



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research / **NIOSH**

Distribution Line Technician Electrocuted by Conductor in Contact with 7200-volt Power Line

FACE 89-36

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 April 20, 1989, a 44-year-old male distribution line technician was electrocuted and a second distribution line technician received severe electrical burns when a new conductor they were installing contacted an existing, energized 7200-volt power line.

Contacts/Activities

State officials notified DSR of this fatality and requested technical assistance. On May 16, 1989, two safety specialists evaluated pictures, line drawings, and the circumstances of the incident with the company's president, regional manager, and supervisor of power line construction. The circumstances of the incident were also reviewed with the county coroner and the county police. Investigative reports were obtained from the county police and the company.

Overview of Employer's Safety Program

The victim was one of 100 distribution line technicians employed by an electrical contractor. The contractor has been in operation for 43 years and employs 550 workers. The contractor has no written safety policy or safety program but adheres to the safety practices of any company for which they do contract work. The contractor does have an unwritten policy that requires linemen's gloves and rubber overshoes be worn when line work is being performed. Daily safety tailgate meetings are held at the job site, and weekly safety meetings are held at the office. The company maintains a video library of safety films dealing with all aspects of power line construction. These films are shown both in the office and in the field. Supervisors are required to complete a daily safety checklist for each job completed. Since this incident, the company has begun to develop a comprehensive written safety program and has reaffirmed with each worker its position on the use of rubber gloves and rubber overshoes.

Synopsis of Events

The company was under contract to assist the local utility in converting an existing single-phase 7200-volt distribution system into a 3-phase system by installing two new conductors. The new conductors were to be located just 15 inches below the existing conductors, which were attached to pole-top insulators located at opposite ends of the 8-foot crossarms on each pole. At the time of the incident the job was nearly completed. One new conductor had been installed. Three 2-man crews (one crew from the utility company and two from the contractor) at the site were preparing to sag (adjust the amount of slack) the last four spans (one span is the distance between two power poles) of the second new conductor, an overall distance of 1,058 feet.

The two utility company employees were located in a bucket at the top of the pole at the end of the fourth span preparing to “dead-end” (attach) the second new conductor to an insulator on the final crossarm (see [Figure 1](#)). One contractor crew (the victim and co-worker) was located at the base of the pole, at the end of the fourth span, preparing to pull the slack out of the new conductor by hand. The second contractor crew was directing traffic near the first pole of the fourth span, which was 216 feet from the end pole.

The victim, because of his seniority, was the supervisor of the contractor employees. When the utility company employees were ready to dead-end the conductor to the crossarm, they called down to the victim to take up the slack. The victim grasped the conductor and began to pull but was not able to take up any slack. The co-worker, seeing that the victim was having a difficult time, grasped the conductor behind the victim and also began to pull. At this time one of the crewmen directing traffic saw that the conductor had become snagged in the topped-out cedar trees in the first span. Before he could yell for the victim to stop pulling, he heard a loud buzz and saw a flash at the midpoint of the first span above the topped-out cedar trees. The two workers had pulled on the new conductor with enough force to cause it to flip up into the energized conductor. The crewman also noticed the new conductor swaying back and forth. The utility company employees heard the victim and his co-worker yell and turned to see both men fall to the ground. They immediately lowered themselves to the ground and began to administer cardiopulmonary resuscitation (CPR) to the victim. The co-worker received electrical burns to his left arm and right side. Two nurses passing in a car stopped and assisted with CPR until the emergency medical service (EMS) rescue squad arrived. The EMS personnel transported the victim and co-worker to a local hospital where the victim was pronounced dead by the attending physician. The injured co-worker was transferred to a burn center where he was listed in serious condition. At the time of the NIOSH investigation, the co-worker had been released from the burn center, but had not returned to work.

Investigation revealed that neither man was wearing the required rubber gloves or rubber overshoes at the time of the incident. The victim and co-worker had been seen wearing their protective equipment by the field supervisor during several daily inspections, and had been seen wearing their gloves and overshoes earlier on the day of the incident. At the time of the incident, the co-worker was wearing leather gloves and the victim was working bare-handed. The fact that the co-worker was wearing leather gloves, and was standing behind the victim who may have received most of the electrical charge, might explain why there was only one fatality in this incident.

Cause of Death

The attending physician listed cardiac arrest due to electrocution as the cause of death.

Recommendations/Discussion

Recommendation #1: Employers should stress the importance of strictly following established safe work procedures including wearing required personal protective equipment.

Discussion: The victim, the contractor supervisor at the job site, had worked for the contractor for 13 years, and was aware of safety procedures requiring the wearing of rubber gloves and overshoes. The two workers had been observed at various times, including earlier on the day of the incident, wearing the required protective equipment. They were not wearing their equipment at the time of the incident. Employers must ensure that all workers understand the importance of following established safe work procedures at all times.

Recommendation #2: Non-conductive drag lines should be attached to the conductors being installed for use by employees during sagging operations, especially when performing these operations by hand.

Discussion: The protective equipment required for these operations, if worn, would probably have reduced the severity of the outcome of this incident. To further protect the safety of workers, non-conductive drag lines could be attached to the conductors and pulled by workers during sagging operations. In this instance the energized lines were located only 15 inches above the new conductor. This would eliminate the need for the workers to directly contact the conductors during these operations.

Recommendation #3: A job site survey should be conducted prior to beginning work to identify existing or potential hazards.

Discussion: A job site survey performed prior to beginning work may have identified the topped-out cedar trees as a potential hazard. Once this hazard was identified, a lookout could have been posted near the tree to alert the other workers if the conductor became snagged in the trees. Additionally, the feasibility of placing protective sleeves over energized conductors during stringing operations should be considered.

Recommendation #4: The employer should design, develop, and implement a comprehensive safety program which includes specific written procedures for all work near energized power lines.

Discussion: The employer should design, develop, and implement written procedures for specific tasks such as line stringing and sagging. These procedures should include, but not be limited to:

1. Worker training
2. Electrical hazard recognition
3. Use of personal protective equipment
4. Supervisory job site surveys prior to the start of work
5. First aid cardiopulmonary resuscitation (CPR) certification training.

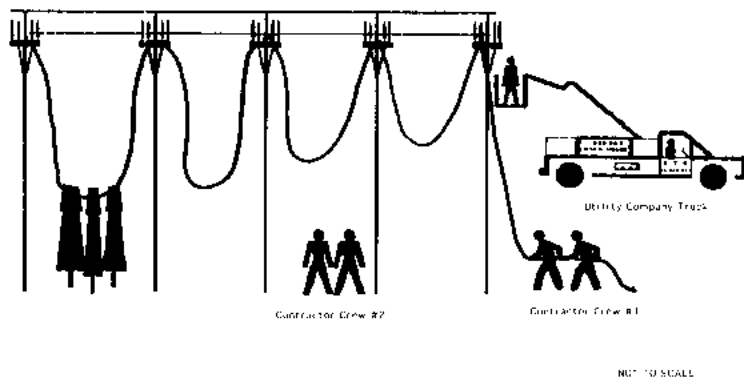


Figure 1.

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Partly

No

