The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Lineman Electrocuted After Contacting 7,200-Volt Cutout Switch on Utility Pole in Tennessee.

FACE 90-26

SUMMARY

A lineman was electrocuted when he contacted a 7,200-volt cutout switch on a newly installed utility pole. Just prior to the incident the victim had climbed the utility pole, installed a cutout switch, and connected it (with a jumper cable) to a 7200-volt conductor that had not yet been energized. He was wearing lineman gloves and a body safety belt with a lanyard. The victim then climbed down the pole, removed his lineman gloves and disconnected his safety belt, and radioed other crew members to energize the distribution line. He was about to close the cutout switch with a hot stick when he noticed a piece of electrical tape hanging from the energized side of the cutout switch. In an attempt to remove the electrical tape, the victim climbed back up the pole (without first putting his lineman gloves and safety belt back on), grabbed a guy wire with his right hand to stabilize himself, and reached with his left hand to remove the tape. In doing so, the victim's climbing boots slipped, causing his left hand to contact the energized side of the cutout switch, and the victim was electrocuted. NIOSH investigators concluded that, in order to prevent future similar occurrences, employers should:

- **ensure that workers wear required personal protective equipment before climbing utility poles that have energized circuits**
- **ensure that workers wear lineman safety belts while performing work from utility poles**
- **conduct scheduled and unscheduled safety inspections to ensure that safety procedures are being followed.**

INTRODUCTION

On February 21, 1990, a 60-year-old male lineman was electrocuted when he contacted the energized side of a 7,200-volt cutout switch on a newly installed utility pole. On February 22, 1990, officials of the Tennessee Occupational Safety and Health Administration notified the Division of Safety Research (DSR) of the death and requested technical assistance. On March 8, 1990, a research industrial hygienist from DSR traveled to the incident site to conduct an investigation. The DSR investigator reviewed the incident with company representatives and employees, the medical examiner, and the OSHA compliance officer assigned to this case. Photographs and diagrams of the incident site were obtained during the investigation.

The employer in this incident is an electrical contractor that has been in operation for 42 years. Most of the work performed by the company involves powerline construction. The company employs approximately 1,000 full-time employees, including 5 full-time safety officers. The company has a comprehensive safety program and provides on-the-job training to the employees. The company conducts 1-hour monthly safety meetings with all employees. Additionally, weekly "tailgate"

safety meetings are held at construction sites to discuss safety concerns specific to the jobsite. The victim had attended a 1-hour safety meeting 1 month prior to the incident. During this meeting the company's safety policy concerning the requirement for linemen to wear lineman gloves and a safety belt while working from utility poles was discussed.

INVESTIGATION

The company had been contracted by the local utility company to replace approximately 1 mile of a power distribution line to accommodate the added electrical demand for a new housing subdivision in the area. A crew of eight employees were working at the jobsite performing various powerline installation tasks. After the new utility poles and powerlines had been installed, the crew began energizing the powerlines. This was accomplished by installing utility pole cutout switches and jumper cables to connect sections of the lines on the poles and closing the switches (using a hot stick) along the power distribution line.

On the day of the incident the work crew had energized nearly all of the new power distribution line. At 4:00 p.m., a lineman (the victim) and a groundman (the co-worker) who were part of the work crew arrived at a utility pole located approximately 100 feet from one of the houses in the subdivision. They were to install a cutout switch and jumper cables near the top of the pole (approximately 30 feet above the ground). The utility pole held a 7200-volt conductor which had not yet been energized. The victim put on his climbing boots (pole climbers), safety belt, and lineman gloves. He then climbed to the top of the pole, installed the cutout switch, and connected it (with jumper cables) to the conductor on both sides of the pole. After making the connection he climbed down the pole, disconnected his safety belt, and removed his lineman gloves and hooked them on his belt. The victim then radioed crew members working several hundred yards down the distribution line to energize the line.

After receiving word that the line had been energized, the victim was about to take a hot stick and close the cutout switch (thereby energizing the distribution line to the homes being served), when he noticed a piece of electrical tape hanging from the top of the cutout switch. Wanting to leave a "clean" job, the victim decided to climb back up the pole and remove the tape. However, he did not put his lineman gloves or safety belt back on before climbing the pole, a violation of the company safety policy and procedures. Instead, he put on his leather work gloves. The co-worker stated that the victim had planned on putting his lineman gloves and safety belt back on after reaching the top of the pole since they were attached to his belt. Although the event was not witnessed, evidence suggests that, after climbing to the top of the pole, the victim grabbed a guy wire with his right hand in order to stabilize himself as he reached with his left hand to remove the tape. As he did so, his climbing boots began to slip from the pole causing his left hand to contact the top of the live 7200-volt circuit cutout switch (Figure). This provided an electrical path to ground through the victim's chest, causing his electrocution.

The co-worker (who was standing on the ground 30 feet directly below the victim) heard an electrical arcing noise and the victim's yell. When the co-worker looked up, he saw the victim falling and reached out in an attempt to break the victim's fall. The victim fell to the ground through the co-worker's hands, and fractured the victim's right leg. The co-worker radioed for help. Within minutes the jobsite foreman and other crew members who were nearby arrived at the site and initiated cardiopulmonary resuscitation (CPR). They administered CPR for 20 minutes until local emergency medical service (EMS) personnel arrived. EMS personnel administered advanced cardiac life support to the victim and transported him to a local hospital where he was pronounced dead on arrival by the attending physician.

CAUSE OF DEATH

The medical examiner listed the cause of death as electrocution.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that workers wear required personal protective equipment before climbing utility poles that have energized circuits.

Discussion: The company has a comprehensive safety program in place with specific safe work procedures for working on energized lines and equipment. The procedures specifically require the wearing of rubber lineman gloves for any work performed from a utility pole with energized circuits: “On climbing any pole possessing energized circuits at any voltage, linemen must put on rubber lineman gloves and/or other necessary protective equipment before leaving the ground to do work in the air, and must keep rubber gloves and/or other necessary protective equipment on their hands until returning to the ground after the completion of the work.” Employers should ensure that all workers wear all required personal protective equipment and that they are aware of the hazards of not wearing such equipment.

Recommendation #2: Employers should ensure that employees working from utility poles wear body belts with safety straps or lanyards as in 29 CFR 1926.951,(b),(1).

Discussion: Although the victim wore his safety belt when he initially climbed the utility pole to connect the jumper cable, he did not wear it when he climbed back up the pole to remove the electrical tape from the cutout switch. Failure to wear the safety belt may have contributed to the victim’s pole climbers slipping out of the pole. When this occurred the victim grabbed the energized top of the cutout switch with one hand (while holding on to the guy wire with the other hand) in an attempt to keep from falling.

Recommendation #3: Employers should conduct scheduled and unscheduled safety inspections regularly at each jobsite.

Discussion: Although the company has a comprehensive safety program which includes monthly employee safety meetings and weekly “tailgate” safety meetings (which the victim had attended regularly), upper management personnel should conduct, or appoint safety personnel to conduct, scheduled and unscheduled safety inspections at each jobsite to ensure that safety procedures are being followed. Admittedly, regular company safety inspections are no guarantee that worker fatalities will not occur. However, it does demonstrate to workers that the company is committed to enforcing its safety policies and procedures.

REFERENCES

1. Code of Federal Regulations, Labor, 29 CFR Part 1926.951, page 285, U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C. 1989.

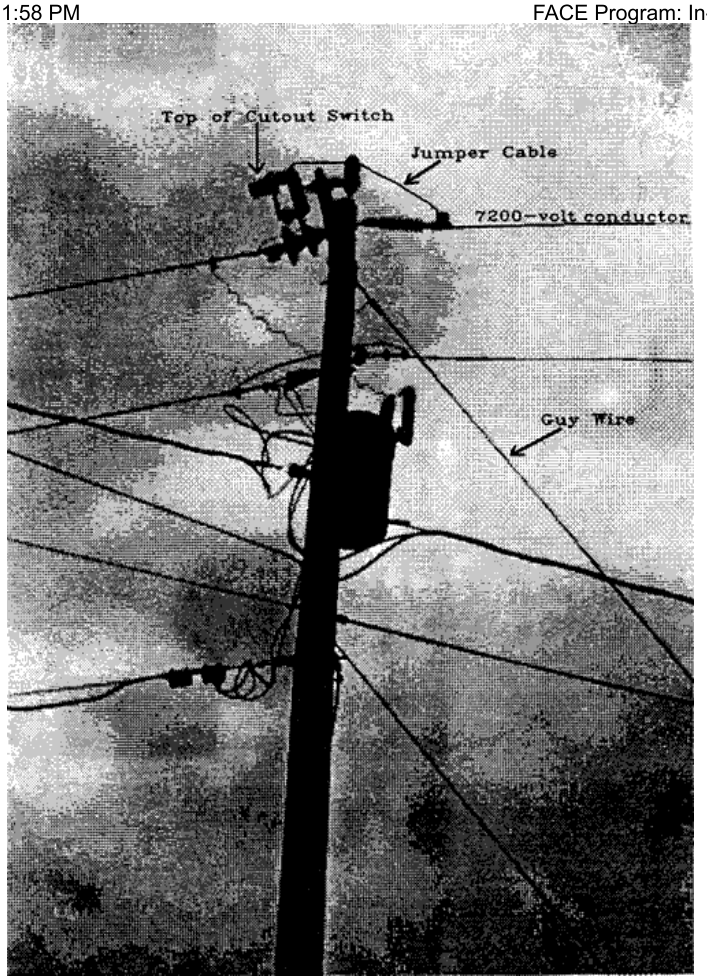

Figure. Utility Pole

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Last Reviewed: November 18, 2015