Practices</p> <ul style="list-style-type: none"> • Review Operating Instructions • Proper loading of truck and packing procedures • Proper dumping of truck • Proper pre/post trip procedures VCR use
<p>Traffic/Vehicle Safety</p> <ul style="list-style-type: none"> • Hazards of working in traffic • Proper backing procedures • Instruction on DOT Hours of Service requirements, Log Book • Awareness of vehicle height and length • Seat belt usage (driver and crew) • Turning radius -- forward and reverse • Proper use of hand signals and blind spot locations (use physical demonstration) • Proper use of mirrors/camera • Where to stand while packing and loading (Staying clear of hopper) • No riding on the step or running board while backing or traveling • Entering and exiting alleys (Three point turns) • Defensive Driving-Smith System fundamental • Proper mounting and dismounting off truck • Riding step safety • No snaking, zigzagging on route • Use of grab handles and three points of contact
<p>Emergency Events</p> <ul style="list-style-type: none"> • Location of emergency equipment • Fire extinguisher and use; Risk of a truck fire • Spill kit location (Emergency spill procedures) • Hydraulic tank, pump and shut off locations
<p>Other</p> <ul style="list-style-type: none"> • Lockout/tag out procedures (Cleaning out inside the body) • Location of pinch points • Responsibility of cleanliness of truck-interior, body, behind blade, etc. • Identifying unauthorized waste set out by residents • Common cause of accidents • Job Safety Assessments • OSHA requirements • Location of all required documents which are kept in the truck

The company's safety training materials have consistent messaging meant to empower drivers and helpers to take responsibility for promoting safety through PRIDE:

- Promote, practice and preach operating safety
- Respect customer, company, and employee property
- Involve yourself in promoting safety
- Do not act unsafely
- Expect the unexpected

Their monthly safety materials cover a variety of topics including the following:

- **Seasonal safety briefings:** These address topics such as the beginning of school. The school safety briefing reminds drivers to be alert at intersections, use turn signals, look for pedestrians when making right turns, be aware of bicyclists, and eliminate distractions.
- **Specific safety topics:** These rely on a combination of their own materials and some developed by organizations such as the SWANA. One example of this is the SWANA brochure on *Top 10 Backing Best Management Practices*.
- **Policy updates:** These address internal and external policy considerations. An example they provided is an internally developed informational flyer on the 25MPH speed limit adopted city-wide as part of the Vision Zero efforts.

Safety Training Conclusions

Despite the limited availability of materials to review, in large part because formalized safety training is mainly limited to large private hauling companies, there are several key conclusions that may be drawn from this review.

- Safety training should be formalized for private hauling companies of all sizes. The availability of standardized materials through organizations such as SWANA and NWRA may minimize potential burdens or hurdles for small and mid-size companies.
- Safety training should take place for new employees (orientation) as well as at regular intervals throughout the year. Safety updates reinforce a safety culture and the responsibility of everyone in creating a safe workplace.
- There is an opportunity for DSNY to leverage its expertise in safety training as it pertains to its own workforce to develop noteworthy practices for safety training for private haulers. These noteworthy practices would not be mandatory, but would provide the reference materials small and mid-size haulers may need to develop effective safety training programs commensurate with their business size.

OVERALL SAFETY CONCLUSIONS

The combined data analysis, interviews, and review of training materials has led to the following general safety conclusions:

- Safety culture is of critical importance. This requires an ongoing commitment to safety at all levels and relies on the empowerment of employees to promote a safe work environment among their peers and with their supervisors.
- Relying solely on safety data to understand the breadth and depth of safety challenges may be misleading. The low frequency and high severity of incidents reported across safety datasets combined with information gathered during interviews indicates that less serious incidents may not be regularly reported to appropriate authorities.

- The balance between safety and efficiency can be challenging. Employees at the driver/helper and supervisor levels may be financially motivated to focus on efficiency, sometimes at the expense of safety.

These are supported by the conclusions from each of the independent analyses.

Traffic Safety Analysis Conclusions

Key takeaways from the crash analysis are the following:

Crash severity: Although the frequency of reported private carting crashes is small, the associated severity of these crashes is notably higher than for all NYC crashes. For private carting crashes, fatal and injury crashes accounted for 86 percent of private carting crashes.

Pedestrian Involvement: Fatalities and injuries in private carting crashes involving a pedestrian accounted for 10 (36 percent) fatalities and injuries in private carting crashes.

- **Time and Day of Week:** Most private carting crashes happen at night, with 52 percent taking place between midnight and 5:59 AM. Furthermore, nearly 25 percent of private carting crashes occurred on weekend nights (Friday 9:00PM through Saturday 5:59AM and Saturday 9:00PM through Sunday 5:59AM).

Labor Safety Analysis Conclusions

It is difficult to draw broad conclusions from the available labor data but there are some observations of interest.

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- General trends indicate that the average annual TCR, DART and DAFWII decreased between 2002 and 2011 for both private carting and other establishments. The trend line for all other establishments indicates a greater decrease over the 10-year period than the trend line for Private Carting – Master Haulers for TCR, DART and DAFWII.

Safety Interview Conclusions

While it is difficult to draw industry-wide conclusions from a fairly limited number of interviews, several consistent themes were noted.

- A corporate commitment to safety is key to ensuring safety is important at all levels. While an individual may understand the importance of safety practices, if there is not peer or management support, that individual commitment may be minimized by the corporate safety culture. The safety culture can be demonstrated through the following:
 - Formalized/documented safety training at the start of employment followed by regular safety updates helps.
 - Regular safety oversight practices such as routine spot checks and vehicle safety inspections with ramifications for failure to comply.
- The desire for efficiency can overshadow the importance of safety for drivers, helpers, and supervisors who are financially compensated for completing the work as quickly as possible.
- The need for the paycheck and the fear of retaliation may deter some employees from reporting injuries. As a result, some datasets may not be an accurate representation of the full spectrum of safety incidents associated with private hauling.

Safety Training Conclusions

Despite the limited availability of materials to review, in large part because formalized safety training is largely limited to large private hauling companies, there are several key conclusions that may be drawn from this review.

- Safety training should be formalized for private hauling companies of all sizes. The availability of standardized materials through organizations such as SWANA and NWRA minimized potential burdens or hurdles for small and mid-size companies.
- Safety training should take place for new employees (orientation) as well as at regular intervals throughout the year. Safety updates reinforce a safety culture and the responsibility of everyone in creating a safe workplace.
- There is an opportunity for DSNY to leverage its expertise in safety training as it pertains to its own workforce to develop noteworthy practices for safety training for private haulers. These noteworthy practices would not be mandatory, but would provide the reference materials small and mid-size haulers may need to develop effective safety training programs commensurate with their business size.