



The National Institute for Occupational Safety and Health (NIOSH)

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Department of Transportation Maintenance Foreman is Electrocuted and a Highway Maintenance Worker Severely Burned When Truck Bed Contacts Overhead 7,200-volt Powerline—South Carolina

FACE 94-08

SUMMARY

A 46-year-old male road maintenance foreman (the victim) died and a 20-year-old male road worker was severely burned when the 20-foot-long dump bed of a truck, which was backed against a paving machine they were leaning on, contacted an overhead 7,200-volt powerline. The victim and the road worker were members of a 5-man crew that was paving a 2-lane highway frontage road and an interstate exit ramp. An overhead 7,200-volt powerline ran in a direction perpendicular to the frontage road. One lane of the frontage road had been paved, and the crew was paving the second lane at the time of the incident. The victim was leaning on the paving machine, a road worker was operating the asphalt depth screw regulator while standing on the ground, and two other road workers were positioned at the operator station on the paving machine. The truck was backed up against the paving machine and the victim motioned for the driver to raise the truck bed to allow the asphalt material to flow into the paving machine. As the bed raised, the warning alarm flasher at the left top corner of the truck bed sounded and flashed, then the truck bed contacted the 7,200-volt powerline. The electric current traveled through the truck body and paving machine to the ground through the victim and the road worker. The victim was electrocuted and the road worker received severe electrical burns. The truck driver lowered the bed away from the powerline, and neither he nor the two road workers on the paving machine was injured. NIOSH investigators concluded that, in order to prevent similar circumstances, employer should:

- **conduct a jobsite survey before starting any work to identify any hazards, implement appropriate control measures, and provide subsequent training to employees specific to all identified site hazards**
- **contact the local utility company to de-energize or insulate the powerlines when circumstances offer no alternative to operating a dump truck in proximity to powerlines**
- **conduct safety meetings at frequent intervals.**

In addition, utility companies should:

- **ensure that the vertical clearance of their supply cables complies with applicable rules of the National Electrical Safety Code.**

INTRODUCTION

On March 15, 1994, a 46-year-old highway maintenance foreman (the victim) was electrocuted and a 20-year-old highway maintenance worker received severe electrical and thermal burns over 35 percent of his body when the raised bed of a dump truck, which was backed against the paving machine they were leaning on, contacted an overhead powerline. On March 18, 1994, officials of the South Carolina Occupational Safety and Health Administration (SCOSHA) notified the Division of Safety Research of this fatality, and requested technical assistance. On March 24, 1994, a DSR safety specialist conducted an investigation of this incident. The incident was reviewed with the SCOSHA compliance officer, the highway patrol, and the county coroner. Photographs of the incident site were taken.

The victim was employed by the state department of transportation (DOT). The DOT had 5,000 employees, 15 of whom worked in the regional highway maintenance section where the victim was employed. The DOT had a written safety program and written safety rules. Weekly tailgate safety meetings were conducted at the jobsite by the crew foreman, and training was conducted on the job. The workers had received basic training regarding work around overhead powerlines. For example, powerlines are uninsulated, and the crew supervisor would serve as an observer to ensure that safe clearance would be maintained away from overhead powerlines.

The victim had worked for the DOT for 20 years. This was the first fatality the DOT had experienced in the past 3 years.

INVESTIGATION

A 5-man DOT road maintenance crew (the foreman [the victim], two paving machine operators, truck driver, laborer [injured co-worker]) had been assigned the task of repairing and repaving an interstate highway exit ramp and a section of a 2-lane highway frontage road that ran parallel to the interstate. An overhead 7,200-volt powerline ran perpendicular to the frontage road (Figure). The crew had discussed the presence of the overhead powerline, and the crew foreman said that he would monitor the clearance between the asphalt truck and the powerline. Three weeks prior to the day of the incident, the crew had been at the same site repairing the exit ramp and the frontage road.

On the day of the incident, the crew was repaving a section of the frontage road. By 2:30 p.m., one lane of the section of frontage had been repaved and the crew had begun repaving the second lane. The foreman was leaning against the paving machine, one road worker was operating the asphalt depth screw regulator while standing on the ground at the rear of the paving machine, and two workers were seated at the operator's station on the paving machine. The crew foreman directed the truck as it backed against the paving machine. When the truck was against the paving machine, the foreman directed the truck driver to raise the bed to allow the asphalt to flow into the paving machine. As the bed was raised, the proximity warning flasher at the top left corner of the truck bed sounded and flashed. The truck bed then contacted the 7,200-volt powerline. The current traveled through the truck bed and paving machine to ground through the foreman and the road worker at the rear of the machine. The road worker's clothes ignited. The truck driver heard the arc when the truck bed contacted the powerline and immediately lowered the bed. Neither he nor the two workers on the paving machine was injured. The driver radioed the office and requested the emergency medical service (EMS). The crew members immediately initiated cardiopulmonary resuscitation (CPR) on the foreman. Although the road worker at the rear of the machine had received severe burns to 35% of his body, he was breathing and conscious. The men were life flighted to the hospital, where the foreman was pronounced dead by the attending physician.

Measurements taken at the site revealed that the powerline was located 15 feet, 10 inches above the roadway. The truck bed could be raised to a maximum height of 17 feet, 3 inches. Since the incident, the utility company raised the powerline to a height of 20 feet.

CAUSE OF DEATH

The coroner listed the cause of death as electrocution.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should conduct a jobsite survey before starting any work to identify any hazards, implement appropriate control measures, and provide subsequent training to employees specific to all identified site hazards.

Discussion: Prior to any work being undertaken, a jobsite evaluation should be performed by a competent person¹ to identify potential hazards: the uninsulated overhead powerline, work being performed underneath and in proximity to an overhead powerline, and the dump truck with a 20-foot bed that could be elevated to a height of 17 feet 3 inches. Once potential hazards are identified, appropriate control measures can be implemented and corresponding employee training provided. For example, all employees at the site could have been instructed to monitor the clearance between the overhead powerline and the truck bed.

Recommendation #2: Employers should contact the local utility company to de-energize or insulate the powerlines when circumstances offer no alternative to operating a dump truck in close proximity to powerlines.

Discussion: De-energizing powerlines in work areas will provide workers protection as long as clear communication among the utility company, the employer, and the workers is maintained. All parties involved must be aware of when the powerlines will be de-energized, the period of time the powerlines will be de-energized, and the exact time power will be restored so that workers are not exposed to energized conductors. Insulating powerlines by installing line sleeves, or hoses, will offer a measure of protection, but should not be the only means utilized to prevent contact with electrical energy. When there is no alternative to operating a dump truck near overhead energized powerlines, these procedures may provide basic viable options.

Recommendation #3: Employers should conduct safety meetings at frequent intervals.

Discussion: Although weekly tailgate meetings were held, the length of time that individuals retain such information varies considerably. Safety meetings conducted at frequent intervals (even daily when workers are exposed to hazardous conditions) should help ensure that more workers retain important safety information and are provided an opportunity to discuss relevant safety concerns and issues.

Recommendation #4: Utility companies should ensure that the vertical clearance of their supply cables complies with applicable rules of the National Electrical Safety Code.

Discussion: National Electrical Safety Code Rule 232B1 requires that for open supply conductors over 750 volts to 22 kilovolts, an 18½-foot clearance between the supply conductor and roads, streets, and other areas subject to truck traffic must be maintained. It is possible that the truck bed may have stretched the conductor slightly in this case; however, utility companies should ensure that required clearance distances are maintained.

¹ Competent person — one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate them.

REFERENCES

IEEE [1992]. The National Electrical Safety Code, The Institute of Electrical and Electronic Engineers, Inc., August 3, 1992, 1993 Edition, p.75.

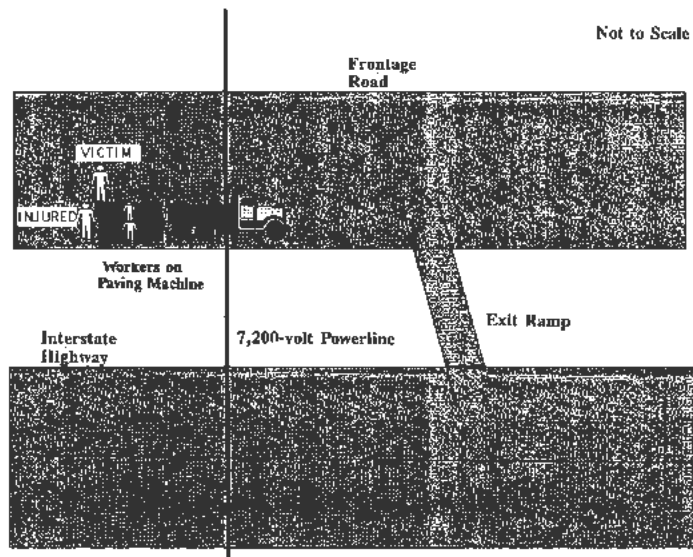


Figure.

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