The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research NIOSH

Line Technician Electrocuted During Power Restoration Following Hurricane Hugo in South Carolina

FACE 90-08

SUMMARY

A utility company line technician was electrocuted while working to restore electrical service that had been interrupted by Hurricane Hugo. The victim and a co-worker had been clearing debris from a pole-mounted three-phase 7200-volt powerline. When they thought the line was clear of debris, the victim asked substation workers to energize the three phases. However, the recloser (an automatic switch or circuit breaker that reestablishes an electrical circuit after an interruption of service) on the middle phase opened indicating that a problem with that phase still existed. The workers, who started to look for the problem without requesting that the powerlines be de-energized, found that the middle phase had been pulled down into a guy wire by storm debris. The victim climbed the pole to cut the middle phase, and called to his co-worker to throw him a pair of pliers. The co-worker asked the victim whether he wanted his hardhat tossed up as well, but the victim declined. While he was maneuvering between the powerlines, with his feet on the neutral wire, the back of the victim's head contacted an energized jumper wire and he was electrocuted. In order to prevent similar deaths in the future, NIOSH suggests that:

- **extra emphasis be placed on strict adherence to all company safety procedures during emergency operations**
- **the company change its procedures to require that substation workers de-energize powerlines when notified that problems exist**
- **workers inspect an entire circuit that has been de-energized for maintenance to ensure the circuit is clear of debris and free from physical damage prior to re-energizing that circuit.**

INTRODUCTION

On October 11, 1989, officials of the South Carolina Occupational Safety and Health Administration notified the Division of Safety Research (DSR) of the electrocution of a line technician on September 22, 1989. The victim was electrocuted while working to restore electrical service interrupted by Hurricane Hugo. The state requested an investigation of the circumstances involved with this fatality and on October 20, 1989, a DSR safety engineer conducted an investigation. The DSR investigator met with company officials to discuss the circumstances of the incident, and examined and photographed the incident site. The incident was also reviewed with state compliance personnel.

The employer, a utility company with approximately 20,000 employees, has a comprehensive safety program that includes detailed, job-specific procedures. Safety training is accomplished through on-the-job training, as well as by manuals and classroom sessions. Safety procedures are discussed regularly so that employees are aware of procedures to follow in various situations. Monthly safety meetings are held, and toolbox meetings are conducted on site to discuss job-specific safety measures. During the time that restoration work was being performed after the hurricane, company safety personnel were out in the field observing the workers and verifying that safety procedures were being followed.

According to local management and company safety personnel, the victim, a 58-year-old male, had been with the company for over 20 years and had a good safety record. He was the secretary of the local safety committee.

INVESTIGATION

Hurricane Hugo began to affect the area on the morning of September 22, 1989. The utility company workers had assembled at the area office, waiting for the storm to pass before going out to work. At 10:00 a.m., work to restore electrical service began.

The victim and a co-worker were working along a road to restore service and were clearing debris from the area of a three-phase 7200-volt powerline. The co-worker was a meter reader assigned to assist the victim on the ground. At 6:00 p.m., believing that the lines were clear, the workers radioed substation workers requesting them to energize the three phases. Upon re-energization, however, the recloser on the middle phase opened, indicating that a problem still existed on that phase. The victim notified the substation workers that a problem still existed on one of the phases, and that he was going to find it. He and the co-worker drove along the road until they identified that the middle phaseline had at one site been pulled down by storm debris and was in contact with a guy wire causing a fault.

The victim climbed the pole to cut the middle phase and he then called to the co-worker to toss him a pair of pliers. The victim was wearing lineman boots, insulated gloves, and fall protection as required by company policy. He was not wearing his hardhat, also required by company policy. The co-worker told the victim that he would toss him his hardhat, but the victim declined. The victim climbed the pole to the neutral wire and commented that he was tired. While attempting to maneuver into position to cut the middle phase, the back of his head contacted an energized jumper wire while his feet were on the neutral wire. The current passed through his body, and he was electrocuted. The co-worker immediately radioed the dispatcher from the truck to summon the Emergency Medical Service (EMS). A supervisor who had arrived at the scene, radioed the substation and instructed them to de-energize the three phases. The supervisor climbed up the pole to assist the victim, and he could not find any vital signs. A bucket truck arrived at the scene, and the victim was removed from the pole. The victim was transported by the EMS to a local hospital, where he was pronounced dead.

While restoring service after the hurricane, the company worked daylight hours to minimize hazards posed by working in the dark. Also, the company required the workers to be off duty for at least 8 hours each day, to minimize the effects of fatigue.

CAUSE OF DEATH

The coroner ruled that the cause of death was electrocution.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: During emergency operations, extra emphasis should be placed on strict adherence to all safety procedures.

Discussion: In this instance, the victim, who had a good safety record, violated safety procedures. Employers must emphasize strict adherence to safe work procedures, especially during emergency operations. The company discussed safe work procedures daily with the workers during these emergency operations. Safety staff were in the field observing the work habits of the workers, and were taking corrective action where safety rules were not being followed. The company

safety procedures state that a worker cannot climb a pole with energized lines. The worker is to work on energized lines from an insulated bucket truck or an insulated platform, and the lines must be covered by mats, line hoses and/or blankets. When climbing a pole, a worker must wear a hardhat, insulated rubber linemen gloves, boots, and fall protection. If these established safety procedures had been followed, this fatality might have been prevented.

Recommendation #2: The company should re-evaluate its procedures pertaining to the de-energization of powerlines.

Discussion: The company should re-evaluate its procedures and policies regarding the de-energization of powerlines prior to the start of maintenance work in emergency situations. Company policy prohibits working on energized powerlines from a pole. However, the company should institute a policy that requires de-energizing an entire circuit prior to starting maintenance. In this case, the powerlines should have been de-energized by substation personnel as soon as word was received that trouble still existed and that additional work would be performed. Once the powerlines are de-energized, substation personnel should then inform the workers that work can proceed. Had such practices and established safe work procedures been followed in this case, this fatality would have been prevented.

Recommendation #3: Company policy should require workers to visually inspect an entire circuit that has been de-energized for maintenance prior to energizing that circuit.

Discussion: The company should require that workers visually inspect an entire circuit that has been de-energized prior to energizing that circuit. In this case, the victim had substation personnel energize the circuit before performing a visual inspection of the entire circuit to ensure that all lines on that circuit were clear. Had a visual inspection been performed, the trouble might have been identified before the powerlines were energized, thereby preventing this incident.

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