



The National Institute for Occupational Safety and Health (NIOSH)

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through safety and health research



Electrical Lineman Electrocuted After Contacting Energized Trailer-Mounted Line Tensioner in South Carolina

FACE 91-25

SUMMARY

A 27-year-old male electrical lineman (victim) was electrocuted when he contacted an energized trailer-mounted line tensioner. The victim was a member on a crew that was stringing new conductors to replace an existing three-phase, 14,200-volt powerline. The existing energized conductors had been repositioned and attached to insulators on extensions bolted to the power pole crossarms. The crew had been pulling a new conductor through rollers attached to the same crossarm on three consecutive power poles, a span of 300 feet. A 4-foot clearance existed between the new conductor and any of the existing conductors. At the time of the incident, the victim and a co-worker (groundman) had been working at a trailer-mounted line tensioner. The new conductor was being pulled in a straight line from the tensioner by a pulling rig located immediately behind the farthest power pole. Because of either improper tension on the new conductor or a failure of the tensioner's braking system, the conductor began to pull from the tensioner in a jerking motion. This motion caused the conductor strung through the rollers to sway back and forth and contact one of the existing phases. Current traveled back through the conductor, energizing the tensioner and fatally shocking the victim, who was in contact with the tensioner. NIOSH investigators concluded that, in order to prevent similar occurrences, employers should:

- **perform a hazard analysis of each project prior to initiating work, and communicate hazard information and control measures during work crew safety meetings**
- **ensure that all workers comply with established safe work procedures that apply to the use of personal protective equipment**
- **evaluate the feasibility of incorporating electrical isolation into the design of trailer-mounted line tensioners.**

INTRODUCTION

On August 5, 1991, a 27-year-old electrical lineman was electrocuted when he contacted an energized trailer-mounted line tensioner. On August 6, 1991, officials of the South Carolina Occupational Safety and Health Administration notified the Division of Safety Research (DSR) of this fatality, and requested technical assistance. On August 22, 1991, a DSR safety specialist traveled to the incident site to conduct an investigation. The incident was reviewed with company representatives, the county sheriff and coroner, and the OSHA compliance officer. Photographs of the incident site were obtained during the investigation.

The employer in this instance was an electrical contractor that specialized in powerline construction. The company had been in operation for 56 years and employed 300 workers, including 150 linemen. The company had a safety director, safety program, safety policy, and written safe work procedures. Training was accomplished on the job.

INVESTIGATION

The employer had an ongoing contract with a local electric utility for powerline construction and maintenance. At the time of the incident one crew was stringing new conductors to replace conductors for a three-phase, 14,200-volt powerline. The crew consisted of a lineman (victim) and three groundmen.

The crew had previously bolted wooden extensions to each end of the crossarms at the top of the three power poles in the 300-foot-long straight span (100 feet between power poles) that they were going to string on the day of the incident. The energized conductors were repositioned on insulators on the extensions (two conductors on one, one on the other extension). Rollers were installed at the center point of each of the three crossarms. The energized conductors were positioned so that there would be a 4-foot clearance on either side of the new conductor as it passed through the rollers.

At the time of the incident, the victim and a co-worker were working at a grounded, trailer-mounted line tensioner. The first new conductor was being pulled from the tensioner by a pulling rig at the other end of the run. Unexpectedly, the new conductor began to pull from the tensioner in a jerking motion. (It could not be determined if the braking system on the tensioner malfunctioned or if it was improperly set—the tensioner had been completely rebuilt since the incident.) This action caused the new conductor to sway and contact an energized conductor. The exact point of contact could not be determined. The electric current passed through the trailer's grounding system to ground. The victim, in contact with the trailer, also provided a path to ground and was electrocuted. The co-worker was standing a few feet from the trailer, and felt a tingling in his feet but was not injured. Neither man was wearing linemen's gloves or rubber overshoes as required by the company. The co-worker immediately initiated cardiopulmonary resuscitation (CPR) and continued CPR until the emergency medical service (EMS) arrived. The EMS transported the victim to a local hospital where he was pronounced dead by the attending physician.

CAUSE OF DEATH

The coroner listed the cause of death as electrocution.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should perform a hazard analysis of each project prior to initiating work, and communicate hazard information and control measures during work crew safety meetings.

Discussion: Each project differs in the scope of work to be accomplished, the makeup of the work crews, the physical layout of the jobsite, and the equipment used to perform the work. This uniqueness creates differing situations for exposure to job hazards. Therefore, the hazards associated with each work effort must be analyzed so that appropriate control measures can be developed and implemented. A serious safety hazard which existed at this jobsite, the potential that the new conductor would contact an existing energized conductor, was not recognized and, therefore, not controlled. The fact that energized conductors were present on both sides of the new conductor increased the hazard potential. This factor should have been identified prior to the initiation of work. Corrective measures to prevent the hazardous contact might then have been adopted and communicated to the crew.

Recommendation #2: Employers should ensure that all workers comply with established safe work procedures that apply to the use of personal protective equipment (PPE).

Discussion: In this instance, neither the victim nor the co-worker were wearing linemen's gloves or rubber overshoes as required by the company's written safety rules. Compliance might be improved if qualified safety professionals conducted scheduled and unscheduled safety inspections. These safety inspections would not guarantee compliance, but would demonstrate the company's dedication to the prevention of occupational injury.

Recommendation #3: Employers should evaluate the feasibility of incorporating electrical isolation into the design of trailer-mounted line tensioners.

Discussion: In this incident, the new conductor made contact with conductive parts of the trailer as it exited the spool. This allowed the trailer to become energized when the new conductor contacted an energized conductor. If the new conductor and spool were electrically isolated from the body of the tensioner, inadvertent energization of the trailer would be less likely, thereby enhancing worker safety.

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