



The National Institute for Occupational Safety and Health (NIOSH)

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Workman Electrocuted When Crane Load Line Contacts 7200 Volt Power Line

FACE 85-08

Introduction

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrically-related fatal injuries and confined space fatalities. By scientifically collecting data from a sample of fatal accidents, the FACE will identify and rank factors which increase the risk of fatal injuries for selected employees.

On January 3, 1985, at approximately 9:45 a.m., a construction worker was electrocuted when a crane came into contact with an overhead 7200 VAC power line while the worker was attempting to hook a load to the crane.

Contacts/Activities

Subsequent to a request for assistance in evaluation of the electrocution, DSR provided a research team to assist the state Occupational Safety and Health Administration. The research team, consisting of a safety engineer and a mechanical engineer, met with the state OSHA investigator who provided details about the accident. The team accompanied the investigator to the incident site where they photographed the general layout of the site and interviewed the victim's co-workers and other individuals who were working nearby.

Synopsis of Events

The work site was within an established shopping center. A chain grocery store had contracted to have an addition built onto an existing building. The prime contractor had sub-contracted with the victim's employer to install the roof on the addition. The roof was to consist of fabricated metal roofing joists and metal decking with an overlaid built-up asphalt roof. The joists, decking and 1" by 1" joist angle bracing materials, had been delivered to the worksite while the masonry work was being completed. The materials were off-loaded from the delivery truck by a forklift and stored at the edge of the property as directed by the prime contractor. Part of the material was placed directly beneath a 7200 volt AC distribution line which was 37' above the stored material.

The victim's employer had contracted with a crane rental company to provide a truck-mounted crane and operator at the work site to assist in erecting the roof. The operator arrived with the crane at the worksite at approximately 8:00 a.m. on the morning of the accident. The victim's supervisor told the crane operator and the victim which materials needed to be moved and where to place them. He also warned them about some of the materials being under the power lines and suggested

they drag them out with the crane instead of lifting them straight off the ground. The operator then positioned the crane to begin moving the roof structure materials. With the victim's assistance in rigging and hooking the loads, the operator moved four bundles of roofing joists from their temporary storage area to an area closer to the building. They then proceeded to move a bundle of joist angle bracing which was directly beneath the power line. Apparently, as the victim was in the process of hooking the load to the crane, the load line contacted the power line when the boom moved and the electricity flowed through the victim's body to ground.

The operator saw the victim fall to the ground and yelled for help. Two of the victim's co-workers responded, one began CPR and the other called for emergency help. A paramedic rescue squad arrived within 5 minutes and continued CPR. A pulse was detected about 10 minutes after contact with the electricity. The victim was then transported by a paramedic helicopter to a local hospital and was pronounced dead soon after arrival.

Conclusions/Recommendations

The following factors contributed to this electrocution:

- 1) Storage of construction materials beneath overhead power lines.
- 2) Use of crane load lines within a 10 foot distance of overhead power lines.
- 3) Both the crane operator and the victim took the risk in order to get the job done.
- 4) The working surface was wet from thawed sleet.
- 5) The crane operator knew he was close to the overhead power lines but did not adequately observe the crane's movement toward the lines while setting the hook over the load.
- 6) The crane's controls were on a pivot arm which allowed operation from either side of the truck. When pivoted to the opposing side the controls are reversed and operate in a reverse direction. Therefore, the crane operator may have thought he was activating the load line when in reality he was causing the boom to swing in a lateral direction inadvertently making contact with the lines.

Recommendations

- 1) Stored materials should be kept in areas where they do not create additional job hazards. Company safe work practices should address proper temporary storage of work materials.
- 2) Cranes should not be used within a distance of 10 feet from overhead power lines without first having the lines deenergized, insulated with protective coverings, or having an approved insulated lifting device on the load line.
- 3) Company safe work practices or safety policies should emphasize that employees not take undue risks to accomplish the job.
- 4) Since the crane was working within the ten foot absolute limit of approach to the overhead lines, employees hooking loads should have worn protective rubber, lineman's gloves and boots to insulate them from ground (damp working surface in this case).
- 5) When cranes are being used near overhead lines and could possibly enter the absolute limit of approach zone to the lines when the crane boom is swung, a signalman or warning device should be used to notify the crane operator of the crane's proximity to the power lines.
- 6) Equipment manufacturers should not place controls on pivot arms which cause reversal of function and direction when pivoted from one side of the equipment to the other. This potentially creates operator confusion and could result in severe consequences.

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