



TO: Director, National Institute for Occupational Safety and Health

FROM: Iowa FACE Case No. 2010 IA 005 Report Date: 10 October 2012

SUBJECT: Special-needs sanitation route helper caught in tailgate of waste collection truck

SUMMARY

A 51-year-old sanitation route helper was injured when he was caught in the tailgate of a rear loader trash collection truck in early 2010. The victim exited the truck cab to close an overhead door of the regional recycling center (also operated by the victim's employer) after he and the driver had emptied a load of cardboard. The driver pulled out of the building with the truck's tailgate partly lowered to clear the doorway. He parked the truck and exited the cab to manually secure the tailgate in closed position using levers located on the outside of the driver's side of the truck. The victim, who was out of sight of the driver, spotted cardboard that had not completely cleared the tailgate area and attempted to pull it free at the same time the driver was lowering the tailgate. When the driver realized the tailgate was not closing properly, he raised it and discovered the victim had been caught between the lowered tailgate and the body of truck. Employees assisted the conscious victim to the office and drove him to a local hospital. He was transferred by helicopter to a regional medical center and died the following evening.

After the fatality and prior to the Iowa FACE investigation, the employer proactively identified and implemented Recommendations 1 through 6 below to protect employees.

RECOMMENDATIONS

1. *Demarcate restricted areas to keep all persons a safe distance from moving trucks and unloading activities.*
2. *Designate trained spotters to direct drivers in all truck movement when entering, unloading, and exiting facilities where employees or bystanders may be present.*
3. *Train all drivers—of both company trucks and non-company commercial vehicles involved in loading and unloading of materials—on the employer's safety policy regarding the use of spotters and truck traffic. Train all drivers to stop their vehicle when visual contact with the spotter is lost.*

4. *Require all employees and visitors to wear high-visibility vests or shirts in truck traffic and unloading areas.*
5. *Specify that only drivers are authorized to unsecure tailgate latches and operate tailgate mechanisms.*
6. *Require drivers to follow defined protocols for removing lodged materials from truck bodies or hoppers. These include using tailgate props to secure the tailgate in a supported open position, and shutting off the ignition and pocketing keys prior to clearing the tailgate or rear body of the truck.*
7. *Develop and implement specialized accommodations and training programs in businesses to support safety and health professionals, training specialists, employers of and employees with disabilities.*

INTRODUCTION

A 51-year-old sanitation route helper was fatally injured when he was caught in the tailgate of a rear loader trash collection truck in early 2010. The Iowa FACE program learned of the fatality through the Bureau of Labor Statistics Iowa Census of Fatal Occupational Injuries (CFOI) program, and began a preliminary investigation within the month of this fatality. The owner of the sanitation and recycling business granted two on-site interviews with a FACE investigator the following year and described actions that their business had implemented to improve safety and prevent future incidents. Information from the County Medical Examiner report was also used to develop this case study.

INVESTIGATION

The 51-year-old victim was employed for 17 years in a family-owned business that originated as a small sanitation service for residential and commercial customers and expanded to include a regional recycling facility handling cardboard, paper, plastic, glass, and metal. At the time of the incident, over 30 persons were employed in the business's sanitation and recycling divisions. Other local providers of sanitation services also unloaded recyclable materials at this regional recycling center.

At the time the victim was hired, sanitation workers typically worked in teams: a truck driver and a helper/thrower. The helper's job was to manually empty trash containers into the side or rear of a trash collection truck. Typically a team would collect trash along their route at the beginning of the shift and unload it at the county landfill. They then reversed their route to pick up recyclable cardboard and unload it at the recycling center. At the end of the shift, trucks were returned to the main sanitation facility 20 miles away.

Over the years, trash collection trucks were developed with automated loading capability. Automated loader trucks reduced labor intensity of trash pickup and allowed drivers to usually work their routes without a helper. At the time of the incident, both manual- and automated-loader trucks were used in the employer's sanitation business. The employer rotated team partners and their pick-up routes periodically so all employees became familiar with all routes.

The victim was a long-tenure employee who worked approximately 32 hours weekly as a helper/thrower. During his employment, the victim always worked as the helper in the two-man team. The victim was described as a “special-needs” person with below-average intellectual function. He had completed high school, was literate, and had a driver’s license but lacked skills for independent living; he lived with his parents throughout his life. He wore corrective lenses but was not hearing impaired and was on no known medications. He was physically strong, enthusiastic, and highly motivated to be productive. His employers and many co-workers regarded him as family. Early in his employment, the victim worked as a team member with the company owner when the owner drove routes.

The victim’s job training included one-on-one coaching and demonstration, practicing necessary skills and tasks, participating in periodic safety meetings, and reviewing policies included in the company’s safety manual. Because the victim did not have a well-developed ability to independently perceive or evaluate safety hazards, the employer took extra measures to repeat and emphasize safe practices and policies. Particular emphasis was placed on the importance of all teams working together constructively and with both members’ safety in mind. This was in recognition of the many hours that a team must spend together on their routes, and the dangers of heavy equipment and roadway or street traffic to which sanitation workers are exposed.

On the day of the incident, the victim and his partner began the work shift at 0630. The truck driver, a 20-year employee, and the victim had worked together as route partners over the years. Conditions were wintry with sub-zero temperatures at the beginning of the shift, rising to near 30°F at the end of the shift. Road conditions were not completely clear, so drivers had to use extra caution. As the day progressed, local forecasts predicted deteriorating weather and driving conditions by the end of the day. Weather conditions may have been an indirect factor in the incident, since teams monitored forecasts through the day and pushed to finish their routes so they could return trucks to the sanitation business headquarters before road conditions worsened.

The victim and his partner conducted their pickup route in a 2004 rear load packer truck with 20 cubic yards capacity (Exhibit 1). On a rear load packer, the helper manually lifts and empties individual trash containers - or cardboard - into a 3-cubic-yard hopper in the tailgate of the truck. A hydraulic packer panel in the tailgate compacts the hopper contents and pushes them into the main body of the truck.



Exhibit 1: Rear load packer truck involved in incident

To unload the truck, two locking screw attachment links must be unsecured manually. The attachment links are located on the driver and passenger sides of the truck between the tailgate and main body (Exhibit 2).

After the links are unsecured, the driver operates hydraulic controls that raise the entire tailgate, swinging it upward (Exhibit 3). The hydraulic tailgate controls are located on the exterior of the truck to the rear of the driver side of the cab. A vertical hydraulic ejector panel inside the front body of the truck then pushes contents out the back of the truck (Exhibit 3).



Exhibit 2: Attachment link that secures tailgate in closed position

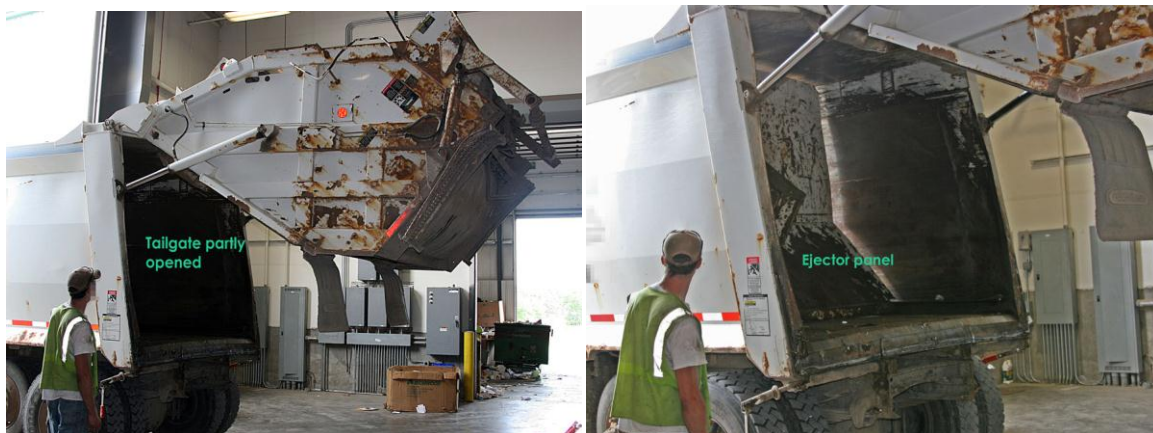


Exhibit 3: Rear-load packer truck with tailgate opened and ejector panel fully extended

After the contents are emptied, the tailgate must be lowered to a closed position and the tailgate attachments must be re-secured. When the tailgate is in any position other than fully closed, an audible alarm sounds until the tailgate is returned to fully closed position. The sound of the alarm does not change based on the movement or position of the opened tailgate. Signage is present on both sides of the truck to the front of the tailgate warning of the danger of being caught or struck by the tailgate (Exhibit 4).

The driver and victim unloaded their route's trash at the county landfill at approximately 1330, then left the landfill and began their cardboard pickup route, returning to the recycling center before 1500. Company safety policies required that helpers stay in the truck cab at the landfill. Back at the recycling center, helpers could exit their trucks to use the restroom, break room, or get refreshments.

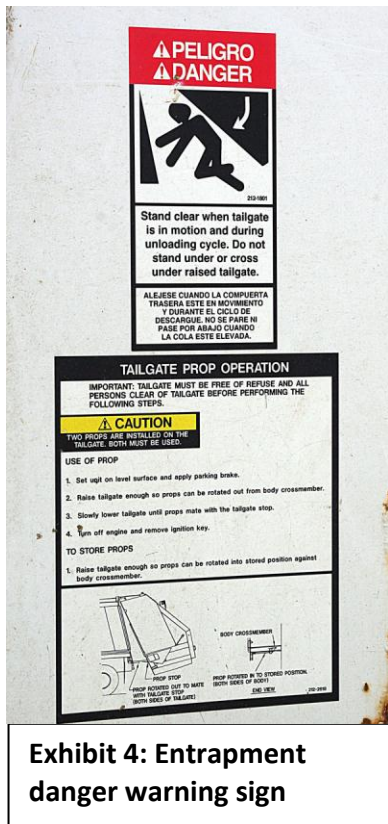


Exhibit 4: Entrapment danger warning sign

At the recycling center the driver backed into the building through an open overhead door. The driver instructed the victim to close the building’s overhead door to conserve heat after he pulled out of the building. Inside the building, the driver raised the tailgate and operated the ejector panel to unload the cardboard. He then lowered the tailgate to three-quarters-closed position so the truck could clear the overhead door as he pulled through. The driver parked the truck just outside the building and got out to close the tailgate.

While the driver was preparing to fully close the tailgate, the victim was at the rear of the truck on the passenger side, out of the driver’s sight. The victim spotted a piece of cardboard that had not completely cleared the body of the truck during unloading and reached in to pull it free as the tailgate lowered. He was trapped between the tailgate and body of the truck. The driver, unable to get the tailgate fully closed, raised the gate and went to the rear of the truck and discovered the victim. The manager and a coworker inside the building ran to assist the victim, who had slumped onto the paving. The victim was conscious but was injured on the head, shoulder, and upper torso. With assistance of his coworkers, he

stood and walked to the break room. The manager drove the victim to the hospital in the manager’s own vehicle. During transport, the manager kept the victim alert and talking. The victim was able to recognize and identify landmarks they passed en route. The victim told the manager it was his (the victim’s) fault he got hurt because he had reached under the tailgate to get cardboard.

The victim experienced a decrease in consciousness after being evaluated at the hospital and was transported by helicopter to a regional medical center where he died the following evening.

CAUSE OF DEATH

The county medical examiner reported the cause of death as *complications of ischemic brain injury due to acute traumatic dissection of distal right vertebral artery.*

RECOMMENDATIONS AND DISCUSSION

Recommendations 1 through 6 below were identified during our interviews with the company owner. After the death of this employee, the company proactively engaged in a number of policies and training efforts to prevent tailgate entrapment hazards from occurring in the future. We describe in the discussion points how the company applied these recommendations in their workplace.

Recommendation 1. *Demarcate restricted areas in recycling warehouses or other locations for truck loading and unloading to keep all persons a safe distance from moving trucks and unloading activities.*

Discussion: After the fatality, restricted areas at the recycling facility were identified and marked to denote lines behind which sanitation route helpers and other employees at the recycling center must stand any time trucks are unloading. Restricted areas are denoted to keep all employees a) on the driver's side of the truck, b) to the rear of the building where they would be a safe distance from trucks and falling materials being unloaded, and c) within view of the spotter directing truck movement.

Recommendation 2. *Designate trained spotters to direct drivers entering, unloading, and exiting facilities where other employees or bystanders may be present.*

Discussion: The company implemented a new policy after the fatality requiring that all truck traffic into the facility be directed by spotters. Several recycling center employees were designated and trained as spotters. Drivers waiting to unload must wait outside the facility for a spotter to direct their truck into the building. Spotters assure that all persons are clear of the restricted area during unloading. Spotters give drivers clearance to proceed with all unloading activities and maneuvers using standard hand signals. They direct the driver in entry and exit from the facility, raising and lowering the tailgate, and ejection of a load (Exhibit 5). Spotters assure that only drivers operate latches and controls involving tailgate movement.

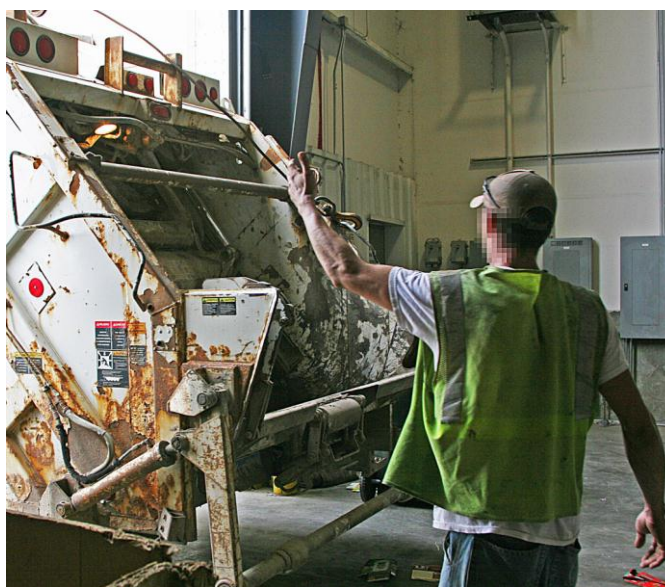


Exhibit 5: Spotter using hand signal to direct truck into recycling center

Recommendation 3. *Train all drivers—of both company trucks and non-company commercial vehicles involved in loading and unloading materials—on the employer's safety policy regarding the use of spotters and truck traffic. Train all drivers to stop their vehicle when visual contact with the spotter is lost.*

Discussion: A company policy was implemented requiring company drivers and drivers of non-company commercial vehicles using the recycling center to be trained in the safety procedures regarding spotters who direct vehicle traffic and unloading activities. All drivers are trained not to proceed without a clear view of the spotter and the spotter's hand signals. Truck movement must stop if visibility of the spotter is lost.

Recommendation 4. *Require all employees and visitors to wear high-visibility vests or shirts in truck traffic and unloading areas.*

Discussion: Employees now are provided high-visibility shirts and vests that must be worn whenever they are in the recycling center facility. High-visibility clothing helps spotters and drivers identify and locate all persons in the work area.

Recommendation 5. *Specify that only drivers are authorized to unsecure tailgate latches and operate tailgate mechanisms.*

Discussion: Prior to the fatality, helpers may on occasion have assisted drivers in unloading procedures at the recycling center. Following the incident, drivers were instructed that only they are authorized to prepare and operate their truck tailgate for unloading. With only drivers having authority to unsecure both tailgate latches, there is no need for helpers or other employees to be in restricted areas out of the driver's or spotter's line of vision, reducing the potential risk of their being injured by moving equipment.

Recommendation 6. *Require drivers to follow defined protocols for removing lodged materials from truck bodies or hoppers. These include using tailgate props to secure the tailgate in a supported open position, and shutting off the ignition and pocketing keys prior to clearing the tailgate or rear body of the truck.*

Discussion: Drivers must use lockout practices to safeguard against equipment starting or releasing hazardous energy. When it is necessary to clear material from the tailgate or truck body at the recycling center or landfill, drivers must now either a) enter the front of the truck body through an access door behind the cab, or b) use tailgate props which are standard equipment on the vehicles to support the opened tailgate in a fixed position with the engine off. In both instances, clearing the truck of lodged material is done only after the truck ignition has been turned off and the driver pockets the keys. This policy assures that the truck controls cannot be engaged, that the risk of injury from a moving tailgate is minimized or eliminated, and that *drivers only* are authorized to clear lodged materials.

Recommendation 7. *Develop and implement specialized accommodations and training programs in businesses to support safety and health professionals, training specialists, employers of and employees with disabilities.*

Discussion: Workers with disabilities represent a substantive proportion of the working population, and as American workers, particularly baby boomers, grow older, it is expected that the numbers of workers with disabilities will increase. Studies show that workers with disabilities are at increased risk for occupational injuries, but only 12% report receiving workplace accommodations.

The Americans with Disabilities Act requires that employers provide reasonable accommodations for workers with disabilities, such as modified job duties, personal assistance, and appropriate job training. The National Institute for Occupational Safety and Health provides specific recommendations for workers with mental retardation or developmental disabilities, identified from research with sheltered workshops (nonprofit businesses employing predominantly people with developmental disabilities and other chronic mental and physical disabilities). Suggested accommodations include spending more time in training; breaking job tasks into small, clearly

defined steps; instructing in clear, basic language; developing pictures and diagrams to depict job sequences to teach tasks. Warning devices and signs may also need to be modified for persons with disabilities to assure that they are understood. This company engaged in various types of training modalities for the victim during his tenure, and he was part of a two-man working crew. Future research, however, is needed to tailor specialized trainings for those with disabilities and evaluate their effectiveness, particularly in mainstreamed settings which have been found to be lacking in health and safety training for employees with and employers of persons with disabilities (Dewey, 2006). Fortunately, there are some informational resources available from NIOSH (www.cdc.gov/niosh/topics/widd/nioshPubWDD.html), the Department of Labor (www.disabilityinfo.gov and www.jan.wvu.edu) and the Department of Education's Office of Special Education and Rehabilitation Services. Nonetheless, evidence-based programs have not been established to assist workers with disabilities, and future research is needed in this area.

The Iowa FACE project wishes to thank the employer for their time and assistance in developing this case report.

Keywords: sanitation worker, garbage helper, rear load packer truck, struck by tailgate, workers with developmental disabilities

REFERENCES

ANSI [2008]. Mobile wastes and recyclable materials collection, transportation and compaction equipment – safety requirements. New York, NY: American National Standards Institute, ANSI Z245.1-2008.

ANSI/ISEA [2010]. American national standard for high visibility safety apparel and headwear devices. New York, NY: American National Standards Institute; Arlington VA: International Safety Equipment Association, ANSI/ISEA 107-2010.

Dewey R [2006]. Promoting the health and safety of individuals with developmental disabilities employed in mainstream settings. Report and recommendations to the National Institute for Occupational Safety and Health. Available at:

<http://www.lohp.org/docs/projects/workerswithdisabilities/nioshfinalreport.pdf>

NIOSH [1997]. NIOSH Alert: preventing worker injuries and deaths from moving refuse collection vehicles. Cincinnati, OH: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 97-110. <http://www.cdc.gov/niosh/refuse.html>

NIOSH [2000]. Lenhart SW. Protecting workers with developmental disabilities. Applied Occupational and Environmental Hygiene 2000; 15 (2):171-181. Available at: http://www.aamr.org/ehi/media/protecting_workers.pdf

NSWMA [1998]. Manual of recommended safety practices. Washington, DC: National Solid Waste Management Association.

Code of Federal Regulations. 29 CFR 1910.147. The control of hazardous energy (lockout/tagout). Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.

Zwerling C, Whitten PS, Sprince NL, Davis CS, Wallace RB, Blanck P, Heeringa SG. Workplace accommodations for people with disabilities: National Health Interview Survey Disability Supplement, 1994-1995. Journal of Occupational and Environmental Medicine. 2003;45:517-25.

Zwerling C, Whitten PS, Davis CS, Sprince NL. Occupational injuries among workers with disabilities: The National Health Interview Survey, 1985-1994. JAMA. 1997;278:2163-6.

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Fatality Assessment and Control Evaluation
FACE

Fatality Assessment and Control Evaluation (FACE) is a program of the National Institute for Occupational Safety and Health (NIOSH), which is part of the Centers for Disease Control and Prevention of the US Department of Health and Human Services. Nationally, the FACE program identifies traumatic work-related deaths, conducts in-depth studies of select cases, makes recommendations for prevention, and publishes reports and alerts. The goal is to prevent occupational fatalities across the nation.

The NIOSH head office in Morgantown, West Virginia, carries out an intramural FACE case surveillance and evaluation program and also funds state-based programs in several cooperating states. The Iowa FACE program is conducted by the Injury Prevention Research Center at the University of Iowa working in conjunction with the Iowa Department of Public Health and its Office of the State Medical Examiner.

NIOSH combines its and the state programs' information for wide dissemination, in a variety of forms, among the industries involved. NIOSH publications are available on the web at <http://www.cdc.gov/NIOSH/FACE/> and from the NIOSH Distribution Center (1-800-35NIOSH).

Iowa FACE also publishes its case studies, issues precautionary messages, and prepares articles for trade and professional publications. In addition to postings on the national NIOSH website, the information is posted on the Iowa FACE website (www.public-health.uiowa.edu/FACE/).

The Iowa FACE team at the University of Iowa includes Marizen Ramirez, Director; Corinne Peek-Asa, Co-Investigator; John Lundell, Co-Investigator; T. Renée Anthony, Co-Investigator; and Stephanie Leonard, Field Investigator. Additional expertise is provided from the Iowa Department of Public Health, including Rita Gergely, Principal Investigator; Kathy Leinenkugel, Surveillance Specialist; and John Kraemer, Director, Forensic Operations at Iowa Office of the State Medical Examiner.

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