

Construction Worker Electrocuted When Crane Cable Contacts an Overhead Power Line

DATE: December 10, 1992

SUMMARY

On August 14, 1992, a 35 year-old male construction worker was electrocuted when a crane hoist cable attached to a pump he was handling contacted a 7,200 volt overhead power line. The incident occurred at the site of a road construction project while a work crew was using a crane to lower a water pump into a construction excavation. The victim was pulling the suspended pump into position when the crane cable swung into contact with the overhead power line. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- *Employers should conduct a job hazard analysis to identify and correct potential hazards prior to starting work.*
- *Employers should ensure that a minimum clearance of 10 feet is maintained between cranes and energized power lines to prevent inadvertent contact.*
- *Employers should contact the utility company to de-energize or isolate the power lines when circumstances require operating cranes less than 10 feet from energized lines.*
- *Employers should require a skilled observer to watch the placement of crane and power lines to ensure that minimum safe distances are maintained.*

INTRODUCTION

On August 14, 1992, NJDOH FACE personnel were notified by the county medical examiner of a work-related fatality that had occurred that morning. On the same day, FACE investigators met with the OSHA compliance officers to visit and photograph the scene. The employer representative was also interviewed during the site visit. Additional information on the incident was obtained from interviewing the crane operator, written witness statements, the OSHA file, the police report, and the medical examiner's report.

The employer is a construction contractor comprised of a tri-venture partnership formed in September 1991 specifically for this road construction project. The company is the primary contractor for the project and employed 47 workers, 25 of which worked as laborers at the site. The project manager (who was one of the partners) acted as the safety officer, and stated that the company had a written safety program. The company did not have a worker job or safety training program. The victim was a 35 year-old male union laborer who had worked for the company since the project started in October 1991. The employer said the victim had over 7 years of experience as a construction worker.

This was the second fatal incident to occur during this project. In an unrelated incident about a year earlier, two workers were electrocuted when the boom of their drill rig contacted a 7,200 volt overhead

power line (see FACE report #NJ-9109). The two workers were employed by a drilling and blasting company that had been subcontracted to find and blast underground rocks in preparation for the road construction. While moving the drill rig from the road, the raised boom of the rig contacted the power line.

INVESTIGATION

The incident occurred alongside a busy two-lane roadway leading into a rural area. The state highway authority was in the process of rerouting and widening sections of the road into a divided four lane highway. This project had been in progress for over a year and had advanced to the point where the new highway sections were being completed.

At this phase of the project, the construction company was installing precast concrete culverts along the path of a small stream that ran alongside the roadway. The ground in the area had been excavated to a depth of about 20 feet below ground level, and concrete footings had been poured into wooden forms at the bottom of the excavation. A single section of box culvert had been laid on a bed of stone spread in the excavation. Utility poles carrying three 7,200 volt primary power lines ran parallel to a now-closed driveway that had also been excavated. A crane had been positioned on a section of the old driveway approximately five feet from the edge of the excavation and 21 feet to the side of the power lines. The crane was marked with signs warning of the danger of contact with power lines.

The morning of the incident was wet and overcast, with rain ending a half hour before the incident. The five man crew began working at the site at 7:30 a.m. and consisted of a foreman, three laborers, and a crane operator. Their task that morning was to continue grading the stone in the culvert. Finding that a large amount of water had gathered in the excavation, the foreman instructed the laborers to get a water pump. A portable gas-powered water pump was loaded into a pickup truck and brought to the site. Once there, the crane line was attached to the pump and it was lifted out of the truck and into the excavation. At about 8 a.m., the victim was standing on an embankment near the bottom of the excavation to direct the crane and position the pump. The crane operator was aware of the power lines and shouted out of the crane window for the victim to "keep an eye on those wires". A nearby co-worker who had been assigned to help the victim also heard the warning and stated that they were all aware of the wires and were watching them.

The crane boom, which was positioned approximately five feet from the lines and was extended above them, stopped just short of setting the pump on an embankment where the victim was standing. The victim took hold of the suspended pump and pushed it away from him. As it swung back, he caught the pump and took two steps back, pulling it towards him and the overhead power lines. Fire and sparks erupted from the pump and victim's hands and feet when the crane cable contacted the power line. The crane operator immediately dropped the pump to the ground, breaking contact with the wire. The victim fell into the water and was semi-conscious when he was pulled out by his co-workers. He soon collapsed and cardio-pulmonary resuscitation (CPR) was initiated by the crane operator. CPR was continued by the police and Emergency Medical Service who arrived a few minutes later. The victim was med-evaced to the regional trauma center where he was pronounced dead at 9:17 a.m.

CAUSE OF DEATH

The county medical examiner determined that the manner of death was asphyxiation and the cause of death was electrocution.

RECOMMENDATIONS AND DISCUSSION

Recommendation #1: Employers should conduct a job hazard analysis to identify and correct potential hazards prior to starting work.

Discussion: Employers should conduct a daily job hazard analysis to identify potential hazards to workers. Once identified, appropriate control measures can be initiated to correct the hazards prior to starting any work. A control measure in this case may have been to reposition the crane to ensure that it is was not in close proximity to the power lines.

Recommendation #2: Employers should ensure that a minimum clearance of 10 feet is maintained between cranes and energized lines to prevent inadvertent contact.

Discussion: In this case, the incident occurred due to inadequate clearance between the crane and the power line. This hazard is addressed in the federal OSHA standards 29 CFR 1926.550(a)(15)(i)-(ii) (construction industry) and 29 CFR 1910.181(j)(i)-(ii) (general industry) which require minimum clearances of ten feet from power lines up to 50,000 volts and greater distances for lines with greater voltages. In addition, the New Jersey High-Voltage Proximity Act (N.J.S.A. 34:6-47.1) requires a minimum clearance of six feet from power lines exceeding 750 volts.

Recommendation #3: Employers should contact the utility company to de-energize or isolate the power lines when circumstances require operating cranes less than 10 feet from energized lines.

Discussion: In situations where it may be difficult or impossible to maintain the minimum 10 foot clearance, it is recommended that the employer contact the utility company to de-energize the power lines. Power lines can also be isolated using electrically insulating hoses and blankets, however it should be noted that this may not be adequate to protect against contacts by heavy equipment. In all situations where heavy equipment may be in close proximity with power lines, the utility company should be contacted for their policy on construction work near their lines.

Recommendation #4: Employers should require a skilled observer to watch the placement of crane and power lines to ensure that minimum safe distances are maintained.

Discussion: Although the employees in this incident were warned and aware of the power lines, they apparently did not see the hazard. This may be due to their position (they were to the front of the victim and may not have clearly seen the distance between the crane cable and power line) and because they were also watching the victim. The victim himself was involved in directing the crane and positioning the pump and could not continuously watch the lines. To prevent contact with power lines, a single

employee should be assigned to watch the movement of the crane and cable when working near power lines. The employee should be positioned where he can clearly see the power lines and crane cable and instructed to notify the crane operator when the cable is near the 10 foot limit.

REFERENCES

1. Code of Federal Regulations 29 CFR 1926, 1991 edition. U.S. Government Printing Office, Office of the Federal Register, Washington DC. pg 201
2. Code of Federal Regulations 29 CFR 1910, 1990 edition. U.S. Government Printing Office, Office of the Federal Register, Washington DC. pg 502
3. New Jersey Statutes Annotated 34:6-47.1 et seq., amended May 20, 1987. Reprinted by the NJ Department of Labor, Division of Workplace Standards, Trenton NJ. pp 1-4

ATTACHMENTS

[NIOSH ALERT: Request for Assistance in Preventing Electrocutions from Contact Between Cranes and Power Lines.](#) DHHS (NIOSH) Publication #85-111, 1985.

To contact [New Jersey State FACE program personnel](#) regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site. Please contact [In-house FACE program personnel](#) regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.