



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Yard Maintenance Worker Electrocuted

FACE 88-26

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying: the working 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.

On June 14, 1988, a 33-year-old male yard maintenance worker died when a crane moving the beam he was guiding contacted an overhead power line.

Contacts/Activities:

The county coroner contacted DSR about this fatality and requested technical assistance. On June 28, 1988, a safety specialist discussed this incident with officials from the coroner's office, met with the employer's representatives, and photographed the incident site.

Overview of Employer's Safety Program:

The employer is a small business engaged in erecting structural steel. The company has been in business for 11 years and currently employs 13 individuals. The victim was the only yard maintenance worker. The company has no written safety policy or written standard operating procedures for any of the tasks performed by employees. All employees are trained on the job.

Synopsis of Events:

The victim and one co-worker were assigned the task of cleaning up the yard where construction materials and equipment are stored. This yard is located in a remote area approximately 2 miles from the company office and shops. The cleanup involved placing several steel "I" beams into one stack.

On the day of the incident the victim and his co-worker, one of the company's regular mobile crane operators, reported for work at noon, and drove to the yard to begin their assigned task. The site selected by the workers for the stack of beams was directly beneath an overhead power line. The crane operator had the boom to its full 70-foot length. The victim rigged

a beam to the crane and the crane operator raised it approximately 3 feet above the ground and began to move it toward the selected site. The victim was guiding the beam with his left hand when the crane boom came into contact with the highest overhead power line wire. The crane and the beam became energized upon contact with the 13-kilovolt (kV) line. The victim became the "path to ground" as current passed from his hand through his arm, chest, right leg, and right foot. When the crane was moved from contact with the overhead line, the victim collapsed. The victim was conscious and talking immediately after the incident, and complained of difficulty in breathing. While help was being summoned, the victim lapsed into unconsciousness.

Cardiopulmonary resuscitation (CPR) was performed by rescue squad personnel at the scene and enroute to the hospital. The victim was pronounced dead on arrival at the hospital. The victim had burns on the fingers and palm of his left hand and on the toes of his right foot.

Cause of Death:

The coroner's office listed the cause of death as electrocution.

Recommendations/Discussion

Recommendation #1: All employers should develop and implement a safety program to protect their employees (required by 29 CFR 1926.20).

Discussion: This employer had no formal safety program. There were no standard operating procedures for any of the tasks performed. In addition, no provision was made for any formal training or verification of the ability of employees to perform the tasks to which they were assigned.

Recommendation #2: The employer should conduct job site surveys prior to the start of any operation to ensure that all involved employees are aware of the hazards associated with their tasks.

Discussion: A pre-job survey in this case would have revealed the presence of the power lines. The beams could have been relocated in some other manner. The crane operator had previously worked in this same area and should have been aware of the presence of the overhead power lines.

Recommendation #3: Employers should make every effort to ensure that cranes are not operated in the proximity of overhead power lines unless it is absolutely necessary.

Discussion: The yard where this incident occurred is an open field, bordered by a road on one side. The overhead power lines follow the right-of-way of this road. The steel beams could easily have been stacked in another area away from the overhead lines. During the inspection of the site it was noted that pre-cast concrete slabs had previously been placed near the incident site, also under the overhead lines. As with the steel beams, these slabs could just as easily have been placed in the open part of the field away from the overhead lines. The storage of materials which are handled by crane beneath overhead lines increases the likelihood of an incident such as this occurring.

Recommendation #4: Employers should ensure that adequate clearance is maintained between cranes and nearby overhead power line.

Discussion: 29 CFR 1926.550(a)(15) requires that a minimum clearance of 10 feet be maintained between cranes and power lines of 50 kV or less. In addition, this standard calls for an observer to be posted to give warning whenever it is difficult for the operator to maintain the required clearance by visual means. None of these actions were taken in the above case.

Recommendation #5: Employers should train their employees in the proper operation of the equipment they are required to operate.

Discussion: The crane operator in this case had received no formal training in the operation of the mobile crane. He had worked as a crane “operator” for only 1 year prior to this incident. His lack of experience in crane operations is demonstrated by the fact that the crane’s boom was extended to its full 70-foot length for a move of only 20 feet. This move could have been accomplished with the boom retracted preventing potential contact with overhead lines.

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Partly

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