

Hispanic Laborer Electrocuted After Boom Truck Contacts Overhead Power Line - North Carolina

SUMMARY

On November 3, 2004, a 44 year-old Hispanic laborer (the victim) was fatally injured after being electrocuted through indirect contact with a 7,200 volt overhead power line. A boom truck with an auger attached (Photo 1) was turning a utility pole anchor in an anchor-setting process in preparation for a utility pole replacement. During the process, the anchor began to wobble and the extended boom contacted the overhead power line. Apparently unaware that the boom was in contact with the overhead power line, the victim grabbed the energized anchor with both hands in an attempt to stabilize it and remained in contact with the energized anchor until the boom was moved away



Boom truck involved in the incident

from the power line. Electrical current moved through the victim's body from his hands to ground through his feet. The boom truck operator immediately called 911 on his cell phone and emergency medical services (EMS) arrived in about 4 minutes. CPR was immediately initiated and the victim was transported to the hospital where he was pronounced dead.

Fatality Assessment and Control Evaluation (FACE) Program

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatality Assessment and Control Evaluation (FACE) investigations when notified by participating states (North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia); by the Wage and Hour Division, Department of Labor; or when a request for technical assistance is received from NIOSH-funded state-level FACE programs in Alaska, California, Iowa, Kentucky, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, Oklahoma, Oregon, Washington, West Virginia, and Wisconsin. The goal of FACE is to prevent fatal work injuries by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact. FACE investigators evaluate information from multiple sources that may include interviews of employers, workers and other investigators; examination and measurement of the fatality site, and related equipment; and review of records such as OSHA, police, medical examiner reports, and employer safety procedures and training records. The FACE program does not seek to determine fault or place blame on companies or individual workers. Findings are summarized in narrative reports that include recommendations for preventing similar events in the future. For further information visit the FACE website www.cdc.gov/niosh/face or call toll free 1-800-35-NIOSH.

NIOSH investigators concluded that, to help prevent similar occurrences, employers should

- *conduct a jobsite survey to identify potential hazards and develop and implement appropriate control measures for these hazards*
- *follow existing OSHA regulations and safe work practices concerning the operation of cranes or equipment in close proximity to overhead power lines, and take steps necessary to de-energize or insulate power lines before work begins*
- *ensure that when working near a high voltage overhead power line where visibility could be obstructed or clearances difficult to determine, an observer is used to help the operator maintain the required clearance*
- *develop, implement, and enforce a comprehensive written safety program for all workers which includes training in hazard recognition and the avoidance of unsafe conditions. A written training plan should require training for all ground crew in electric utility operations.*

INTRODUCTION

On November 3, 2004, a 44 year-old laborer (the victim) was fatally injured after being electrocuted through indirect contact with an overhead power line. On November 8, 2004, the North Carolina Department of Labor Occupational Safety and Health Division notified the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), of the incident. On November 15, 2004, a DSR Associate Service Fellow met with the Compliance Safety and Health Officer (CSHO), North Carolina Occupational Safety and Health Division (NCOSH), investigating the incident. The NIOSH investigator reviewed the case with the town director of public works and the crew supervisor. A copy of the police report and photos were reviewed. The incident site was examined and photographs were taken. On February 2nd and 3rd, 2005, follow-up telephone conversations were held between the DSR Chief of the Fatality Investigations Team and the NCOSH CSHO.

The victim was a prisoner at a State correctional facility who was contracted to work full-time during the day with a municipal electrical service division. The municipality had a contract with the local State correctional facility to provide 8 prisoner-workers, and had assigned the victim to the electrical service division's construction crew as a laborer. He was picked up each morning, along with 7 other prisoners at the prison by municipal (town) workers, and was returned to the prison each evening. The town also employs a total of 70 regular workers in the police, rescue, administration, public works, solid waste and recycling services. During work hours, the prisoner was not confined and was under the direction of a Correctional Agent (CA). In this case the CA was the crew supervisor who had taken the training necessary through the State correctional facility to become a CA.

The victim worked as a laborer on a three-person crew. He had lived in the NC area for over 4 years, but was a native of Mexico. He spoke and understood English fluently. He had been working on this electrical service division crew for about four months.

The victim had no formal or documented training in the electric utility construction industry. All training was provided on-the-job by the municipality. He was not able to attend the regularly scheduled safety training meetings because he had to return to the prison and thus would often miss the late afternoon training sessions; however, he was able to participate in the tailgate meetings held at the work site(s) each morning. It was reported that overhead power line safety was discussed on the morning of the incident. The victim's routine responsibilities included monitoring and controlling the auger/anchor joint and the sway during drilling.

The equipment used in the case was a powered boom truck designed and used to hoist and set utility poles. It had recently been inspected and passed its semi-annual dielectric (a non-conductor of electrical current) test. However, the design of the boom does not accommodate for the complete isolation of the truck, only a portion of the boom. Therefore, electric current passed from the point of contact down through the auger and victim to the ground. This was the town's first workplace fatality.

INVESTIGATION

The municipal electrical service provides power to approximately 5,000 homes and businesses in the area. As part of a system-wide upgrade in services, a replacement utility pole was to be set to support an existing power line. Then a guy pole was to be set approximately 30 feet from the pole and an anchor was to be set approximately 18 feet from the guy pole.

The town picks up 8 prisoner-workers from the State correctional facility each morning, and two are assigned to the municipal electrical service division. The electrical division also employs a total of 12 regular workers. The victim was picked up at the prison at approximately 6:15 a.m., taken to the office for assignments, and he then accompanied the crew to pick up materials. At 8:00 a.m., the victim, crew supervisor, the boom truck operator, and a second ground crew member arrived at the worksite. The crew supervisor reportedly conducted a tailgate safety meeting to discuss hazards, which included overhead power line hazards, but no documentation was kept of any tailgate safety meetings. After the tailgate safety meeting, the guy pole was set and the anchor position was located.

To install the anchor, the distal end of the boom truck auger is fitted with a coupling allowing the attachment of the eye ring on the end of the six foot anchor. The auger motor rotates and the anchor is slowly screwed (set) into the ground.

As the anchor was being set, it broke. At 8:30 a.m., the crew was sent to the material yard to get a second anchor and the crew supervisor left the scene to check on other work. At 9:20 a.m., the crew was back at the site with an eight foot long, ten inch wide auger-end anchor. At about 9:30a.m., the crew located the anchor position and noted that there was a clearance issue due to the longer anchor and the proximity of the boom to the overhead power line. The crew began to dig a nineteen inch deep, twelve inch wide pilot hole to accommodate the longer anchor and maintain clearance from the power line.

At about 9:50 a.m., the ground crew connected the anchor to the end of the auger and placed the anchor into the hole. A few minutes later the boom truck operator began turning the boom auger and setting the anchor. Because of the angle of the required hole (see Photo 1) the rotating auger/anchor pivot point began to wobble, causing the boom to sway. The victim went over to the anchor and grasped it with both hands to likely try to stabilize it. The boom truck operator saw the victim approach the anchor and called to the victim to stop. The victim, despite the boom truck operator's attempt to warn him, reached for the anchor at the same time the boom operator heard



Photo 1. Illustrates the angle of the anchor. Photo courtesy of NCOSH.

a ‘zapping’ noise and saw the victim holding the anchor. Electrical current moved through the victim’s body from his hands, through his torso, and to the ground through his feet. Realizing that the victim was in contact with the energized anchor, the operator moved the boom away from the power line and the victim fell to the ground.

The boom truck operator then called 911 on his cell phone. Another ground crew member called the crew supervisor on the two way radio. EMS arrived in about 4 minutes, began CPR and transported the victim to the hospital where he was pronounced dead at 10:30 a.m.

CAUSE OF DEATH

According to the medical examiner’s report, the cause of death was electrocution.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should conduct a jobsite survey to identify potential hazards and develop and implement appropriate control measures for these hazards.

Discussion: Before beginning work at any site, a competent person^a should evaluate the site to identify any potential hazards and ensure appropriate control measures are implemented. The jobsite had identifiable hazards (i.e., a 7200-volt overhead power line) in close proximity to where the work was being performed.

In this incident, appropriate control measures may have included designating a safe area at the work site where the employees should remain until the hazard was mitigated and disconnecting the power to the lines. Alternatively, the procedure could have been modified, such as digging a larger and deeper pilot hole to accommodate the longer anchor and ensure proper clearance with the power line. Regardless, equipment should be located in a manner which does not create a hazard at the jobsite. Additionally, an area should be designated and marked (perhaps with barricades) at the worksite to provide the safest location for employees to remain while the auger was rotating and the boom of the truck was in close proximity to the power line.

Recommendation #2: Employers should follow existing OSHA regulations and safe work practices concerning the operation of cranes or equipment in close proximity to overhead power lines, and take steps necessary to de-energize or insulate power lines before work begins

Discussion: OSHA Standard 29CFR 1926.416^{b,1} states that “No employer shall permit an employee to work in such proximity to any part of an electric power circuit that the employee could contact (direct or indirect) the electric power circuit in the course of work, unless the employee is protected against electric shock by de-energizing the circuit and grounding it or by guarding it effectively by insulation or other means.” In addition, 29CFR 1926.955(a)(5)(i)² states that “When setting, moving, or removing poles using cranes, derricks, gin poles, A-frames, or other mechanized equipment near energized lines or equipment, precautions shall be taken to avoid contact with energized lines or equipment, except in bare-hand live-line work, or where barriers or protective devices are used.” OSHA 29 CFR 1926.550(a) (15)³ requires that the minimum clearance between electrical lines rated 50 kV or below (this overhead power line was 7,200-volts) and any part of a crane/equipment or load be ten feet, unless the electrical lines have been “de-energized and visibly grounded” or insulating barriers have been erected “to prevent physical contact with the lines,

^a A competent person is defined by OSHA as 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 authorization to take prompt corrective measures to eliminate them.

^b Code of Federal Regulations. See CFR in references

equipment or machines.” When it is necessary to work closer than 10 feet (horizontal distance) from an energized line, the power company should comply with the 10-foot clearance standard. In this case, the municipal utility was the power company, but no steps were taken to de-energize or insulate the line from contact.

Recommendation #3: Employers should ensure that when working near a high voltage overhead power line, in situations in which visibility could be obstructed or clearances difficult to determine, an observer is used to help the operator maintain the required clearance.

Discussion: The boom of the truck was in a position that may have obscured the operator’s view of the power line. Also, the operator was preoccupied with positioning the anchor, which was having difficulty in being set because of the angle of the required hole. The rotating auger/anchor pivot point began to wobble, causing the boom to sway. If an observer had been present or utilized, he/she could have quickly warned the operator and other workers of the equipments’ proximity or contact with the power line, and the incident may have been avoided. This is required by OSHA Standard 29CFR 1926.550(a)(15)(iv)⁴, which states: “A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.”

Recommendation #4: Employers should develop, implement, and enforce a comprehensive written safety program for all workers which includes training in hazard recognition and the avoidance of unsafe conditions. A written training plan should require training for all ground crew in electric utility operations.

Discussion: A comprehensive written safety program should be developed for all workers that includes training in hazard recognition and the avoidance of unsafe conditions. It should then be noted in a company’s safety program that certain types of site-specific training (i.e., training in hazards associated with the installation of support anchors with equipment/boom trucks in proximity to overhead power lines) must be conducted and documented. This training should be given by a person who has the knowledge, training, and experience necessary to train workers and could consist of a combination of formal instruction i.e., lecture, discussion, interactive computer learning, videotape, written material, practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of worker performance in the workplace. Information useful for training in work to be performed in proximity to power lines while using articulating boom vehicles can be found on the world-wide web at: <http://www.cdc.gov/niosh/crane.html>⁵, or by calling 1-800-356-4674 and requesting the *NIOSH Alert: Preventing Electrocutions of Crane Operators and Crew Members Working Near Overhead Power Lines*, NIOSH Publication No. 95-108. The Alert contains case reports and summarizes safety precautions for operators of boomed vehicles and cranes and ground crews. In addition, posting the single-page sheet found at <http://www.cdc.gov/niosh/pdfs/95-108sum.pdf>⁶ at the worksite or including in tool box talks may serve as an additional means of communicating safe work procedures to workers. Other valuable resources that may assist employers and employees alike may be found at the OSHA site: http://www.osha.gov/SLTC/etools/construction/electrical_incidents/powerlines.html.⁷ A pocket-guide resource that employers may provide employees can be found at: http://www.osha.gov/Region7/overheadpowerlines/ohpl_card_eng.pdf.⁸

REFERENCES

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INVESTIGATOR INFORMATION

This investigation was conducted and the report drafted by Timothy Struttman, Associate Service Fellow, and written in final form by Robert E. Koedam, Chief, Fatality Investigations Team, Surveillance and Field Investigations Branch, Division of Safety Research.

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