The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Lineman Electrocuted in North Carolina

FACE 86-09

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrical-related and confined space-related fatalities. By scientifically collecting data from a sample of fatal accidents, it will be possible to identify and rank factors that influence the risk of fatal injuries for selected employees.

On November 4, 1985, a lineman was electrocuted while working from an aerial-bucket truck when he came in contact with a 13.2 kV power line.

Contacts/Activities:

Officials of the Occupational Safety and Health Program for the State of North Carolina notified DSR concerning this fatality and requested technical assistance. This case has been included in the FACE Project. On December 17, 1985, the DSR Research Team Coordinator met with employer representatives, the North Carolina Occupational Safety and Health Program compliance officer, conducted a site visit, interviewed comparison workers, and photographed the accident site.

Overview of Employer's Safety Program:

The victim worked for a power company that employs 9579 employees, 60 of whom work as linemen in the district of the accident site. The victim was classified as a first-class lineman. All linemen are required to attend a lineman training school conducted by the company. The company has a written safety policy and program with a safety and health manager and 17 safety and health professionals. Safety training is accomplished by on-the-job training, simulation, and classroom courses with outdoor training activities. Safety committees are located at each of the company locations and meet monthly. All accidents are investigated at the local and corporate level.

Synopsis of Events:

On November 4, 1985, the victim (a 34-year-old male, first-class lineman) was attempting to install a 37.5 kVA transformer on a new pole. The new pole was installed next to the old pole and the 13.2 kV primary conductor had been transferred to the new pole. A "stirrup" (U-shaped connector) had been clamped to the primary conductor. The "stirrup" is used to connect the transformer input wire to the primary conductor. The primary conductor (including the "stirrup") remained energized during the transformer installation. An insulated line hose covered the conductor, but part of the "stirrup" remained

exposed. The victim was working from the insulated bucket of an aerial-bucket truck; however, the aerial-bucket truck was not grounded per standard operating procedure. The transformer was attached to the hook of the steel cable rigging on the boom of the aerial-bucket truck. The victim was trying to install the transformer onto the two bracket bolts on the pole and was having difficulty because the bolts did not properly align with the holes on the transformer bracket.

As the victim was guiding the transformer with his right hand and operating the controls with his left hand, he contacted the “stirrup” of the primary conductor. His body was leaning over the steel cable rigging assembly when he contacted the “stirrup,” which was only 2 feet 4 inches from the top of the bucket. The electricity entered his left shoulder and exited through his chest, into the steel cable of the rigging assembly, and to ground through the aerial-bucket truck. The victim was in contact with the power line for 10-20 seconds.

A co-worker, who was removing a tool belt from the truck at the time of the accident, was also injured due to electric shock. Two other co-workers were within the vicinity of the truck, but were not injured.

Cause of Death:

The coroner determined that the cause of death was due to electrocution.

Recommendations/Discussion:

Recommendation #1: All energized conductors and any connections to these conductors should be covered with insulating line hoses or blankets to assure proper protection for anyone working near these conductors.

Discussion: The insulating line hose in this situation did not completely cover the “stirrup.” In addition to the line hose, an insulating blanket should have been wrapped around the exposed “stirrup.”

Recommendation #2: The aerial-bucket truck should have been properly grounded.

Discussion: The aerial-bucket truck should have been grounded to the distribution system in order to provide protection for anyone near the truck (in case of a ground fault through the truck).

Recommendation #3: During transformer installation, the transformer should be raised to the proper installation height and then a worker positioned on the pole should guide the transformer onto the installation bolts, for a work situation such as involved in this accident.

Discussion: In this accident, the victim in the bucket was in an awkward position (leaning out of the bucket) in order to install the transformer. This placed him within a 2 feet 4 inch area near the primary conductor. A person on the pole would be in a better position to install the transformer and would be at a safe distance from the primary conductor.

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