



The National Institute for Occupational Safety and Health (NIOSH)



Apprentice Lineman Dies After Making Contact With the Secondary Power Lines on a Utility Pole

New Jersey Case Report: 90NJ015 (formerly NJ9011)

DATE: December 11, 1990

SUMMARY

On September 7, 1990, an apprentice lineman died after making contact with the secondary power lines on a utility pole. While preparing to replace the old primary wiring on the pole, the lineman was passing nylon rope around two 110 volt secondary lines when he contacted both lines simultaneously with his arms. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- Personnel should comply with proper procedures when working around electrical lines in order to prevent phase-to-phase contacts, i.e., either by deenergizing the circuit and grounding it or by effective insulation.
- Personal protective equipment should be utilized while working in the vicinity of energized power lines.

INTRODUCTION

On September 11, 1990, NJDOH FACE personnel were notified by an OSHA office safety supervisor of a work-related electrocution that occurred on September 7, 1990. The following day, a meeting was held with an OSHA compliance officer to discuss the findings of his on-site investigation. NJDOH FACE staff then proceeded to the job site where we interviewed the general foreman and two co-workers of the deceased, who were continuing to replace the old electrical power lines. Photographs were taken and a drawing was made of the utility pole where the incident occurred.

The employer is an electrical utility construction company who employed 45 persons (including 20 journeyman and 7 apprentice electricians) at the time of the incident. The company has been in business for 3 years. The employer was working under contract to a larger-sized electrical utility company to replace the 40 year-old primary electrical power lines with new ones. The employer does have a safety officer and safety manuals and provides both classroom and on-the-job training. All linemen are required to read the employer's safety manuals and the safety manuals of the power company. The electrical linemen are unionized and must pass through seven six-month apprenticeship periods to become journeymen. The deceased was in the fourth step (2 years) of his apprenticeship and had over 1000 hours working primary and secondary power lines. The deceased was working for two weeks with the subcontractor and was hired from a local union hall.

INVESTIGATION

The utility pole where the incident occurred is on a narrow street close to the driveway of a private residence. The pole is like other utility poles on the street that are being rewired. The rewiring procedure involves the movement of the primary power lines (7200 volts) away from the center of the pole and on to temporary booms attached to the crossarm (see diagram). Four pulleys are attached to the crossarm through which ½ inch color-coded nylon rope is pulled. Electrical wire is attached to nylon rope which is

then pulled back through the pulleys in the opposite direction. The wire is then attached to the insulators on the pole and energized. Approximately six feet beneath the primary wires on the pole are the secondary wires which carry 110 voltage current. The work was being performed with an insulated "cherry picker" boom truck tested in May 1990 for protection up to 100,000 volts.

On the day of the incident, in humid weather, two work crews were assigned to the job: One crew consisted of two journeyman lineman; the other consisted of two apprentice linemen. At about 8:30 am, the victim, an apprentice lineman, was working in the crane bucket near the secondary power lines on the utility pole. The truck he was working from was on the street side of the pole. He had to get the nylon rope over the secondary lines and into the rope pulleys on the field side of the pole (see diagram). The power lines are uninsulated; the decedent was wearing leather gloves and a short sleeve shirt. The victim was not wearing rubber gloves or sleeves.

He was passing 2 nylon ropes from one hand to the other around the secondary power lines when he contacted both lines simultaneously with his arms. When he contacted both live 110 volt lines, he received a combined 220 volt phase-to-phase shock through both arms and his chest. He then slumped over the lines, remaining in contact. A co-worker on the ground heard him yell and ran to the truck to bring the lift bucket down. Neighbors who are emergency medical technicians (EMTs) responded immediately and CPR was started less than two minutes after the shock. The rescue squad arrived soon after and took him to the hospital where he was later pronounced dead.

CAUSE OF DEATH

Electrocution due to contact with electrical wires

RECOMMENDATIONS AND DISCUSSIONS

Recommendation #1: Personnel should comply with proper procedures when working around electrical lines in order to prevent phase-to-phase contact, i.e., either by deenergizing the circuit and grounding it or by effective insulation [29CFR 1926.416(a)].

Discussion: Electrical lineman who might come into contact with secondary lines should be instructed to insulate the lines before working around them. Insulating sleeves or blankets should be used.

Recommendation #2: Personal protective equipment should be utilized while working in the vicinity of energized power lines [OSHA 1926.28(a)].

Discussion: It was stated in the interviews with co-workers that the usual method of moving the rope from the street side of the pole to the field side is to toss the loose end over the secondary wires, avoiding any direct contact with the wires. However, it was also stated that some linemen use the hand-to-hand approach, a method that led to the death of the worker. Proper training in the mandatory use of rubber gloves and sleeves when working within reach of energized lines is necessary.

FATAL ACCIDENT CIRCUMSTANCES AND EPIDEMIOLOGY (FACE) PROJECT

Staff members of the FACE project of the New Jersey Department of Health, Occupational Health Service, perform FACE investigations when there is a work-related fatal fall or electrocution reported. The goal of these investigations is to prevent fatal work injuries in the future by studying: the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

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