

## ***Laborer Dies When a Water Truck Drifts Downhill and Pins Him Against a Retaining Wall – Tennessee***

### **SUMMARY**

On June 9, 2006, a 28-year-old male laborer (the victim) died following injuries he received on June 7, 2006, when a water truck drifted downhill and pinned him against a retaining wall. The victim was working at a new residential construction site and was washing an entrance retaining wall. The employer had parked the water truck on an incline on the entrance road, placed it into neutral, engaged the parking brake, and left it idling. Approximately 20 minutes later, the truck started drifting down the road as the victim washed the wall with his back to the water truck. The employer yelled to warn the victim, as he and a subcontractor ran behind the truck. The victim froze, and the water truck struck him, pinning him between the water truck and the wall. The employer backed the truck off of the victim and called 911 on his mobile telephone as he checked the victim for injuries.

At approximately 10:30 a.m., Emergency Medical Services (EMS), the county sheriff and fire department were dispatched to the incident. At approximately 10:36 a.m., the sheriff, fire and EMS arrived at the scene. EMS assessed the victim and found that he was having difficulty breathing. A life flight helicopter was requested and the victim was transported to a state hospital where he was admitted and died two days later.

NIOSH investigators concluded that, to help prevent similar occurrences, employers should:

- *ensure that construction motor vehicles are inspected daily and that defective equipment is reported and removed from service until all the needed repairs have been made*
- *ensure that wheels are properly chocked on all construction vehicles when they are parked or left unattended on an incline*
- *develop, implement, and enforce a comprehensive written safety program for all workers which includes training in hazard recognition and the avoidance of unsafe conditions*

### **Fatality Assessment and Control Evaluation (FACE) Program**

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatality Assessment and Control Evaluation (FACE) investigations when notified by participating states (Maryland, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia); by the Wage and Hour Division, Department of Labor; or when a request for technical assistance is received from NIOSH-funded state-level FACE programs in California, Iowa, Kentucky, Massachusetts, Michigan, New Jersey, New York, Oregon, Washington and West Virginia. The goal of FACE is to prevent fatal work injuries by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact. FACE investigators evaluate information from multiple sources that may include interviews of employers, workers and other investigators; examination and measurement of the fatality site, and related equipment; and review of records such as OSHA, police, medical examiner reports, and employer safety procedures and training records. The FACE program does not seek to determine fault or place blame on companies or individual workers. Findings are summarized in narrative reports that include recommendations for preventing similar events in the future. For further information visit the FACE website [www.cdc.gov/niosh/face](http://www.cdc.gov/niosh/face) or call toll free 1-800-35-NIOSH.

## **INTRODUCTION**

On June 9, 2006, a 28-year-old male laborer (victim) died from injuries he received 2 days earlier after being crushed against a retaining wall by an unattended water truck. On June 12, 2006, officials of the Tennessee Occupational Safety and Health Administration (TOSHA) notified the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), of the incident.

On September 12, 2006, a DSR safety and occupational health specialist conducted an investigation of the incident and reviewed incident circumstances with the TOSHA safety compliance manager assigned to the case. Photographs of the incident site and witness statements taken by TOSHA shortly after the incident were reviewed. The city police report was reviewed. On September 14, 2006, the victim's employer was interviewed and a site visit was conducted. The medical examiner's report and death certificate were reviewed.

### **Employer:**

The victim's employer was an excavation contractor. The company had been in business for approximately 5 years. The company employed 3 full-time workers. This was the company's first workplace fatality.

### **Victim:**

The 28-year-old male victim had been working full-time for the company for four months. On the day of the incident, the victim was working as a laborer. The victim also operated a track hoe and performed other miscellaneous jobs on the construction site as needed. Prior to working for the employer, he had been working as an equipment operator.

### **Safety Program and Training:**

The company had a verbal safety program. The employer provided the safety rules verbally to employees when they were initially hired. Safety meetings were not provided by the company.

### **Incident Scene:**

The incident occurred at a residential construction site. Work began on the 400-acre site in February 2006. The residential construction site was owned by a family member of the employer. The incident occurred at the entrance of the site where the victim was cleaning a retaining wall (Photo 1). The masonry retaining wall was multi-level, varied in height and was approximately 300 feet in length. The entrance road located beside the retaining wall where the truck was parked had a 12-percent down grade and at the time of the incident the road was compressed dirt and gravel.

### **Equipment:**

The water truck involved in this incident was a 1975, used fire engine pumper, with a 5-speed manual transmission, that had been previously owned by a volunteer fire department. (Photo 2). The truck was purchased to be used as a water truck on the construction site by the owner of the residential construction site in March 2006.

**Weather:**

It was sunny at the time of the incident. Conditions were clear, and the temperature was in the 60's.

**INVESTIGATION**

On June 7, 2006, at approximately 8:00 a.m., a laborer (the victim) began operating a track hoe on the residential construction site. At approximately 10:00 a.m., the employer called the victim and told him that the retaining wall at the entrance needed to be washed and that he was on his way to pick him up. The employer picked up the victim in his work vehicle and they drove to retrieve the water truck. After arriving at the water truck, the employer assumed the driving position while the victim rode in the passenger seat. After driving approximately three miles, they arrived at the entrance road where the retaining wall was located.

The employer parked the water truck in the middle of the entrance road and applied the hand-lever parking brake. Prior to exiting, the employer turned the truck wheels to the left, so they were facing towards the retaining wall. The truck was parked halfway down the entrance road, which allowed the hose to reach the majority of the length of the wall. The employer assisted the victim with pulling a 2-inch hose that was approximately 100 feet in length from the driver's side of the truck. When the victim was ready to begin the washing process, the employer placed the water truck's manual transmission into neutral, engaged the power take-off (PTO) pump transfer and adjusted the throttle. The water truck was left idling, because power was needed to run the water pumps.

The victim began cleaning the retaining wall by starting near the top of the entrance road which was located above where the water truck was left idling and working his way down the hill toward the site entrance. As the victim cleaned the retaining wall, the employer stood near the top of the entrance hill and talked with a subcontractor regarding landscaping issues.

Approximately 20 minutes later, after cleaning approximately 150 feet of the retaining wall, the victim continued the washing process. The water truck (facing downhill approximately sixty feet away) began its descent down the entrance road, towards the retaining wall and the victim. The victim was positioned with his back to the truck. The employer observed the water truck moving down the road and thought that the victim was attempting to reposition the truck. As the employer began walking down the entrance road, he realized that the victim was working with his back towards the moving water truck, so he began yelling in an attempt to warn the victim.

The employer and the subcontractor ran behind the water truck, which the employer estimated was traveling downhill at approximately 5 miles per hour. The victim turned around and froze as the water truck approached. The employer and the subcontractor were approximately 40 feet away from the victim when the water truck struck the victim and the retaining wall. When they reached the victim he was facing toward the water truck and was pinned to the retaining wall. The employer jumped into the water truck, disengaged the pump operation and placed the truck into reverse. As the employer backed up the water truck, the victim fell to the ground. The employer called 911 on his mobile telephone as he checked the victim for injuries.

At approximately 10:30 a.m., Emergency Medical Services (EMS), the county sheriff and fire department were dispatched to the incident. At approximately 10:36 a.m., the sheriff, fire and EMS arrived at the scene. EMS assessed the victim and found that he was having difficulty breathing. A life flight helicopter was requested and the victim was transported to a state hospital, where he was admitted and died two days later.

Following this incident, the TOSHA compliance officer attempted to check the parking brake on the truck, however she was unable to do this due to the ignition of the truck being inoperable. The NIOSH investigator was unable to view the water truck due to weather issues and the truck's unsafe location. According to a written statement provided by the chief of the volunteer fire department, the truck was in service until the date of purchase and there was no indication of any service issues. According to the employer, prior to this incident the truck has been used at other areas on the residential construction site on two separate occasions without incident.

### CAUSE OF DEATH

The medical examiner's report stated that the causes of death were due to a cerebral edema, a liver laceration and pelvic fractures due to being crushed by a truck.

### RECOMMENDATIONS

***Recommendation #1: Employers should ensure that construction motor vehicles are inspected daily and that defective equipment is reported and removed from service until all the needed repairs have been made.***

Discussion: All construction vehicles should have an adequate functioning service brake system and parking brake system. These systems may use common components, and must be maintained in operable condition.<sup>1</sup> All construction equipment in use is required by OSHA 1926.601(b)(14) to be checked at the beginning of each shift.<sup>1</sup> The employer did not require the water truck involved in this incident to be inspected prior to each shift. The water truck was equipped with a parking brake. According to the employer, when the victim was ready to begin the washing process, the employer placed the water truck's manual transmission into neutral, engaged the power take-off (PTO) pump transfer, adjusted the throttle and engaged the hand-lever parking brake. In this incident, the water truck drifted down hill while being used, therefore the parking brakes either malfunctioned or failed while the hand-lever parking brake was applied. The parking brake is a required safety device and must work properly when called upon to keep a vehicle stationary. The main function of the parking brake is to prevent the vehicle from drifting forward or backward when the vehicle is parked.

Employers should designate a supervisor and/or a competent person<sup>a</sup> to be responsible for daily pre-shift equipment checks and for verifying that any problems identified are corrected.<sup>2</sup> Although construction motor vehicles may also be inspected by other workers, the employer must be responsible for ensuring that inspections are performed daily, that all the necessary repairs are made, that scheduled maintenance is performed, and that records of all inspections are maintained. A

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<sup>a</sup> "Competent person" means one who is capable of identifying existing and predictable hazards in the surrounds or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

requirement that all construction motor vehicles be removed from service until the required repairs are made must be implemented and consistently followed.

***Recommendation #2: Employers should ensure that wheels are properly chocked on all construction vehicles when they are parked or left unattended on an incline.***

Discussion: When construction vehicles are parked on inclines, ensuring that the wheels are chocked and the parking brake set will assist in preventing the vehicle from moving. Even when the parking brake is applied, construction motor vehicles can still sometimes move. In this incident, the pumping operations may have contributed to the downhill movement. Wheel chocks come in several designs such as a contour, pyramid, and wedge, and they are best utilized in pairs. Appropriate wheel chocks should be carried at all times with the vehicle to make them readily available to be used anywhere they are needed.

Companies should require that chocks be used as a standard operational procedure when parking any construction motor vehicle, especially on an incline. To prevent downhill movement of the water truck in this incident, wheel chocks should have been placed squarely against and installed on tires downhill from the truck's center of gravity (i.e. on the front axle tires) and placed squarely against the tires.

According to the victim's employer, wheel chocks were purchased following this incident and are now kept on the water truck at all times. Additionally, workers were notified that they are now required to use the wheel chocks anytime the water truck is parked.

***Recommendation #3: Employers should develop, implement, and enforce a comprehensive written safety program for all workers which includes training in hazard recognition and the avoidance of unsafe conditions.***

Discussion: A comprehensive written safety program should be developed for all workers and should include training in hazard recognition and the avoidance of unsafe conditions.<sup>3</sup> It should also include site-specific training (i.e., working with and around mobile construction vehicles) that must be conducted and documented. The safety program should include, at a minimum, worker training in hazard identification and the avoidance and abatement of these hazards. Employers should evaluate all tasks performed by workers, identify all potential hazards, then develop, implement, and enforce a written safety program that meets applicable OSHA standards and addresses these hazards. The victim's employer did not have a comprehensive written safety program or provide any type of formal employee safety training.

Employers should evaluate tasks performed by workers, identify all potential hazards, and then develop, implement, and enforce a safety program addressing these identified hazards. Additionally, according to 29 CFR 1926.21(b)(2)<sup>3</sup> "the employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to their work environment to control or eliminate any hazards or other exposure to injury or illness." The victim had not received any type of safety training from the employer. Residential construction sites expose workers to multiple and complex hazards. It cannot be assumed that employees, especially those recently hired,

are able to recognize hazards to which they are being exposed such as working downhill from an idling construction vehicle. Training in recognizing and avoiding hazards should be given to all workers, coupled with employer assessments that workers are competent in the recognition of hazards and safe work practices.

### REFERENCES

1. Code of Federal Regulations 2006 edition. 29 CFR 1926.601 Motor Vehicles, Mechanized Equipment, and Marine Operations. Washington, DC: U.S. Printing Office, Office of the Federal Register.
2. Code of Federal Regulations 2006 edition. 29 CFR 1926.32(f). General Safety and Health Provisions. Washington, DC: U.S. Printing Office, Office of the Federal Register.
3. Code of Federal Regulations 2006 edition. 29 CFR 1926.21 General Safety and Health Provisions. Washington DC: U.S. Printing Office, Office of the Federal Register.

### INVESTIGATOR INFORMATION

This investigation was conducted by Nancy T. Romano, Safety and Occupational Health Specialist, Fatality Investigations Team, Surveillance and Field Investigations Branch, Division of Safety Research.

### ACKNOWLEDGEMENT

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**Photo 1. Photo of the Entrance Road and Retaining Wall 3 Months After the Incident.**



**Photo 2. Photo of the Water Truck. [Photograph courtesy of the TOSHA].**