



The National Institute for Occupational Safety and Health (NIOSH)

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through safety and health research



One Laborer and Two Steel Workers Electrocuted when an Elevated Work Platform Contacts 69,000-volt Powerline in Ohio

FACE 90-01

SUMMARY

Three construction workers were electrocuted, and three others were seriously burned, when the mobile elevating work platform they were moving contacted the bottom phase of a 69,000-volt overhead powerline. This occurred as the crew was installing aluminum siding to one side of a 25-foot warehouse under construction. The three-phase powerline, which ran parallel to the warehouse, is 7-feet lower on the north end of the warehouse than on the south end. On the south end, the powerlines were attached to the horizontal crossarm of a utility pole so that all three phases were 34 feet off the ground. The powerlines twist 90 degrees from the horizontal orientation to a vertical orientation, and were attached directly to the utility pole on the north end of the warehouse, where the bottom phase is only about 27 feet off the ground. The six crew members were working from the south end of the warehouse, where adequate clearance for the 25 foot 6 inch platform existed, toward the north end. They moved the platform under the lowest part of the powerline at a point where the ground sloped upward to meet the existing roadway. The platform's top guardrail contacted the bottom phase of the powerline, and current passed to ground through the platform and the workers who were touching it. NIOSH investigators concluded that, in order to prevent future similar occurrences, employers and employees must:

- **conduct initial jobsite surveys to identify overhead electrical hazards and develop job specific methods of controlling them, and follow up with scheduled and impromptu safety inspections to ensure that safety procedures are being followed**
- **lower mobile elevating work platforms to ensure that adequate clearance exists before moving them into close proximity to overhead powerlines**
- **follow company and equipment manufacturer safety procedures (both include prohibitions against moving such platforms into close proximity to overhead powerlines)**
- **consult with local electric utility company officials to discuss preventative measures to be taken before initiating work under, or around overhead powerlines.**

INTRODUCTION

On September 25, 1989, officials of a State Industrial Commission of Ohio notified the Division of Safety Research (DSR), of three construction workers (30-year-old male laborer and two male steel workers, 34- and 38-years-old, respectively, who were electrocuted on September 25, 1989, when the mobile elevating work platform they were moving contacted a

69,000-Volt powerline. Technical assistance was requested by the State Industrial Commission, and on October 12, 1989, a safety specialist from DSR traveled to the site to conduct an investigation. The safety specialist reviewed the incident with a company representative, State personnel, an electric utility representative, and the OSHA compliance officer assigned to this case. Photographs and diagrams of the site were obtained during the investigation.

The employer in this incident is a general construction company that has been in operation for 9 years. The company employs 180 full-time employees, including a safety director. The company has a comprehensive, multifaceted safety program and provides on-the-job training to the employees. Additionally, the company conducts monthly safety meetings with all employees. Also, weekly “toolbox” meetings are held to discuss safety matters for the specific jobsite.

INVESTIGATION

The company had been contracted to construct a large (300-foot-long by 150-foot-wide by 25-foot-high) steel-framed and aluminum-siding warehouse. The three victims were members of a six-man crew assigned to install aluminum siding on the warehouse. The crew was using a mobile elevating work platform (Figure 1) to install 3-foot by 20-foot sections of aluminum siding. The work platform, mounted on inflated rubber tires, measured 25 feet, 6 inches from ground level to the top guardrail. Parallel to the warehouse (approximately 30 feet away) was a 69,000-volt three-phase overhead powerline. At the south end of the warehouse, the powerlines were 34 feet off the ground. However, toward the north end of the warehouse, one of the lines was only 27 feet off the ground. This difference was due to the methods of attaching the lines to the utility poles at opposite ends of the warehouse. The lines on the utility pole at the south end were attached to a horizontal crossarm, while the lines on the pole at the north end (327 feet away) were attached vertically, directly to the pole. This configuration required the power lines to twist from a horizontal to a vertical orientation between the poles (Figures 2a & b).

The crew had been installing siding on the long (300-foot) side of the warehouse for 7 days prior to the incident. The crew had started working on the south end of the warehouse and was moving northward. On the morning of the incident, the crew had progressed to a point where relocating the platform was necessary due to a raised driveway curb that extended to the north end of the warehouse. Although details are still incomplete, crew members may have assumed that clearance between the top guardrail of the mobile platform and the powerlines was the same at both the north and south ends of the warehouse. However, the lowest powerline was 7 feet lower at the north end of the warehouse. When the six-man crew moved the platform under the powerline at a point where the ground sloped upward to meet the existing roadway, the top guardrail contacted the powerline. Three crew members were electrocuted and three were seriously burned.

A security guard and another construction employee heard the arcing, observed a fireball, and ran to the incident site. After seeing what had happened, the security guard telephoned for help. A fire truck arrived in approximately 5 minutes and firemen then removed the workers from contact with the energized platform by using a “dead man stick” (i.e., 10-foot fiberglass rod equipped with a hook on one end). Two emergency medical service (EMS) units arrived concurrently 2 minutes after the arrival of the fire truck, and transported three severely burned workers to a nearby hospital. The three other workers were pronounced dead by the county coroner approximately 2 hours later at the incident site.

CAUSE OF DEATH

The medical examiner’s report listed the cause of death as electrocution.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Established company safety procedures should be followed at all times.

Discussion: This company has a comprehensive safety program in place. The plan specifically prohibits moving a mobile elevating work platform to within 10 feet of energized power lines. Had this policy been followed, this incident would not have occurred.

Recommendation #2: Scheduled and impromptu safety inspections should be conducted by upper management personnel at each jobsite.

Discussion: The company has a comprehensive safety plan which includes monthly safety contacts and toolbox meetings. Apparently, however, the enforcement of the safety program is incomplete. Upper management personnel should conduct or appoint competent personnel to conduct scheduled and impromptu safety inspections at each jobsite to ensure that safety procedures are being followed.

Recommendation #3: The employer should follow equipment manufacturers general and operating rules for safe practices.

Discussion: The manufacturer of the mobile elevating work platform provides a list of general and operating rules which governs the safe operation of the equipment. These rules specifically address the hazards of operating equipment near energized power lines. The employer should read, understand, and follow these rules provided by the manufacturer. Had the manufacturer's rules been followed, this incident may have been prevented. Also, the mobile elevating work platform is designed and constructed to be raised and lowered via two manual winches. Had the crew recognized the height of the powerline, the platform could have been lowered approximately 9 feet prior to moving it. If the crew would have taken the time to lower the platform, the top rail would have passed approximately 8 feet beneath the powerline.

Recommendation #4: The employer should comply with 29 CFR 1926.416 (a)(1) and (a)(3)(1), which establish requirements for the protection of employees exposed to electrical hazards.

Discussion: Employers should not permit employees to work in such proximity to energized powerlines that the employee could make contact in the course of work, unless the employee is protected against electric shock by de-energizing and grounding or by effective guarding. The employer should comply with the aforementioned regulations governing this activity.

Recommendation #5: The employer should contact the appropriate utility company before moving mobile elevating work platforms near energized power lines.

Discussion: The policy of the electric utility company is to send a representative to the jobsite and discuss preventive measures to be taken with the requesting company. The company neglected to request this service and continued work near the energized powerlines which ultimately resulted in three deaths. The company should contact the appropriate utility company and make arrangements to have the appropriate preventive measures taken.

Recommendation #6: The employer should conduct initial jobsite surveys to identify all hazards associated with the specific jobsite.

Discussion: The jobsite had numerous associated hazards: 1) energized powerlines located adjacent to the warehouse (work area) 2) varying heights of the powerlines and 3) uneven ground surrounding the warehouse. Recognition and consideration through jobsite surveys may have prompted the employer to have the powerlines de-energized or the platform lowered or dismantled before it was moved. Employers should conduct jobsite surveys, identify all hazards, and apply appropriate preventive measures.

REFERENCES

Office of the Federal Register: Code of Federal Regulations, Labor 29 Part 1926. p. 162. July 1989.

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