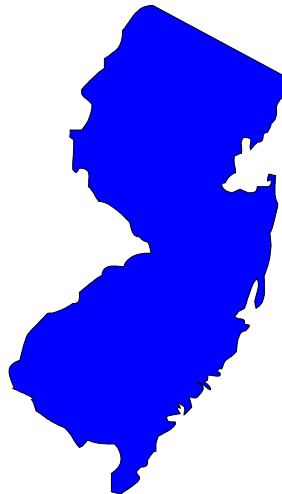


F.A.C.E. INVESTIGATION REPORT

Fatality Assessment and Control Evaluation Project

FACE #96-NJ-044-01

Municipal Maintenance Worker Killed When Struck With
the Steel Coupling of an Out-of-Control High Pressure
Water Hose



New Jersey Department of Health and Senior Services
Occupational Disease and Injury Services
P.O. Box 360
Trenton, New Jersey 08625-0360
(609) 984-1863

TO: Division of Safety Research
National Institute for Occupational Safety and Health
Morgantown, West Virginia

FROM: Fatality Assessment and Control Evaluation (FACE) Project
New Jersey Department of Health and Senior Services (NJDHSS)

SUBJECT: FACE Investigation #NJ-96-044-01
Municipal Maintenance Worker Killed When Struck With the Steel
Coupling of an Out-of-Control High Pressure Water Hose.

DATE: December 3, 1996

SUMMARY

On June 27, 1996 a 62 year-old senior grounds keeper/maintenance worker was killed when a high pressure water hose went out of control. A crew of workers was using a plunger pump sewer cleaner to attempt to blast water into a hole to deepen it for installation of a new light pole. The victim died when he was struck on the head by the steel coupling of the hose. Three other workers were injured. New Jersey FACE investigators concluded that, in order to prevent similar incidents, the following safety guidelines should be followed:

- o Equipment should be used only for the purpose for which it was designed.
- o Employers should implement a comprehensive safety training program.
- o Employers should conduct a job hazard analysis to identify and correct potential hazards.

INTRODUCTION

On June 27, 1996, the NJDHSS FACE staff was informed of this fatal work-related incident by a NJDHSS Public Employees Occupational Safety and Health (PEOSH) program staff person. It was initially reported as an explosion. A FACE staff member visited the site within a few hours of notification but found the site had been cleared and all equipment removed. After contacting the employer, a second site visit was conducted on July 1, 1996. The employer's safety representative was present and one witness was interviewed. Further information was received from the medical examiner, police report, and the NJ Department of Labor PEOSH program.

The employer was a municipality which employed 350 employees at the time of the incident.

The decedent was a 62 year-old senior grounds keeper/maintenance worker for the department of public works who had worked for the municipality for 23 years. The maintenance department was unionized.

The employer had no written safety instructions specific to this incident and no formal instructions had been given to the workers who were present that day.

INVESTIGATION

This incident occurred in an open recreational field owned by the municipality and located about 150 feet from a river and swimming area. The soil was sandy and covered with grass. New lighting was needed for the area, in anticipation of recreational activities during the summer season.

Three of the workers at the site were employed by the municipality, three were employed by an electrical contractor, on site to do the electrical wiring for the new lights, and one was employed by a subcontractor hired to dig the holes with an auger truck and mount the pole in the hole. The decedent was the acting foreman for the public works crew, replacing the usual foreman who was on vacation.

The crew of seven workers had earlier installed a light pole in the same field, about 50 feet further away from the water. They dug that hole using an auger and finished it by clearing it out with the plunger pump sewer cleaner, using a hose with nozzle attached, with no difficulties. A plunger pump sewer cleaner is a positive displacement exhauster unit designed as a combination vacuum and high pressure cleaning unit for cleaning sewer drains or catch basins, as well as performing other cleaning operations.

At approximately 2 p.m., the crew of seven moved to the area in which a second light pole was to be installed. At the scene were the auger-pole truck, a truck-mounted aerial lift to be used by the electricians, and the plunger pump sewer cleaner diesel truck owned by the municipality. The hole for installation of the light pole was dug using the power auger but the walls of the excavation kept collapsing and filling with water. The water table at this location was higher than the first since it was closer to the river. The wooden cedar pole, 36 feet long and 6 inches square, was picked up by the gripper attached to the pole truck, inserted into the hole, and held in an upright position by the gripper. Planning to insert the pole to a depth of six feet, they met resistance when the pole was 5 feet into the ground. After discussing the problem, the decision was made (unknown by whom) to use a small diameter hose, with a gun type attachment, to attempt to force the water and sand out of the hole and insert the pole to the designated depth. This was not successful so they chose a one inch diameter rubberized hose with a metal coupling 4 inches long, apparently to add higher pressure. Attached to this was a 4 inch oval-shaped cleaning nozzle, or reduction bit, that had a center opening to direct the stream of water and outlets which discharged the backflow fluid. This was also not effective in deepening the hole sufficiently. The workers shut off the truck and discussed the situation. Apparently a decision

was made (again unknown by whom) to try to deepen the hole using the water pressure without the cleaning nozzle. One worker removed his shoes and stepped into the hole, which was about ten feet in diameter. He placed the end of the hose five feet down to the bottom of the hole. The decedent stood behind him, stabilizing the hose. One worker was elevated in the aerial lift and others stood by to observe. The truck was re-started, turning on the water pressure which was set around 1500 to 2000 psi. Within seconds, the worker standing in the hole and holding the hose was blown about ten feet out of the hole, suffering severe injuries to his torso and right arm. The hose, which delivered approximately 62 to 64 gallons per minute (according to the NJDOL PEOSH program) was out of control, flailing about under pressure. The victim was struck in the head by the coupling. The hose, still under pressure, struck a third worker, severely injuring his arm, and a fourth worker who also suffered an arm injury. The hose was controlled only when the truck was turned off. The reduction bit was found on the ground, near the hole.

A loud explosive noise was heard by lifeguards, which was why the incident was first reported as an explosion, and others near the beach, probably resulting from the hose coupling gouging the wooden light pole. They immediately called for help. Police and a municipality representative arrived within minutes. A retired fire fighter, who was in the area, rendered first aid. Police immediately called for medivac service. The most severely injured was taken by helicopter to a trauma center and admitted for surgery, one worker was transported by ambulance and admitted for surgery, one was taken to a general hospital and treated in the emergency room, and one was sent to an emergency room for observation.

The victim was pronounced at the scene.

Crisis counseling, plus follow-up, was offered by the municipality to all workers, witnesses, lifeguards and anyone involved with the incident.

CAUSE OF DEATH: The medical examiner determined that death was caused by blunt force injury of the head.

RECOMMENDATIONS/DISCUSSIONS

Recommendation # 1: Equipment should be used only for the purpose for which it was designed.

Discussion: The plunger pump sewer cleaner (positive displacement exhaustor unit) was designed as a combination vacuum and high pressure cleaning unit for cleaning sewer drains or catch basins, as well as performing other cleaning operations. It was not designed to water jet excavations such as the one for the lighting pole. Although a manufacturer's maintenance manual was available, no operating manual was found. If the maintenance department finds that they are using this equipment for other purposes, they should investigate the availability of new and appropriate equipment for those uses.

Recommendation #2: Employers should implement a comprehensive safety training program.

Discussion: None of the municipal employees at the site had been trained in operating the pump sewer cleaner. When the equipment was purchased in 1990, the workers were trained by the dealer's representative. No documentation was kept to record which employees had been present during this training. Since that time, workers have been trained on the job by senior employees. Workers were apparently unaware of the consequences of using equipment being operated under such high pressure. A comprehensive training program should be initiated and attendance documented. Training should include safe use of equipment and emphasize that equipment be used only for purposes for which it was designed.

Since this incident, training procedures have been revised and upgraded. Records are kept of what training has been offered and what workers participated in the training.

Recommendation # 3: Employers should conduct a job hazard analysis to identify and correct potential hazards.

Discussion: A job hazard analysis should be conducted by employers with their employees to identify potential hazards of the workplace. An analysis should include evaluating job sites, types of tasks performed, equipment usage, and standard operating procedures. Because municipal maintenance workers perform many different tasks in many types of settings, an overall analysis should be accompanied by an overview of each work site.

REFERENCES

N.J.A.C. 12:100 New Jersey Public Employees Occupational Safety and Health Program.

Job Hazard Analysis. OSHA 3071, US Department of Labor, Occupational Safety and Health Administration, Washington, DC. 1988.