



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Lineman Electrocuted

FACE 88-23

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 June 7, 1988, a 41-year-old male journeyman lineman with 23 years' experience was electrocuted when his hands contacted both sides of a switch on a pole-mounted capacitor bank.

Contacts/Activities:

State Occupational Safety and Health Administration officials notified DSR of this fatality and requested technical assistance. On June 21, 1988, a DSR research team conducted a site visit and met with employer representatives to investigate this incident.

Overview of Employer's Safety Program:

The victim was an employee of an electrical contractor that has been in operation for over 19 years. The contractor employs 300 workers, including 17 journeyman linemen. The contractor has a written safety policy, a comprehensive safety and training program, and a full-time safety officer. The employees receive periodic training and re-training. Daily tailgate safety meetings, including discussions on safe work procedures for hazard control, are conducted at the job site. Additionally, the safety officer visits each crew at least once a week to conduct a site evaluation and crew safety meeting.

The employer has developed a list of "absolute don'ts" as their primary job site safety rules. These rules are carefully explained to the workers. This list includes items such as: 1) do not begin work before truck and equipment are properly grounded, and 2) do not enter a bucket without all personal protective equipment in place. A violator of these absolute don't" rules is sent home upon committing an infraction two times. The third infraction warrants dismissal.

The employer implements an additional safety measure at job sites. Multiple grounding of all trucks and equipment is required in an effort to prevent electrocutions due to inadvertent energization of this equipment. This procedure is not required by legal or consensus standards, but is felt by the company to be essential in reducing workers' risk of injury during line work.

Synopsis of Events:

Development in the metropolitan area where the incident occurred, had increased the load on the existing 7200-volt distribution system causing voltage dips in the supply. In order to correct this problem, the local electrical utility company contracted the employer to install pole-mounted capacitor banks and connect them to the system.

On the day prior to the incident, a crew had installed a pole-mounted capacitor bank, but had not connected it to the system.

On the day of the incident, the victim and a crew leader arrived at the site to connect the capacitor bank. They first held a tailgate safety meeting just prior to the arrival of the company safety director to conduct his weekly site safety evaluation and meeting. Following the meetings, the safety director told the victim that the day was going to be extremely hot. He instructed the victim to take all the extra time and precautions necessary to complete the job safely, and to drink plenty of fluids.

By approximately 7:30 a.m., the truck had been grounded, line hoses and blankets were in place, and the victim, wearing his required personal protective equipment, had begun work. At approximately 11:50 a.m., the victim notified the crew leader that his hands were cramping and that he was very hot. The crew leader instructed the victim to take a break and get a drink while he called the utility company to ask a technical question on the electrical hook-up of the capacitor bank. The victim lowered himself to the ground and removed his gloves, hanging them on hooks in the basket.

The crew leader then turned away and walked toward a pay phone approximately 100 feet away. The crew leader had walked about 50 feet when he heard an electrical arc. He turned to see that the victim had raised the bucket up to the power lines. The victim was upright in the bucket but leaning backwards. His gloves were still hanging on the hooks on the bucket. The crew leader ran to the truck and lowered the bucket. He pulled the victim from the bucket and immediately began cardiopulmonary resuscitation (CPR). When he could detect no pulse, he called his dispatcher to summon the emergency medical service (EMS). He then returned to the victim and continued CPR with the assistance of a passing motorist who had stopped. The EMS arrived and transported the victim to the hospital where he was pronounced dead-on-arrival.

Electrical burns on the victim's hands and a switch at the capacitor bank indicate that the victim's left hand contacted the jaw of the switch and his right hand contacted the base of the switch. The current passed across the victim's chest causing the electrocution. No explanation could be given as to why the victim raised the bucket or why he had his gloves off. During his 23 years as a lineman he had a perfect safety record.

Cause of Death:

The medical examiner reported the cause of death as electrocution.

Recommendations/Discussion

Recommendation #1: Personal protective equipment should be evaluated under different environmental conditions while employees perform tasks.

Discussion: A review of the employer's safety program reveals that the employer is taking every step to ensure safety of their workers. In this case, an environmental factor (extreme heat) may have contributed to the death. The personal protective equipment (gloves) were uncomfortable under these circumstances and because the worker did not use the gloves, he was electrocuted. Whether this was intentional (due to the discomfort) or unintentional (due to stress induced by the heat) is unclear. Personal protective equipment should be designed so that it is comfortable and easy to use under all environmental conditions a worker might be exposed to.

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Partly

No