



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Construction Worker Electrocuted When Crane Boom Contacts 13,800 Volt Power Line in Arizona

FACE 85-14

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, it will be possible to identify and rank factors which influence the risk of fatal injury for selected employees.

On March 14, 1985, a construction company was in the process of laying sections of concrete water pipe in the Arizona desert when the fatal accident occurred. The company had been laying pipe all morning. The crane was moved as needed to lift the heavy concrete pipe into place. At approximately 11:20 a.m. two workmen guided the operator as he moved the crane into a new location. As the workmen were in the process of placing support timbers beneath the outrigger pads, the operator began extending the crane boom to prepare for the next lift. The crane's cable contacted a 3 phase 13,800 volt overhead power line, thereby electrocuting one worker who was in contact with the crane's outrigger.

Contacts/Activities

The Division of Occupational Safety and Health (DOSH) of the Industrial Commission of Arizona invited a DSR research team, consisting of a safety engineer, a research industrial hygienist and a medical doctor (DSDTT) to collect research information. On April 8, 1985, the team visited the office of the Director of DOSH to discuss the fatality. The owner of the company was contacted by telephone to make arrangements for the investigation and schedule times and events. The owner of the company made voluntary right-of-entry conditional upon all data collected being treated as privileged information until this case was settled in court before any meeting or investigation could take place. The owner was informed about technically collected information being subject to the Freedom of Information Act requests and that this could not be agreed to. Therefore, no investigation of this fatality was conducted.

Recommendations

1. The OSHA Safety and Health Standards, 29 CFR 1926.550(a)(15), have specific requirements for the safe use of cranes around overhead power lines. Electrical distribution and transmission lines should be de-energized and visibly grounded or separated from cranes with independent insulating barriers. If this standard is not used, then cranes may operate proximate to power lines when:

- a) a minimum clearance (absolute limit of approach) is maintained between the crane and the lines (10 feet for < 50 kV and 10 feet plus .4 inch for each 1 kV over 50 kV, or twice the length of the line insulator but never less than 10 feet) or,
- b) in transit with no load and boom lowered if the absolute limit of approach is 4 feet for < 50 kV, 10 feet for 50 kV to 345 kV, or 16 feet for up to and including 750 kV.

Additionally, 1926.550(a)(15) requires a signalman be used when it is difficult for the crane operator to use direct observation to maintain the proper clearance; and if cage-type boom guards, insulating lines, or proximity warning devices are used the work practices still must satisfy the aforementioned standards.

2. The Construction Safety Association of Ontario also recommends safe work practices to include: the use of nonconductive taglines to guide loads, the use of insulating personal protective equipment by exposed workers, and the storage of material away from power lines.

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