



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Crew Foreman Electrocuted When He Contacts Energized Conductor in South Carolina

FACE 91-29

SUMMARY

A 27-year-old crew foreman was electrocuted when he contacted an energized conductor on a utility pole. The foreman was part of a three man crew stringing new television cable in a residential section of the city. Prior to the incident, the foreman attached one end of a polyethylene rope to the cable wire. A weight was attached to the other end of the rope. The rope was then supposed to be thrown over the existing cable wire which was attached between the utility poles. When the rope was thrown, it became tangled in the overhead powerlines above the existing cable wire. The foreman instructed the lineman to retrieve the wire, but the lineman refused to do so. The foreman then donned a pair of linemen's climbers and, without using a safety belt and lineman's strap or lanyard, ascended the utility pole to a position above the transformer, approximately 25 feet above ground level. At this time, the co-workers had their backs turned to the victim when they heard an electrical arcing noise. The victim apparently touched an energized conductor (e.g., jumper wire, fuse, fuse holder, powerline, etc..) and fell to the ground. In that neither co-worker had CPR training, potentially critical CPR care could not be immediately administered to the victim. NIOSH investigators concluded that in order to prevent future similar occurrences, employers should:

- **evaluate existing safety programs and incorporate specific procedures, including worker training, related to recognition and avoidance of hazards, especially electrical hazards**
- **train employees in the proper use of safety and personal protective equipment, and ensure its use where appropriate**
- **consider, evaluate, and adopt alternate methods for positioning guide ropes between wires**
- **train employees in cardiopulmonary resuscitation (CPR) procedures.**

INTRODUCTION

On August 27, 1991, a 27-year-old male crew foreman was electrocuted when he contacted an energized conductor on a utility pole. On September 6, 1991, officials of the South Carolina Occupational Safety and Health Administration (SCOSHA) notified the Division of Safety Research (DSR) of this fatality, and requested technical assistance. On September 18, 1991, a safety specialist from DSR conducted an investigation of this incident. The investigator reviewed the incident with a company representative and the SCOSHA compliance officer assigned to the case. Photographs of the incident site were taken, and the coroner's report and witnesses' statements were obtained during the investigation.

The employer in this incident was a cable installation company that had been in operation for about 4 years. The company employed 22 workers, including 5 crew foremen. The company had a written safety program and written safety procedures. The field supervisor and crew foreman were responsible for administration of the safety program. On-the-job training was provided to the employees, and employee safety meetings were held monthly. The incident occurred on the victim's first day at work.

INVESTIGATION

The company was working as a subcontractor for a major cable television (CATV) installer on a production-oriented basis installing cable television wire as part of a 2,500 mile up-graded cable system. The company had six three-man crews working throughout the city. The project had been in progress for 3½ months prior to the incident.

On the day of the incident, a three-man crew consisting of a crew foreman (the victim), a lineman, and a groundsman (all hired a day before the incident) arrived at the worksite to continue lashing new CATV wire (i.e., ½ inch, 75 ohm, coaxial wire) around the existing CATV wire. The existing CATV wire was attached to utility poles approximately 4 feet below the existing electrical system ground wire.

Prior to the incident, the crew pulled enough CATV wire from the spool to reach across two spans of utility poles. The foreman then connected a 3/8-inch polyethylene rope to one end of the CATV wire, while a weight was connected to the other end of the rope. The foreman tried to throw the rope between the ground wire and existing CATV wire, but instead the rope landed around the overhead powerlines above the transformer (Figure). The foreman then requested the lineman to retrieve the rope, but the lineman refused, stating it was too dangerous. The foreman then donned a pair of linemen's climbers and, without using a safety belt and lineman's strap or lanyard, ascended the utility pole to a position above the transformer about 25 feet above ground level. Although no one witnessed the incident, it is apparent that the victim came into contact with an energized conductor and fell to the ground. The coroners report stated the body had electrical burns on the extremities and upper torso, but did not indicate whether the burns were entrance or exit wounds.

The victim's co-workers ran to a nearby house and requested an ambulance be called. In the interim, another resident, a nurse, saw the commotion and ran to the incident site to offer assistance. The nurse provided cardiopulmonary resuscitation (CPR) until the arrival of the ambulance. The victim was transported to a local hospital where he was pronounced dead 1½ hours after the incident.

CAUSE OF DEATH

The coroner's report listed the cause of death as cardiac arrest due to electrical shock.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1: Employers should evaluate current safety programs and incorporate specific procedures related to recognition and avoidance of hazards, especially electrical hazards.

Discussion: The crew, including the victim, was hired the day before the incident. Although the victim was supposed to have been experienced in this field of work, no documentation, other than verbal, was provided to ensure the crew's competency. The crew was then sent to a worksite to perform duties where potential life-threatening hazards such as the overhead powerlines existed. No safety training was provided by their employer. OSHA standard 1926.21(b)(2)(2) states that "the employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury." Employers should provide employees with adequate training to ensure that they can recognize potential hazardous exposures and

perform assigned tasks safely. This training is needed to ensure that employees understand the hazards and corrective actions that can be taken to control or eliminate the hazards. The safety program should be evaluated and specific procedures designed to assure that all new employees are able to recognize and avoid hazards.

Recommendation #2: Employers should ensure employees are trained in the proper use of safety and personal protective equipment, and ensure its use where appropriate.

Discussion: After the rope was thrown into the powerlines, the victim climbed the utility pole and was eventually electrocuted. Five sections of “hot stick” (24 feet), were available to the crew in a utility truck 100 feet away. Although the safety procedures specify the use of a “hot stick” to remove objects from powerlines, the procedure was ignored. Since this was the first day on the job for the victim, it is possible that he was not totally familiar with the company’s safe work procedures. Also, the victim climbed approximately 25 feet up the utility pole using only climbers, a safety belt and lineman strap or lanyard were not used. When the victim contacted the energized conductor he fell 25-feet to the ground striking his head on a cement block. If the victim would have survived the electrical contact, he may have died from the fall.

Recommendation #3: Employers should consider, evaluate, and adopt alternate methods for positioning guide ropes between wires, especially when any of the wires may be energized and uninsulated.

Discussion: The rope was supposed to have been thrown between an existing cable television wire and an electrical system ground wire. Instead, the rope was thrown onto the powerline. Two alternate methods which exist and should be considered for positioning the rope between the wires are: (1) the use of a “hot stick” to position the rope, or (2) a worker using fall protection and climbing the pole to position the rope. Either method is a safer alternative.

Recommendation #4: Employees who work around powerlines, electrical circuits, and electrical equipment should be trained in cardiopulmonary resuscitation (CPR).

Discussion: To optimize results, CPR should begin within four minutes (in accordance with American Heart Association guidelines). To meet this criteria, workers should be trained to support circulation and ventilation until trained medical personnel arrive. Because neither co-worker was trained in CPR, potentially critical care could not be provided in a timely manner. Employees working on or in proximity to powerlines, electrical circuits, and electrical equipment should be trained in CPR.

REFERENCE

1. Office of the Federal Register: Code of Federal Regulations, Labor 29 Part 1926. p.20. July 1, 1990.

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