MISSOURI FACE INVESTIGATION #94MO096

SUBJECT:

Roofing Materials Deliveryman Electrocuted When Truck-mounted Boom Conveyer Contacts Overhead Power Line

SUMMARY:

A 34-year-old roofing deliveryman was electrocuted and a co-worker was injured when a truck-mounted conveyer boom contacted a 7200-volt overhead power line. The victim was standing on the ground leaning against the truck, and the co-worker was standing on the truck bed operating the boom controls, when it the boom contacted the power line. The co-worker was thrown from the truck and the victim provided a path-to-ground for the electrical current.

The MO FACE investigator concluded that in order to prevent similar occurrences employers should:

- **instruct employees on how to conduct a job site hazard survey before starting any work**
- **contact the local utility company to de-energize or insulate power lines when circumstances offer no alternative to operating equipment in close proximity to power lines**
- **follow applicable OSHA regulations concerning operation of boomed vehicles near electric power lines**
- **stress the importance of proper selection of loading/unloading sites away from power lines**
- **establish procedures for boom operation and positioning, and proper procedures in emergency situations**
- **employees who work around electrical transmission lines, electrical circuits, and electrical equipment should be trained in cardiopulmonary resuscitation (CPR)**

INTRODUCTION:

At 4:02 p.m. on June 6, 1994, a 34-year-old roofing deliveryman was electrocuted and a co-worker was injured when a truck-mounted conveyer boom contacted a 7200 volt overhead power line. The company sells and delivers roofing supplies in three cities in Missouri and one city in Kansas. They have been in business for almost 20 years, and at the time of the incident employed approximately 80 employees. The area office involved in this incident employs eight persons, of which two were deliverymen. The victim had been employed by this company for a year and nine months. The company has written safety policies and procedures for all work conducted by employees and has regular scheduled safety meetings and safety reviews. Just days prior to this incident the victim's supervisor conducted a safety review and rode along with the workers on several deliveries.

The Missouri Department of Health FACE Investigator was notified of the incident by the county coroner on June 9, 1994, and conducted an interview with the company president and area office supervisor. Other records obtained for this investigation include the death certificate, coroner's report, police report, fire report, and the workman's compensation claim form.

INVESTIGATION:

The victim and co-worker routinely delivered roofing materials to rooftops of residences and businesses using an International 4800, flat-bed truck, with a Clairfield boom conveyer mounted at the rear of the bed. The truck's overall length was approximately 32 feet, with the conveyor extending out in front of the truck approximately two feet. The workers work as a team; the victim in this incident drives the truck and the co-worker operates the boom. The boom controls are located at the rear of the truck and are operated while standing on the truck bed. At the delivery site one worker is to check the load to insure the order was complete and then visually help guide the boom conveyer into position. The workers are instructed to conduct a site hazard survey before any equipment is moved.

The workers had loaded roofing shingles on the truck at the supply yard and drove to the delivery site. The site was a one-story, ranch-style home

on a corner lot. The workers proceeded to back the truck into the driveway of the home at a slight angle to where the left rear tires were in the yard and all other tires remained on the concrete driveway. The front left tire was located about three feet form the street edge. The overhead power lines consisted of three 7200 volt phases and one neutral line along the street edge and over the driveway. At the time of the incident the co-worker was raising the boom out of it's cradle and the victim was standing at the rear of the truck, next to the co-worker, leaning against the truck bed with a clipboard in his hand. The co-worker was going to raise the boom enough to then swing it to the side, out from under the powerlines, where it could safely be raised and positioned over the roof. The co-worker then continued raising the boom and the victim may have tried to shout at him that he was about to contact the power lines. The co-worker may have turned his attention away from the boom to look at the co-worker. The boom continued raising, contacted and rolled the middle phase power line over the end of the boom. The boom came to rest on top of the power line. The electrical energy energized the truck and threw the co-worker about 15 feet away. The victim, being in contact with the truck bed, provided the path-to-ground and suffered a fatal electrical shock. A tire blew on the left rear of the truck allowing the tire rim to contact the ground. The electrical energy also ignited the hydraulic fluid and the truck caught fire which quickly spread to the shingles loaded on the truck. A neighbor had witnessed the event and came to aid the workers. The co-worker and the neighbor then dragged the victim away from the burning truck. The victim was conscious for a short time than quit breathing and CPR was begun immediately.

The power line, experiencing a ground fault, was de-energized by the oil disconnect switch located at a near-by substation. The switch than cycled and re-energized the line. With the boom still in contact with the power line the truck was energized again. The truck tire rim was on the ground due to the blown tire and caused direct ground fault and possibly another explosion. Some of the glass windows of the home were broken, possibly at this point. Also, the electricity melted the tires where they were in contact with the cement driveway. After failing twice to restore electricity to the line, the oil disconnect switch locked out electricity to the line. The neighborhood was alerted to the incident by the loss of power and loud explosions. Emergency crews were notified and police, fire, and ambulance crews responded. The victim and co-worker were transported by ambulance to a local trauma center where the co-worker was treated for burns to his hands and released, and the victim was pronounced

deceased.

CAUSE OF DEATH:

Accidental electrocution due to (or as a consequence of) an industrial accident.

RECOMMENDATION AND DISCUSSION:

Recommendation #1: Employers should instruct employees on how to conduct a job site hazard survey before starting any work, and provide subsequent training to employees specific to the most common site hazards. Employees should be able to identify site hazards and implement appropriate control measures.

Discussion: Prior to any work being undertaken, a job site evaluation should be conducted by a competent person[1] to identify potential hazards: the uninsulated overhead power line, the moving and positioning of electrical conducting equipment near and in proximity to an overhead power line, and the boom conveyer with its length could not clear the power lines if raised vertically. Once potential hazards are identified, appropriate control measures can be implemented.

Recommendation #2: Employers should contact the local utility company to de-energize or insulate power lines when circumstances offer no alternative to operate equipment in close proximity to power lines.

Discussion: De-energizing power lines 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 power lines will be de-energized, the period of time the power lines will be de-energized, and the exact time power will be restored so that workers are not exposed to energized conductors. Insulating power lines 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

[1] Competent person: One who is capable of identifying existing or 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.

alternative to operating boom equipment near overhead energized power lines, these procedures may provide basic viable options.

In most cases with roofing material delivery, workers arrive at the delivery site never knowing what circumstances may prevail for each particular delivery. It is safe to say that the most common hazard would be that of operating boom conveyors around overhead power lines. When workers are properly trained in hazard awareness they should recognize how and when safe operation of equipment can be accomplished.

Recommendation #3: Employers should follow applicable OSHA regulations concerning operation of boomed-vehicles near electric power lines.

Discussion: 29CFR 1919.180 Crawler, Locomotive, and Truck Cranes. (j.)Operation near electric power lines - (1) Clearances, states that, except where the electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work, or where insulating barriers are not a part of or an attachment to the crane or have been erected to prevent physical contact with the lines, cranes shall be operated proximate to, under, over, by, or near power lines only in accordance with the following:

(i) For lines rated 50kV. or below, minimum clearance between the lines and any part of the crane of load shall be 10 feet.

(ii) For lines rated over 50kV. minimum clearance between the lines and any part of the crane or load shall be 10 -feet plus 0.4 inch for each 1kV. over 50kV., or twice the length of the line insulator, but never less than 10 feet.

(iii) In transit, with no load an boom lowered, the clearance shall be a minimum of 4 feet.

Recommendation #4: Employers should stress the importance of proper selection of loading/unloading sites away from power lines. These sites should also be level and firm.

Discussion: The workers chose an unloading site that put the boom directly below overhead power lines. This delivery site was on a residential street corner, and a site survey may have indicated a safer site to unload was from the side street and not the driveway. Employers should stress the importance of proper site selection and encourage employees that an inconvenience is temporary, death is permanent.

Recommendation #5: Employers should establish procedures for boom operation and positioning, as well as proper procedures in emergency situations.

Discussion: While the boom is being operated and positioned, employers should instruct employees on proper guidance techniques to aid the operator with positioning of the boom. Workers should be instructed not to lean against or be in contact with the boom of the truck while the boom is being positioned. Also, in the event of contact with an electrical power line, never board a vehicle, and keep all unauthorized personnel away form the area.

Recommendation #6: Employees who work around electrical transmission lines, electrical circuits, and electrical equipment should be trained in cardiopulmonary resuscitation (CPR).

Discussion: According to NIOSH Alert Request for Assistance in Preventing Fatalities of Workers Who Contact Electrical Energy (NIOSH Publication 87-103), "Prompt emergency medical care can be lifesaving for workers who have contacted either low voltage or high voltage electrical energy. Immediate cardiopulmonary resuscitation (CPR) followed by advanced cardiac life support (ACLS) has been shown to save lives." CPR was administered immediately after the victim contacted the electrical

energy. In this incident the trauma received from the electricity was severe and the victim did not survive.

The Missouri Department of Health, in co-operation with the National Institute for Occupational Safety and Health **(NIOSH)**, is conducting a research project on work-related fatalities in Missouri. The goal of this project, known as the Missouri Occupational Fatality Assessment and Control Evaluation **(MO FACE)**, is to show a measurable reduction in traumatic occupational fatalities

SIGNATURES:

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DISSEMINATION LIST

National Institute for Occupational Safety and Health NIOSH
Alaska State Department of Health and Social Services AK FACE Program
California State Public Health Foundation CA FACE Program
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Georgia State Department of Health GA FACE Program
Iowa State Department of Public Health IA FACE Program
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Minnesota State Department of Health MN FACE Program
Nebraska State Department of Health NE FACE Program
New Jersey State Department of Health NJ FACE Program
Wisconsin State Division of Health WI FACE Program
Wyoming State Department of Health WY FACE Program
Jackson County Missouri Office of the Medical Examiner
Mine Safety and Health Administration
Missouri Department of Agriculture
Missouri Department of Elementary & Secondary Education
Missouri Department of Health, Office of Injury Control
Missouri Department of Labor and Industrial Relations
Missouri Department of Public Safety
Missouri Department of Social Services
Missouri Farm Bureau
Missouri Head Injury Advisory Council
Missouri Hospital Association
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North Central Missouri Safety Council
OSHA Area Office, Kansas City, MO
OSHA Area Office, St. Louis, MO
Safety and Health Council of Western Missouri & Kansas
Safety Council of Greater St. Louis
Safety Council of the Ozarks
Shelter Insurance Companies
St. Joseph Safety Council
St. Louis City Medical Examiner Office
St. Louis County Department of Community Health
St. Louis County Medical Examiner Office
The Educational Center on Family Violence
University of Missouri, Agricultural Engineering