



The National Institute for Occupational Safety and Health (NIOSH)

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through safety and health research



Lineman Electrocuted When He Contacts a 7200-volt Powerline While Installing a Guy Wire in North Carolina

FACE 90-27

SUMMARY

A 30-year-old journeyman lineman (victim) was electrocuted when he contacted a 7200-volt powerline while installing a guy wire. The victim was a member of a crew that was installing a new single-phase 7200-volt powerline parallel to, and 24 inches away from, an existing energized single-phase 7200-volt powerline. The new utility poles had been set and the crew had begun to string the new powerline. The lineman had previously insulated the existing powerline by placing a 36-inch-long protective line hose over the powerline on each side of the utility pole. On the day of the incident, the victim was instructed by the supervisor to place more line hoses on the existing powerline, to attach a guy wire to an anchor on the new utility pole, and to put the drag rope for the new powerline through a roller at the top of the new pole. The victim told the supervisor that he would further insulate the existing powerline after he installed the guy wire. The victim entered an insulated aerial bucket and was handed the looped end of the guy wire by the supervisor. The victim pulled the guy wire into the bucket and stood on it as he raised the bucket. When the victim reached the guy wire anchor, he took an adjustable wrench from his tool bag and began to loosen the anchor nut closest to the existing powerline. The supervisor was on the ground giving instructions to the groundmen when he heard an arcing sound and looked up to see the victim's right arm in contact with the existing powerline. The victim's clothes caught on fire, and soon afterward the powerline burned in two, breaking contact. Burn marks on the powerline indicated that the victim contacted the powerline 39 inches from the pole, 3 inches beyond the protective line hose. The NIOSH investigators concluded that, in order to prevent similar occurrences, employers should:

- ensure that all energized components of an electrical system in proximity to the work area are insulated before any line work is performed
- ensure that employees strictly adhere to established safe work procedures.

INTRODUCTION

On March 5, 1990, a 30-year-old male journeyman lineman was electrocuted when he contacted a 7200-volt powerline while installing a guy wire. On March 6, 1990, Officials of the North Carolina Occupational Safety and Health Administration notified the Division of Safety Research of the incident and requested technical assistance. On April 4, 1990,

two safety specialists from DSR traveled to the incident site to conduct an investigation. The incident was reviewed with company and OSHA personnel. The police report and photographs and videotape of the incident site were also obtained during the investigation.

The employer in this incident is an electrical contractor that has been in operation for 53 years and employs 350 workers. The contractor has a written safety policy and a comprehensive safety program that requires training of all new employees and periodic retraining of all employees. Training is conducted both in the classroom and on the job. Tailgate safety meetings are conducted each day at the jobsite prior to work and the safety director makes periodic visits to all jobsites. All employees are required to be certified in cardiopulmonary resuscitation (CPR).

INVESTIGATION

The company had been contracted to install a new single phase 7200-volt powerline by the local electrical cooperative. The new powerline was to be installed parallel to, and approximately 2 feet away from, an existing energized single-phase 7200-volt powerline. The crew (a supervisor, a journeyman lineman (the victim) and two groundmen) arrived at the site on the day of the incident to install a guy wire on the new utility pole and to string the new powerline through a roller on the crossarm at the top of the new pole. The victim had previously placed a 36-inch-long insulated line hose on each side of the pole over the existing energized powerline. The supervisor wanted to further insulate the existing powerline before the new powerline was strung. As the supervisor was obtaining additional line hoses out of the truck, the victim said he would attach the guy wire to its anchor, then place the additional line hoses on the powerline before putting the drag rope for the new powerline through the roller (Figure). The supervisor handed the looped end of the guy wire up to the lineman in the aerial bucket. Rather than place the loop over a hook on the bucket as was standard practice, the lineman pulled the loop into the bucket and stood on it. He then raised himself in the bucket to the guy wire anchor. The lineman was not wearing linemen's gloves or sleeves as required by company safety rules.

Using an adjustable wrench, the lineman began to loosen the nut on the guy wire anchor so that he would be able to place the loop over it. The nut was on the side of the utility pole that was closest to the existing energized powerline. As the supervisor was giving instructions to the groundmen, he heard an arcing sound from above. He looked up to see the lineman's right arm in contact with the existing powerline, and the victim's clothes on fire. As the supervisor began to lower the victim using the controls on the back of the truck, the powerline burned in two, breaking contact. With the help of the groundmen, the supervisor removed the lineman from the bucket and extinguished his burning clothes. The supervisor initiated cardiopulmonary resuscitation (CPR) while one of the groundmen summoned the emergency medical squad (EMS). The victim was transported to the hospital by the EMS where he was pronounced dead on arrival by the attending physician.

Burn marks on the existing powerline indicate that the lineman's right arm contacted the powerline 39 inches from the power pole, 3 inches beyond the insulated line hose. The current passed through the victim and the guy wire on which he was standing to ground.

CAUSE OF DEATH

The attending physician listed electrocution as the cause of death.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that all energized components of an electrical system that might be contacted directly or indirectly by a worker be insulated before any work is performed on or near that system.

Discussion: Before work is performed on or in proximity to an electrical system, all energized components of that system which could be contacted either directly or indirectly (via conductive tools or materials) by a worker should be insulated. Even though a 3-foot-long insulated hose had been placed on the energized powerline on each side of the power pole, the victim was still exposed to the hazards of the energized powerline in proximity to his work area.

Recommendation #2: Employers should ensure that established company safety procedures are followed at all times.

Discussion: Management should re-affirm the necessity of following established safety procedures with all supervisors. This company has a comprehensive safety program in place. Established safety procedures require that linemen's gloves and sleeves be worn when working from an aerial bucket. Additionally, standard operating procedure for lifting the guy wire to the anchor was to place the looped end of the guy wire around a hook on the outside of the aerial bucket. Pulling the guy wire into the bucket introduced a conductor at ground potential which negated the protection afforded by an insulated aerial bucket.

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