The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Distribution Line Technician Electrocuted in South Carolina

FACE 91-01

SUMMARY

A 46-year-old distribution line technician (the victim) for an electrical utility was electrocuted while clearing branches from a single-phase, 7200-volt primary powerline. The victim and a co-worker (groundman) had been dispatched to clear damage following a tropical storm. Because the dirt access road into the damage area was impassable by truck, the victim and his co-worker walked in until they saw a white pine limb lying across the powerline. The victim used a telescopic hot stick (an insulated pole used by line technicians to make energized powerline connections) to knock the limb off. Walking out the access road, the victim heard a popping sound that he thought came from a second limb contacting the powerline in the pine tree above him. Because of the dense growth of the limbs, the victim could not see which limb was making contact and could not use the telescopic hot stick. The victim and co-worker drove to a utility pole to open a fused switch on the pole-mounted transformer that was expected to de-energize the 7200-volt primary line. They returned to the pine tree, and the victim climbed it to correct the problem. The victim called to his co-worker that the limb was not contacting the powerline where he thought. The co-worker next heard an arcing sound and saw the victim fall 20 feet to the ground. The co-worker summoned the emergency medical service (EMS), which transported the victim to the hospital where he was pronounced dead by the attending physician. NIOSH investigators concluded that, in order to prevent similar occurrences, employers should:

- **ensure that prior to any work on an electrical system, all involved workers are familiar with the operation of every electrical component**
- **ensure that workers are trained in and follow established safe work procedures relevant to their duties and responsibilities.**

INTRODUCTION

On October 15, 1990, a 46-year-old distribution line technician was electrocuted while clearing branches from a 7200-volt primary powerline. On October 22, 1990, officials of the South Carolina Safety and Health Administration notified the Division of Safety Research (DSR) of this fatality and requested technical assistance. On November 7, 1990, two safety specialists from DSR went to the site of the fatality and conducted an investigation. The investigators reviewed the incident with the company's manager of engineering and manager of safety and industrial hygiene. The final autopsy report and photographs of the incident site were obtained.

The employer is a public electric utility that has been in operation 85 years and employs more than 20,000 workers. The victim had been with the company for 8 years and was one of 632 distribution line technicians employed in the construction and operations division. The company has a written safety policy, a comprehensive safety program, and a corporate safety director. Seven safety professionals are employed in the construction and operations divisions. In addition to weekly tailgate safety meetings at the jobsite, documented monthly safety meetings are held at the company office.

INVESTIGATION

On the day of the incident, a distribution line technician (the victim) and a groundman were assigned the task of clearing tree branches from a 7200-volt primary powerline. The two line electrical distribution system in this area consisted of an upper energized single-phase 7200-volt powerline, and a second neutral line suspended 40 inches below the energized phase. The tree limbs were interfering with the powerline due to wind damage caused by a tropical storm. When the victim and co-worker arrived at the assigned work area, they found the access road to the primary powerline was impassable by truck because of the heavy rains. The victim got a telescopic hot stick from the aerial bucket truck and with his co-worker began to walk the access road. The victim saw a white pine limb lying across the powerline which he knocked off with the hot stick.

The victim was walking back to the truck when he heard a crackling sound in an area above him where the powerline passed through a white pine tree. Because of the density of the tree limbs, the victim could not see if a limb was in contact with the powerline. The victim told his co-worker that they would open a switch 300 feet away to de-energize the powerline. The victim would then climb the tree and try to correct the problem. The victim and the groundman drove to the pole-mounted switch and opened it. After opening the switch, the victim did not attempt to ground the primary powerline. If an attempt had been made to attach a ground clamp to the energized primary powerline, a flash would have occurred to alert the workers that the primary powerline was still energized. The switch controlled electrical power to a tap line located on the same pole as the primary powerline at this location. The tap line supplied several residences in the area. Opening this switch did not de-energize the 7200-volt primary powerline.

The victim and groundman returned to the previous location where the victim climbed the tree. Because of the density of the tree limbs, the groundman could not see the exact location of the victim. The victim told the groundman that he could not see any limbs in contact with the powerline. The groundman then heard an arcing sound and saw the victim falling through the tree limbs to the ground.

The groundman ran to the aerial bucket truck and told the company dispatcher what had happened. The dispatcher summoned the emergency medical service (EMS). The groundman then returned to the victim and initiated cardiopulmonary resuscitation. Another company worker heard the radio communication and traveled to the site to provide aid. The EMS transported the victim to the hospital where he was pronounced dead by the attending physician. Although the event was unwitnessed, electrical burns on the victim's back, torso and limbs suggest that the victim lost his balance and fell into the powerline. A path for the electrical current was established through the victim and the tree to the ground.

CAUSE OF DEATH

The county coroner listed electrocution as the cause of death.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Prior to any work being performed on an electrical system, employers should ensure that all involved workers are familiar with the operation of every electrical component in that electrical system.

Discussion: It appears that the victim was not sure which powerline was controlled by the pole-mounted switch. Before beginning work on any electrical system, all persons involved should be aware of the function of each system component in the system, and of any hazards created by the functioning of these components. Additionally, workers should be instructed

that if any questions regarding the electrical system arise, qualified personnel should be contacted to answer these questions before work proceeds.

Recommendation #2: Employers should ensure that workers are trained in and follow established safe work procedures relevant to their duties and responsibilities.

Discussion: Established safe work procedures required de-energizing and grounding a powerline before any work was performed on that line. Employers should ensure that workers are trained in and follow established safe work procedures relevant to their duties and responsibilities. If an attempt had been made to connect a ground clamp to the energized primary powerline, a flash would have occurred to alert the workers that the primary powerline was still energized.

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