The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research NIOSH

Sign Technician Electrocuted Stepping from Energized Ladder Truck

FACE 89-08

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) , performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying the working 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.

On November 29, 1988, a 45-year-old male sign technician was electrocuted when a steel cable attached to the extended ladder of the ladder truck he was operating contacted a 12-kilovolt (kV) overhead power line, and he stepped from his truck to the ground while holding the energized door.

Contacts/Activities:

State Occupational Safety and Health Administration officials notified the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) of this fatality and requested technical assistance. On January 10, 1989, a research safety specialist met with a state OSHA compliance officer, the local police chief, emergency medical personnel, and photographed the incident site.

Overview of Employer's Safety Program:

The two-man company (the owner and a helper), a sign and service business, had been in operation for 4 years. The company had no written safety rules or procedures. The helper was trained on the job.

Synopsis of Events:

On the day of the incident the owner (the victim) and the helper were changing light bulbs in the pole-mounted lighting fixtures of a shopping center parking lot. The procedure used for this task was: 1) position the aerial ladder truck next to a light pole, 2) extend the ladder to the proper angle, 3) rotate the ladder toward the light pole, 4) extend the ladder to the

proper height, 5) change the bulb, 6) rotate the ladder back over the cab of the truck, and 7) move the truck to the next light pole requiring service without retracting the ladder to its original position. A steel cable attached to the tip of the ladder was used to hoist materials to the person on the ladder.

Just prior to the incident the victim had changed a light bulb and was moving the truck (following the procedure described above) to the next light pole, which was located on the shopping center's entrance roadway. The helper was following in a pick-up truck approximately 50 yards away. As the victim was driving the ladder truck down the entrance roadway toward the main highway, the steel cable hanging from the tip of the extended ladder contacted a 12-kilovolt (kV) overhead power line. Apparently the victim realized a problem had occurred (presumably he heard an electrical arcing noise), and proceeded to get out of the truck. As the victim stepped onto the ground while holding the door, he completed the "path to ground" for the electrical current and was electrocuted. He was engulfed in flames when the ladder truck caught fire as a result of the arcing electricity.

Local fire, police, and emergency medical service (EMS) units were called; all responded in approximately 4-5 minutes. Also, the local utility company was notified. Utility company personnel arrived in approximately 10 minutes to de-energize the power line. Firemen extinguished the truck fire and EMS personnel removed the victim's incinerated body and transported it to the hospital morgue.

Cause of Death:

The coroner ruled that death was due to electrocution and severe burns.

Recommendations/Discussion

Recommendation #1: Employers should ensure that adequate clearance is maintained between aerial ladders and nearby overhead power lines.

Discussion: 29 CFR 1910.67 (b)(4)(A) requires that a clearance of a least 10 feet be maintained between any part of an aerial lift and power lines of 50 kV or less. The practice of moving a ladder truck while the ladder is extended is extremely hazardous. Overhead power lines can be difficult to see from the ground, particularly if attention is focused on operating a vehicle, and vision is limited by the cab enclosure. The victim apparently did not know (or had forgotten) that the power line was located in the path of the extended ladder, or saw the power line and misjudged the clearance. In either case, avoiding the practice of moving the truck with the ladder extended should prevent similar future incidents.

Additionally, each specific job or worksite introduces potential hazards. Therefore, employers should conduct a jobsite survey, identifying all potential hazards and implementing appropriate control measures, prior to starting any job. A pre-job survey in this case would have identified the power lines and all associated hazards. The aerial ladder could have been retracted prior to the truck being moved thereby preventing the incident.

Recommendation #2: The employer should begin to develop and implement a safety program by performing job hazard analyses and pre-job surveys to identify and control hazards.

Discussion: This employer had no safety program. Since the primary reason for establishing a safety program is worker protection, a logical first step is identification of potential hazards. One way of identifying hazards is to analyze each step in routine operations, anticipate hazards that could arise during each step, and develop procedures or other control measures which effectively eliminate or reduce each hazard. This process is known as job hazard analysis. In this case, an informal operating procedure (moving the ladder truck while the ladder was extended) was inappropriate for the task being performed. Employers should perform job hazard analysis of all jobs, starting with those thought to be most hazardous, and develop and implement controls that protect all workers.

Recommendation #3: Manufacturers should design a passive engine interlock system that prevents engine start-up unless the ladder is fully retracted, and install such systems on all new aerial ladder trucks.

Discussion: An engine interlock system that requires the aerial ladder be in the down (highway transport) position before the truck can be started and moved, would automatically ensure that a moving truck could not come into contact with any overhead powerlines.

Recommendation #4: Shopping center/mall owners should consider installing lighting systems that can be serviced from the ground level.

Discussion: Installation of lighting systems that can be raised and lowered from the ground level should be considered by the owners of shopping centers/malls. Servicing these units would not require use of aerial ladder trucks (or other boomed-vehicle) and would therefore eliminate the possibility of contacting power lines. Also, the possibility of workers falling from ladders while changing light bulbs would be eliminated. Work environment modifications can eliminate or reduce hazards without placing the total responsibility for injury prevention on the worker at risk.

Recommendation #5: All organizations with an interest in protecting worker health, including government agencies such as Federal and State OSHA, NIOSH, trade associations, labor unions, safety societies, universities, insurers, etc., should increase efforts to communicate basic and essential safety information to all levels of society.

Discussion: Everyone in society is exposed to electrical energy. The nature of the hazards presented by overhead power lines and other electrical conductors and equipment must become thoroughly ingrained in our collective consciousness if electrocutions are to be prevented. Had the victim realized that he would have probably remained safe if he stayed inside the vehicle, or if he jumped clear instead of maintaining contact with the energized truck, this death might have been prevented.

Return to In-house FACE reports

Last Reviewed: November 18, 2015