

October 16, 1998

Nebraska FACE Investigation 98025

**SUBJECT:**

Three Fiber Optic Cable Installers Killed by Contact with Power Line

**SUMMARY:**

A 41-year-old journeyman lineman, a 38-year-old journeyman lineman and a 24-year-old, all working as cable installers in aerial line construction, were killed when a guy wire contacted an 8,000 volt above ground power line. The 41-year-old and the 38-year-old were electrocuted and the 24-year-old died the following day as a result of electrical burns. There were no witnesses to the incident, but it appears a guy wire was disconnected by the victims and it contacted an 8,000 volt overhead power line that grounded to earth.

The Nebraska Department of Labor Investigator concluded that to prevent future similar occurrences:

- \* Employers and employees should ensure only qualified personnel (in this case power company personnel) disconnect guy wires around energized power lines.
- \* Employers should ensure all personnel are trained to assess an incident scene to determine if it is "safe" before entering to attempt rescue of personnel.
- \* Employers and employees should ensure the area where fiber optic cable comes up from below ground for connection with existing power poles is clear of obstructions.
- \* Employers should develop, implement and enforce a comprehensive safety program that includes, but is not limited to, training in all hazard recognition.

## **PROGRAM OBJECTIVE:**

The goal of the Fatality Assessment and Control Evaluation (FACE) workplace investigation is to prevent work-related deaths or injuries in the future by a study of the working environment, the worker, the task the worker was performing, the tools the worker was using, and the role of management in controlling how these factors interact.

This report is generated and distributed **solely** for the purpose of providing current, relevant education to employers, their employees and the community on methods to prevent occupational fatalities and injuries.

## **INTRODUCTION:**

On July 23, 1998, at approximately 2:45 p.m., a 41-year-old cable installer (supervisor) and a 38-year-old cable installer (worker 1) were killed when a guy wire to a power pole contacted an 8,000 volt overhead power line. A third individual, a 24-year-old cable installer (worker 2), died the next day from injuries sustained in the incident. The Nebraska Department of Labor became aware of the fatality via the news media the afternoon of the incident. The Nebraska FACE Investigator conducted a site visit, in conjunction with an OSHA Compliance Officer, on July 26, 1998. Interviews were conducted with the contractor who hired the subcontractor experiencing the fatalities. Interviews were also conducted with the Sheriff's Office; Fire Rescue; and Public Power personnel who responded to the incident. The victims were a subcontractor and his two employees, hired by another subcontractor, to install fiber optic cable.

The subcontractor experiencing the fatalities consisted of just the owner and two employees, all who were killed in this incident. They had been at this job site for two days.

## **INVESTIGATION:**

The incident occurred at the corner of a cornfield, bordered by two major roads (figure 1). Two employees of the subcontractor who hired the incident subcontractor were running a boring machine on the South side of road A. The victims were all working on the North side of road A. The job was to run fiber optic cable under road A and connect it to a box on the South side of road A. Then the cable, which came out from underground by power pole 1 (figure 1), was to be lashed, with a lashing

machine, to a messenger wire connected to existing power poles. The cable was then going to be run East several miles to a school. The messenger wire, to which the cable was to be lashed, is 22.5 feet above the ground and 7.5 feet below the closest energized power line (figure 2).

Prior to the incident the bore under the road was completed and the fiber optic cable was pulled from the North side of road A to the connecting box on the South side of road A. There were no witnesses to what happened next, but from the physical evidence, and talking with the personnel working on the South side of road A and those who responded to the incident, the following is a possible scenario.

Two guy wires (SE of the pole, see figure 1) to the power pole by which the victims had been working were disconnected. According to the power company, these guy wires were connected to the pole prior to the victims beginning their work. The pole had a total of six guy wires, four that were SW of the pole and two that were SE of the pole. One of the six guy wires (the bottom guy wire of the four on the SW side) had been added by the subcontractor to help support the added weight of the messenger wire and the fiber optic cable. There was a "come along" by the guy wires which was probably used in loosening them from the guy pins. It is probable that the fiber optic cable was run from the reel via the South side of the guy wires (guy wires #1 and 2) to the bore hole by the power pole, in preparation to be pulled to the South side of the street. After the cable was pulled the victims probably discovered that the fiber optic cable was on the wrong side of the guy wires. To lash the cable to the messenger wire the cable needed to be between the pole and the guy wires. Apparently the victims decided to disconnect the guy wires and move the cable to the North side of the guy wires so it could be attached to the messenger wire.

When the guy wires were disconnected, the uppermost guy wire (#1) contacted the lower energized power line (phase C) which was carrying 8,000 volts. This high voltage current traveled down the guy wire to ground. Worker 1's body was found close to the end of guy wire 1.

Two workers on the South side of road A heard a loud noise, "like an arc welder" and saw sparks coming from the power pole. Weeds around the pole were in excess of seven feet high and therefore they could not see what had happened at ground level. When this first event occurred, the supervisor was sitting in his truck on the North edge of Road A. He immediately ran from his truck, through the weeds, to the area of the incident. He assessed the situation and ran back out to the side of the road and told the workers on the South side of the road that worker 1 was dead, and to call 911. The

workers saw the supervisor go back through the weeds to the incident scene. The workers got in a truck and began driving East to find a phone. As they were traveling East one of them looked back and saw a big burst of light. They continued driving several miles to a store where they called 911 and then returned to the scene. When they returned there were several bystanders at the scene and soon law enforcement personnel and power company personnel arrived on scene. Worker #2's clothing was on fire and the workers from the South side of the street took off their T-shirts, dipped them in standing water at the scene and a law enforcement officer tossed them on victim #2 in an attempt to put out the fire. The supervisor was lying next to worker #1 and they were both dead at the scene. Worker #2 was transported to a regional burn facility where he died the next day.

It is apparent there were two separate incidents where individuals were electrocuted. From the physical evidence and interviews, it is this investigator's opinion that the first electrocution killed worker #1. Then the supervisor entered the incident area to check on victim #1. It appeared that worker #2 stepped on guy wire #1 after the supervisor had re-entered the area, and caused it to contact the 8,000 volt overhead line again. The current came through the guy wire to ground electrocuting the supervisor and shocking and setting worker #2's clothing on fire. Worker #2 was literally knocked out of his right work boot. After the incident his right work boot was directly on top of guy wire #1. The ground was wet at the time of the incident and representatives from the power company said that much electricity going to ground could be lethal for someone within a 50 foot radius of the pole. All three individuals were within approximately 25 feet of the pole. The supervisor was found lying next to worker #1. He had apparently gone over to check on worker #1 when worker #2 stepped on the guy wire.

#### **CAUSE OF DEATH:**

The cause of death, for the supervisor and worker #1, according to the Death Certificates, was high voltage electrocution. The cause of death for worker #2, according to the Death Certificate, was electrical burns.

#### **RECOMMENDATIONS/DISCUSSION:**

**Recommendation #1: Employers and employees should ensure only qualified personnel (in this case power company personnel) disconnect guy wires around energized power lines.**

Discussion: There was a pole contract between the power company and the major contractor for the fiber optic cable installation. This authorized use of the power poles for attaching the messenger wire and it also stated that if guy wires needed to be disconnected it would be done by the power company. Had the power company been notified to move the guy wires, they would have followed company safety procedures which require, among other things, installing 15kv insulators on the energized power lines with which a guy wire could come in contact with. Another option to calling the power company to move the guy wires, would have been to pull the cable out from underground and route it around the proper side of the guy wires and then pull it underground again.

NOTE: The victims were paid "by the foot" and this could have had an influence on their decision to disconnect the guy wires in an attempt to save time. Employers/contractors should seriously consider safety implications when paying by measurement or by piece.

**Recommendation #2: Employers should ensure all personnel are trained to assess an incident scene to determine if it is "safe" before entering to attempt rescue of personnel.**

Discussion: The supervisor entered the incident scene after victim #1 had been electrocuted and prior to power being removed from the scene. This ultimately lead to the supervisor's electrocution. It is a natural tendency to assist a coworker after an incident, however, in incidents involving electricity, confined spaces and hazardous chemicals, it can prove lethal. Training individuals to resist this tendency is no easy task. Briefing personnel on incidents such as this and conducting realistic exercises involving hazardous rescue conditions could be helpful.

**Recommendation #3: Employers and employees should ensure the area where fiber optic cable comes up from below ground for connection with existing power poles is clear of obstructions.**

Discussion: The area where the fiber optic cable was fed below ground was heavily covered with weeds in excess of seven feet. Had the weeds been cleared away in the immediate work area, it would have been more obvious on which side of the guy wires the cable was routed.

**Recommendation #4: Employers should develop, implement and enforce a comprehensive safety program that includes, but is not limited to, training in all hazard recognition.**

Discussion: A comprehensive safety program should have addressed the hazards involved with working around energized power lines. Specifically, the hazards involved with disconnecting guy wires, which could come in contact with energized power lines, should have been addressed. The guidance for fiber optic cable personnel concerning disconnecting guy wires should be that the do not disconnect them - ever. This should only be done by qualified personnel from the associated power company.

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