



FATALITY ASSESSMENT AND CONTROL EVALUATION

Operator of a Trailer Tipper Fatally Struck by a Tractor Trailer at a Landfill Case Report 16NY009

CASE SUMMARY

On February 6, 2016, a 55-year-old equipment operator (victim) was killed while operating a trailer tipper at a landfill. The trailer tipper in this case had a movable platform that could hold, raise, and tilt a trailer to over 60 degrees and discharge the refuse through its rear doors (Photo 1). To get on the tipper, a tractor trailer had to back onto the trailer tipper deck. The communication between a tipper operator and a delivery driver was through a designated CB radio channel. The incident occurred on a Saturday at around 11 AM when the victim was operating the tipper and the last tractor trailer was getting ready to back onto the tipper. The trailer was hauled by a military surplus tractor (“army truck”, Photo 4). The “army truck” did not have a backup alarm and its radio was broken so there was no radio communication between the victim and the truck driver. At the time of the incident, the victim exited the operator’s cab of the tipper and walked to the other side of the deck where the hydraulic controls for the tipper outrigger cylinders were located. He was wearing a high visibility vest. A landfill bulldozer operator stated that he saw the victim standing on the deck leaning over the outrigger controls. Meanwhile the “army truck” was backing onto the trailer deck. The bulldozer operator yelled into his CB radio to stop the delivery driver from backing onto the tipper; the “army truck” driver heard nothing since the truck radio was broken. The bulldozer operator could not warn the victim since the CB radio was inside the operator’s cab and the victim could not hear the radio once he was outside the cab. The “army truck” driver did not see the victim and he continued backing onto the tipper deck. The victim was run over by the rear wheels of the trailer on the passenger side suffering fatal crushing injuries. The bulldozer operator got to the front of the tipper to signal the driver who stopped the truck. The bulldozer operator immediately called 911. EMTs responded and arrived at the site within minutes, but the victim was pronounced dead at the scene.

CONTRIBUTING FACTORS

- The tipper operator and the “army truck” driver could not communicate with each other because the truck’s radio was broken.
- The tipper operator left the operator’s cab and was on the deck while the “army truck” was backing onto the tipper.
- The delivery truck driver backed the tractor trailer onto the deck without knowing/seeing that the tipper operator was on the deck.
- The bulldozer operator could not warn the tipper operator because he could not communicate with the tipper operator once he was out of the operator’s cab.
- The “army truck” did not follow the standard operating procedure at the landfill.

KEY RECOMMENDATIONS

- *Landfill employers should implement measures to prevent tractor trailers from backing onto the tipper deck when a tipper operator is on the deck.*
- *Landfill employers should provide additional communication methods for the equipment operators and other pedestrian workers who work around heavy mobile equipment.*
- *Landfill employers should require that all visiting vehicles have the important safety features such as properly working CB radios and backup alarms.*
- *Landfill employers should develop and implement a standard operating procedure (SOP) to ensure the safety of the tipper operators.*
- *Landfill employers should develop and implement a comprehensive landfill waste disposal policy to ensure the safety of landfill employees and customers.*
- *Landfill employers should provide training to ensure that workers understand and follow the SOP at the working face and the landfill waste disposal policy.*
- *Solid waste trucking companies should follow the landfill safety policy and ensure that the vehicles meet the landfill's safety requirements and their employees follow the landfill safety policy.*

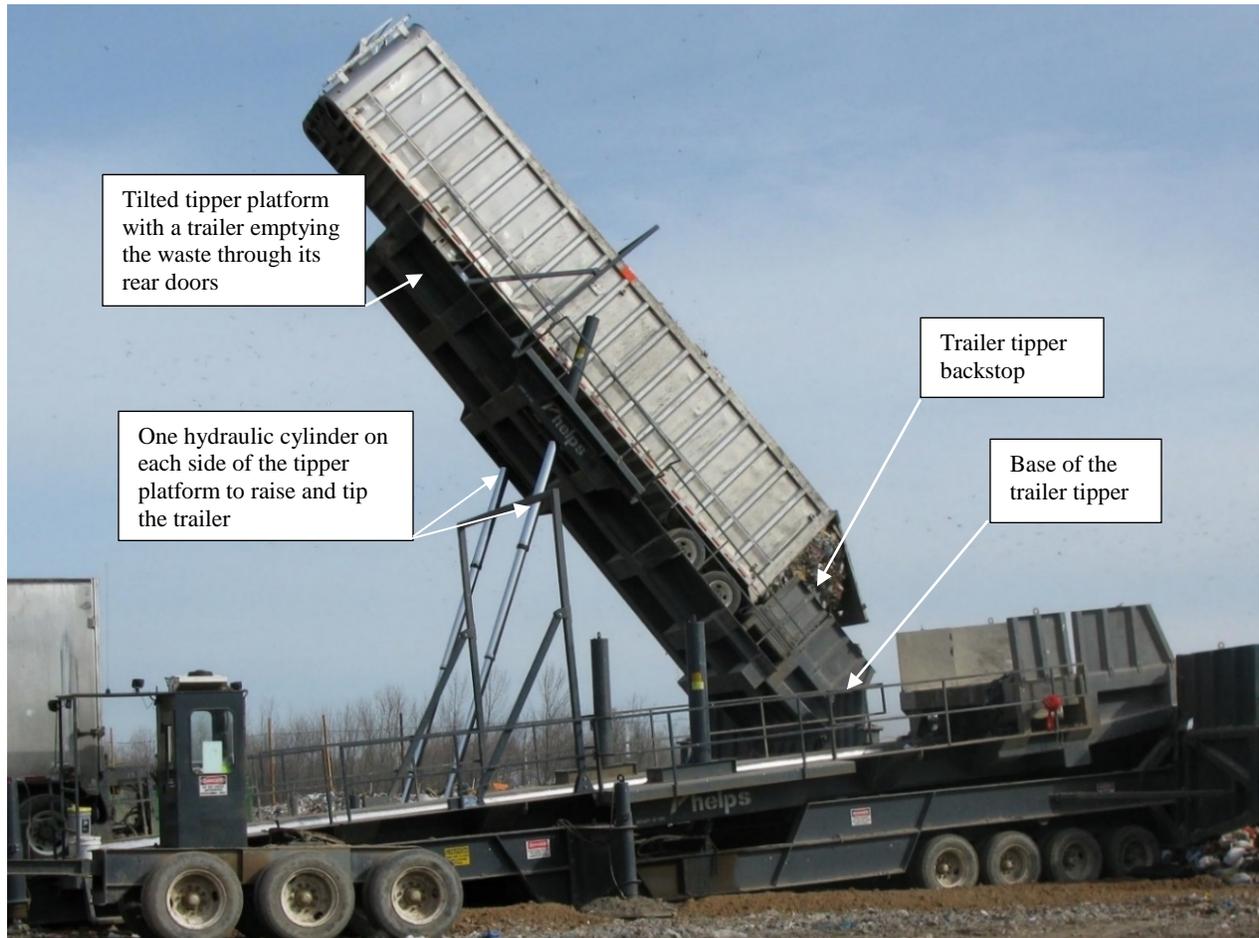


Photo 1. A landfill trailer tipper is tipping a trailer and emptying the waste through the trailer's rear gate by gravity.

INTRODUCTION

On February 6, 2016, a 55-year-old equipment operator (victim) was killed while operating a trailer tipper at a landfill. He was fatally crushed by a tractor trailer that was backing onto the tipper. The New York State Fatality Assessment and Control Evaluation (NY FACE) staff learned of the incident from news media and initiated an investigation. A NY FACE investigator visited the incident site, met with the landfill management representative, and observed the trailer tipper operation. The tractor trailer was driven by an employee of a subcontractor of a large trucking company. The subcontractor was interviewed during the investigation. The case was discussed with the compliance officer of the Occupational Safety and Health Administration (OSHA) who investigated the incident. This report summarizes the findings of the NY FACE investigation.

The victim worked for a solid waste management company that employed approximately 75 workers and operated a landfill of 2,500 acres. The landfill handled approximately 6,000 tons of non-hazardous solid waste daily and received waste from residences, businesses, and municipalities. Two thirds of the employees were equipment operators and the rest were laborers, mechanics, and office workers. The company provided weekly tailgate trainings, daily safety reminders, and mobile equipment safety training to the field employees. The workers were required to wear high visibility vests or jackets, steel toed boots, gloves, safety glasses, hard hats, and ear plugs.

The victim worked for the landfill for a total of seven years including two years as a temporary employee. He was an equipment operator in the department of waste operations. He received task specific training on how to operate a trailer tipper and a trash compactor.

This was the landfill's second work related fatality. On February 20, 2002, a truck driver of a trucking company was run over by a landfill trash compactor. NY FACE investigated the incident and developed the report "*Truck Driver Run Over by Trash Compactor at Municipal Landfill*" that is available at <https://www.health.ny.gov/environmental/investigations/face/docs/02ny007.pdf>.

INVESTIGATION

At the time of the incident, the victim was operating a trailer tipper at a "working face" where waste was received, deposited, and compacted. A trailer tipper is a device that raises and tips a trailer and empties the trailer by gravity (Photo 1). The essential part of a trailer tipper is a movable platform that can be raised and tilted by hydraulic power. In this case, the tipper platform was 9 feet wide and 40 feet long and could hold a standard trailer. It was hinged at one end and had one 4-stage hydraulic cylinder on each side. The tipper's hydraulic system was powered by a 100-horsepower diesel engine. The tipper cylinders could raise and tilt the deck to over 60 degrees and empty the trailer through its rear doors by gravity.

The base of the tipper had metal railings on both sides and a backstop at the hinged end of the movable platform. To get on the tipper, a tractor trailer had to back onto the platform with its rear trailer doors facing the hinged end until it hits the backstop. The tipper had six outrigger cylinders to support and level the structure. The hydraulic controls for the outrigger cylinders were at the left side of the deck when facing the hinged end (Photo 2). The operator only needed to operate the outrigger cylinders when setting up the tipper. There was an operator's cab at the right side of the deck and all the tipper controls along with a CB radio were inside the cab (Photo 3). An operator could only hear the CB radio

when he was inside the cab. There was no radio communication for a tipper operator once he left the cab and was out on the tipper deck.



Photo 2. Hydraulic controls for the outrigger cylinders were on the left side of the deck and the operator's cab was on the right side.

The landfill had five tipper operators operating three trailer tippers that were purchased new in 2014. These tippers ran approximately five hours a day, each tipping approximately 70 trailers. All tipper operators received training from the tipper manufacturer. One or two tippers worked with two bulldozers and one landfill compactor at each working face to dump, push, spread, compact, and cover the waste. There were usually two active working faces receiving waste at the same time and tippers were moved daily to new working faces.

The tipper operators were responsible for setting up the tippers, conducting a daily inspection at the beginning of each shift, and documenting on an inspection form the conditions of the cylinders, pump, engine, and hydraulic parts. Throughout the shift, the tipper operators cleaned debris from the deck area to help maintain trailer tire traction. At the end of the shift, the tipper operators greased fittings on the hydraulics and other parts of the machine.

When a delivery driver arrived at a working face, he waited in line to get on a tipper. The communication between him and a tipper operator was through a designated channel (#3) in Citizen Band (CB) Radio. Once the tipper deck was clear, the tipper operator directed the driver to back his tractor trailer through a metal ramp onto the tipper deck until the trailer hit the backstop. A standard trailer is approximately 102 inches wide. With a trailer parked in the middle of the deck the clearance between the trailer and the metal railing was approximately 2 to 3 inches on either side.



Photo 3. Tipper control panel and a CB radio inside the operator's cab.

Once on the tipper deck, the driver set the brakes, disengaged the trailer, and disconnected air and electrical lines while the tipper operator processed the paperwork. After completion of the paperwork, the driver drove the tractor off the ramp before the tipper operator raised, tilted, and emptied the trailer. After the trailer was emptied, the driver backed the tractor onto the ramp to hook up the trailer before driving off the ramp. According to the landfill management, tipper operators were required to remain inside the operator's cab when a tractor trailer was backing onto or driving off the tipper deck. However, this requirement was not in writing.

A large trucking company trucked municipal waste from New York City to the landfill. Once arriving at the landfill, a driver had to go through the landfill process to deposit the waste. First, the driver had to go through a radiation detector and a weigh station, then do paper work with a scale operator before driving to a working face where the driver may have to wait in line to get on a tipper. After depositing the waste, the driver had to go through the weigh station again before leaving the landfill. The entire process could take up to two hours. To reduce the drivers' down time, the trucking company purchased military surplus tractors, referred to as "army trucks" (Photo 4), and hired a local subcontractor to take care of the landfill process.

The subcontractor hired four drivers and started the "army truck" operation approximately ten months prior to the incident. The trucking company drivers would drive to a parking lot outside the landfill, drop their loaded trailers, immediately pick up empty trailers, and drive back. The "army truck" drivers would pick up the loaded trailers with their "army trucks" and go through the landfill process to discharge the waste before driving the empty trailers back to the parking lot.



Photo 4. A military surplus tractor (“army truck”) was used to haul the trailer and deposit waste in the landfill.

The “army trucks” did not have audible backup alarms, although the mirrors on the trucks worked. The tractor radios did not work most of the time due to the incompatible electrical voltages between the tractor and the radio. The “army truck” drivers reportedly often drove up to a working face and backed up to a tipper whenever they saw that the tipper was empty without getting the radio communication from a tipper operator.

This incident occurred on a Saturday when the landfill received waste between 6 and 11 am. At around 11 am, the last tractor trailer was getting ready to back onto the tripper. The tractor trailer was driven by an “army truck” driver. At the time of the incident, the victim exited the operator’s cab and walked to the other side of the deck where the hydraulic controls for outrigger cylinders were located. He was wearing a high visibility vest. A landfill bulldozer operator stated that he saw the victim standing on the tipper deck leaning over the outrigger hydraulic controls. Meanwhile the “army truck” with a loaded trailer was backing onto the tipper deck. The bulldozer operator yelled into his CB radio to stop the driver who heard nothing since the truck radio was broken. The bulldozer operator could not warn the victim since the CB radio was inside the operator’s cab and the victim could not hear the radio once he was outside the cab. The “army truck” driver did not see the victim and he continued backing onto the tipper deck. The victim was run over by the rear wheels of the trailer on the passenger side suffering fatal crushing injuries. The bulldozer operator got to the front of the tipper to signal the driver who stopped the truck. The bulldozer operator immediately called 911. EMTs responded and arrived at the site within minutes, but the victim was pronounced dead at the scene.

After the incident, the landfill began requiring that the tipper operator raise and tilt the metal access ramp to stop tractor trailers from backing onto the tipper deck every time a tipper operator is outside the operator's cab and on the deck (photo 5).



Photo 5. The access ramp is raised to stop the tractor trailer from backing onto the tipper deck when operator is outside the operator's cab.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: *Landfill employers should implement measures to prevent tractor trailers from backing onto the tipper deck when a tipper operator is on the deck.*

Discussion: A landfill tipper operator performs multiple tasks on the deck such as cleaning, trouble shooting, and maintaining the equipment. Every time the operator is on the tipper deck, he is potentially exposed to fatal crushing hazards due to tractor trailers backing onto the deck. Landfill employers should consider implementing the following measures to prevent tractor trailers from backing onto the tipper deck when the operator is on it:

- Set up a physical barrier to block the deck;
- Radio all delivery drivers at the working face that the deck is closed;
- Use a visual signal such as a flashing red light to show that the deck is closed;
- Coordinate with other landfill vehicles such as bulldozers to block the path to tipper deck.

Landfill employers should ensure that no operator leaves the operator's cab unless these control measures are in place.

Recommendation #2: *Landfill employers should provide additional communication methods for the equipment operators and other pedestrian workers who work around heavy mobile equipment.*

Discussion: The bulldozer operator in this case tried to warn the victim when he saw the “army truck” trailer backing up, but he could not reach the victim since the CB radio was inside the operator’s cab and the victim was on the deck. Landfill employers should provide a secondary communication method such as a walkie-talkie for the working face staff to communicate with the equipment operators and other pedestrian workers. The operators should be required to always carry the walkie-talkie when they are outside the operator’s cab.

Landfills may consider developing a set of standard hand signals as an additional communication method for landfill equipment operators to communicate with each other. The hand signals can be used once direct eye contact is established. Employers should provide training for workers to learn and practice the hand gestures and get familiar with the specific messages being conveyed.

Recommendation #3: *Landfill employers should require that all visiting vehicles have the important safety features such as properly working CB radios and backup alarms.*

Discussion: In this case, the only available communication method between the tipper operator and a delivery driver was through a CB radio. The radios on the “army trucks” did not work and the trucks’ backup alarms were broken. Landfill employers should require that all visiting vehicles have radios and backup alarms that are working properly. Vehicles without working radios and backup alarms should not be permitted to enter the landfill.

Recommendation #4: *Landfill employers should develop and implement a standard operating procedure to ensure the safety of the tipper operators.*

Discussion: The tipper in this case could tip up to 70 trailers a day and the operators were exposed to serious crushing hazards every time they were outside the operator’s cab. Landfill employers should develop a standard operating procedure (SOP) for the tipper operation to ensure the safety of the operators. The procedure should be in writing and it should clearly describe the responsibilities of each party involved, the communication method, and the control measures. The SOP should emphasize the importance of the operator remaining inside the operator’s cab whenever a tractor trailer is backing up. The operator should never leave the operator’s cab until all the specified control measures to prevent tractor trailers from backing onto the deck are implemented.

The landfill should require that all visiting drivers read and follow the SOP once at a working face. All noncompliance incidents should be recorded in the site log and the visitors who failed to follow the safety provisions should be asked to leave the working face.

Recommendation #5: *Landfill employers should develop and implement a comprehensive landfill waste disposal policy to ensure the safety of landfill employees and customers.*

Discussion: It is the landfill’s responsibility to keep both their employees and delivery drivers/visiting customers safe. Both landfill employees and delivery drivers as well as other landfill visitors should strictly follow all safety policies and procedures. An unsafe act by landfill employees may endanger the safety of a delivery driver and a visitor’s failure to follow landfill safety protocols can cause

serious injuries to landfill workers. Landfill employers should develop and implement a safe waste disposal policy and ensure the compliance of both the landfill employees and visitors. The safety policy should clearly define the responsibilities of both parties, the protocols to be followed, and the personal protective equipment required for entering the landfill. The policy should specify the safety requirements for visiting vehicles, for example all visiting waste trucks should have a working CB radio, backup alarm, and other necessary safety features.

The landfills should require tractor trailer drivers to read and follow the policy. The landfill should enforce the safety policy by setting up a system to record noncompliance cases. Visitors who failed to follow the safe protocol should be requested to leave the landfill.

Recommendation #6: *Landfill employers should provide training to ensure that workers understand and follow the SOP at the working face and the landfill waste disposal policy.*

Discussion: Mobile equipment and vehicles backing up are major hazards at a landfill working face and can cause serious worker injuries and death. Large mobile equipment has blind spots and the operators or drivers cannot always see the pedestrian workers in the area. Workers who are out of the operator's cab and walk in the working face are in danger of being run over by landfill equipment as well as the visiting vehicles. Landfill employers should provide employee training to ensure that workers understand the nature of the hazards and are familiar with the communication methods and prevention measures, as well as tipper SOP and landfill safe waste disposal policy.

Recommendation #7: *Solid waste trucking companies should follow the landfill safety policy and ensure that the vehicles meet the landfill's safety requirement and their employees follow the landfill safety policy.*

Discussion: The solid waste trucking company in this case purchased the "army trucks" that did not have working radios and backup alarms. The radio communication was critical at a working face to ensure the safety of the landfill operators and the delivery drivers. Trucking companies should make sure that the waste tractor trailers have all the required safety features and communication devices required by the landfill. Trucking companies should provide training to their drivers to ensure that they follow the landfill safety procedures and policies when depositing wastes at the landfill.

Keywords: *landfill, solid waste, trailer tipper, tractor trailer backing up, working face, crushing hazard, blind spot*

REFERENCES

1. New York State Department of Health, New York State Fatality Assessment and Control Evaluation. *Truck Driver Run Over by Trash Compactor at Municipal Landfill Case Report: 02NY007*. Retrieved September 5, 2017 from <https://www.health.ny.gov/environmental/investigations/face/docs/02ny007.pdf>
2. New York State Department of Health, New York State Fatality Assessment and Control Evaluation. *Preventing deaths and injuries to public workers while working around mobile equipment*. Retrieved September 5, 2017 from https://www.health.ny.gov/environmental/investigations/face/training/mobile_equipment.htm

3. Center for Disease Control and Prevention, National Institute for Occupational Safety and Health. *Solid Waste Industry*. Retrieved September 5, 2017 from <https://www.cdc.gov/niosh/docs/2012-140/pdfs/2012-140.pdf>

The New York State Fatality Assessment and Control Evaluation (NY FACE) program is funded by the National Institute for Occupational Safety and Health and administered by the New York State Department of Health. NY FACE is a research program designed to study the causes of workplace fatalities and develop practical and effective prevention measures. NY FACE investigators evaluate information from multiple sources and provide recommendations for prevention in summary reports. These recommendations are distributed to employers, workers, and other organizations interested in promoting workplace safety. The NY FACE does not determine fault or legal liability associated with a fatal incident. Names of employers, victims and/or witnesses are not included in written investigative reports or other databases to protect the confidentiality of those who voluntarily participate in the program. Additional information regarding the NY FACE program can be obtained from:

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