



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces  
through safety and health research



# Apprentice Lineman Electrocuted While Setting Utility Pole—Virginia

FACE 92-30

## SUMMARY

A 34-year-old male apprentice lineman (the victim) was electrocuted while assisting a co-worker in setting a wooden utility pole. The pole had been raised between two phases of a 34,500-volt overhead powerline and the victim was helping set the pole by steadying the butt over the hole. The victim slipped on the wet ground and his unprotected upper body fell against the pole while the top of the pole contacted one phase of the powerline (19,900-volt phase to ground). The victim was wearing rubber lineman's gloves as required by company policy. The wet connections allowed the current to travel down the pole, entering the victim's chest and exiting to ground through the victim's right elbow. The victim raised up, stepped back from the pole, and collapsed to the ground. Cardiopulmonary resuscitation was initiated immediately by the co-worker and a passing emergency medical technician; however, efforts to revive the victim were unsuccessful.

NIOSH investigators concluded that, to prevent similar occurrences, employers and utility companies should:

- **consider de-energizing overhead powerlines when erecting replacement poles within existing powerline installations**
- **consider the use of redundant methods of protection when erecting replacement utility poles within existing energized overhead powerline installations**
- **ensure that, during pre-work site surveys, particular consideration is given to the hazards presented by existing environmental conditions and that additional control measures are implemented.**

In addition, manufacturers of powerline maintenance equipment should:

- **explore equipment designs which would allow complete "hands-off" erection of utility poles.**

## INTRODUCTION

On May 21, 1992, a 34-year-old male apprentice lineman (the victim) was electrocuted when the utility pole which he was helping to set contacted one phase of a 34,500 volt overhead powerline (19,900 volt phase to ground). On August 14, 1992, officials of the Virginia Occupational Safety and Health Administration (VAOSHA) notified the Division of Safety Research (DSR) of the incident and requested assistance. On September 2, 1992, a safety engineer from DSR accompanied

the employer's safety director to the incident site and conducted an investigation. The investigator reviewed the incident with the safety director and the VAOSHA compliance officer assigned to the case. The incident site was photographed and the death certificate was obtained during the investigation.

The employer in this incident was a multi-state electrical contracting corporation employing a total of 500 employees, 50 of whom were apprentice linemen. The corporation had been in operation for 35 years. The company had a written safety policy and safe work procedures, as well as a full-time safety director who reported directly to the company president. The employer maintained a corporate safety committee which met every 4 months. In addition, the company participated with the local labor union in a joint safety committee. The company was conducting regular weekly safety talks and the journeyman lineman/foreman was holding toolbox safety talks on an unscheduled basis depending on the daily work assignments. The victim was classified as an apprentice lineman 3, with about 1½ years' total experience. He had successfully completed 3 weeks of formal apprenticeship training, including both classroom and hands-on sessions. This was the fourth work-related fatality experienced by the company, the last occurring in 1981.

## INVESTIGATION

The employer had been contracted to perform various maintenance services for an electric utility company. On the day of the incident, the victim's crew (journeyman lineman/foreman, two journeyman linemen, and an apprentice lineman, [the victim]) had been assigned to replace a wooden utility pole located in the right-of-way along a state highway. Two of the crew members, however, had been excused from work to attend to personal business. The new pole had been placed at the jobsite 3 to 4 days before and had been lying on the ground in the powerline right-of-way. The weather had been rainy for several days before the incident and the ground at the work site was wet and muddy. The journeyman lineman/foreman (co-worker) and the victim arrived at the work site at about 2 p.m. They installed two guy wire anchors and were positioning their digging truck in preparation for installing two more anchors when the truck became stuck. They returned to the company headquarters and obtained another truck equipped with a winch. Returning to the jobsite, they freed the digging truck and installed the remaining anchors. They then positioned and grounded the digging truck and dug the hole for the replacement pole. After the hole was dug, the victim put on rubber lineman gloves as required by company policy. Using the boom and hoist of the digging truck to pick up the top end of the pole, the workers raised the pole between two phase conductors of the powerline. With his protective equipment consisting of gloves only, the victim assisted in positioning the pole by guiding and steadying the butt of the pole over the hole. The pole was almost in position so that the digging truck grabs could be closed when the victim apparently slipped on the wet ground. He fell against the pole as the top of it contacted one of the energized phase conductors. The journeyman lineman/foreman immediately looked toward the victim to check his location and saw him leaning against the pole. The victim then stood up, took a few steps backward, and fell over. The co-worker immediately moved the pole from contact with the phase conductor and dismounted the truck. He checked the victim for vital signs and immediately started cardiopulmonary resuscitation (CPR). After a few minutes the co-worker stopped a passing motorist for help, then returned to the victim and continued CPR. The motorist called the local emergency medical squad (EMS). A qualified emergency medical technician (EMT) learned of the incident when he stopped at a convenience store located across the highway from the jobsite. The EMT rushed to the scene and assisted the co-worker in administering CPR. The EMS arrived at the incident site in about 15 minutes and transported the victim to a local emergency room where he was pronounced dead.

## CAUSE OF DEATH

The medical examiner determined the cause of death as electrocution.

## RECOMMENDATIONS/DISCUSSION

**Recommendation #1: Employers and utility companies should consider de-energizing overhead powerlines when erecting replacement poles within existing powerline installations.**

**Discussion:** In this incident, the workers were positioning a utility pole near energized overhead transmission lines. Even though the victim was wearing rubber lineman gloves as directed by the employer's safety policy, the workers' protection ultimately depended on their own actions to avoid contact with energized conductors. De-energization of adjacent powerlines reduces the hazards of energy transfer during the erection of utility poles.

**Recommendation #2: Employers and utility companies should consider the use of redundant methods of protection when erecting replacement utility poles within existing energized overhead power line installations.**

**Discussion:** The victim, whose only protective equipment was rubber lineman gloves, apparently slipped on the wet ground and loose dirt from the freshly dug hole, possibly swinging the pole into the energized phase conductor. Unprotected parts of his upper body made contact with the wet utility pole at the same time the pole contacted the energized phase conductor, completing a path to ground. Several types of protective equipment, in addition to gloves, could offer additional protection from contact with electricity while setting utility poles within existing energized installations. The phase conductors could be covered with insulating line hoses, or the end of the pole could be covered with a sleeve of insulating material. These methods could be used in addition to the personal protective equipment worn by individual workers to provide redundant protection against unforeseen occurrences.

**Recommendation #3: Employers and utility companies should ensure that during pre-work site surveys, particular consideration is given to the hazards presented by environmental conditions and that additional control measures are implemented.**

**Discussion:** In this incident, environmental factors may have increased the risk to workers. It had been rainy for several days before the incident. The ground was wet and muddy and freshly dug material had been placed in the immediate area around the new hole. In addition, the pole had been lying on the ground where it was exposed to the wet conditions. These factors increased the victim's risk of slip/trip falls. Had these factors been identified during the pre-work site survey, additional measures could have been implemented to control them. The freshly dug material could have been removed from the work area and dry canvas tarps spread on the ground to provide secure footing.

**Recommendation #4: Manufacturers of powerline maintenance and construction equipment should explore equipment designs which would allow complete "hands off" erection of utility poles.**

**Discussion:** The equipment used to erect the utility pole was a digging truck equipped with a boom mounted hoist and grab. It was necessary for the victim to manually assist the digging truck by guiding the butt of the pole into position over the hole before the pole could be secured in the grab. Equipment with the capability to securely grab the pole while on the ground, lift it, and position it in the hole without manual guidance, minimizes the need for worker contact.

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Last Reviewed: November 18, 2015

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