



Loss Control Department  
*Technical Information Paper Series*

# Cranes and Power Lines

## *Understanding the Hazard and Controlling the Risk*

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# Cranes and Power Lines: *Understanding the Hazard and Controlling the Risk*

Cranes are the work horses of the construction industry. They are very popular on construction sites and are extremely useful tools for contractors. These mobile machines lift and move the many heavy loads that are common in construction. They remove a lot of the drudgery that is associated with handling construction materials.



Although cranes are subject to a number of different types of accidents, crane contact with overhead power lines is the primary cause of fatality. This type of accident occurs all too frequently, and leaves behind mostly human wreckage.

Even when they are not fatal, the results of power line contacts are devastating and tragic. However, like most other construction site accidents, power line contact accidents are preventable.

## ***What Happens When a Crane Contacts a Power Line?***

To understand the problem requires an understanding of a *short circuit*. A short circuit occurs when an electrical current finds an unintended path to ground. If the current is not flowing, it does no harm, and it will not flow unless it has an uninterrupted path. Contact between two wires of different potential, or to ground with a conductor, will create a circuit and provide a path for the current flow.

When the boom of a crane comes in contact with a live power transmission line, the current flow will be down the boom or load line. Short circuiting will not occur unless there is a completed path for the current to flow to ground. Rubber tires insulate the crane from the ground, and if the hook is in the air, it is also protected. However, there have been instances when steel belted tires have caught fire because of high voltage current flowing through them.

### ***Can't The Power Lines Be Protected Against Contact?***

Overload protection (such as fuses or circuit breakers used in the power line grid) will not protect against a crane boom short circuit. Fuses and circuit breakers will carry the load for a brief period of time, then kick off. However, some are designed to automatically reset after a few seconds and may reset several times.

Electric transmission power lines may be bare wire, without protective insulation. Even insulated wires can be dangerous, though, since weather can deteriorate the insulation, rendering it ineffective.

### ***How Are Workers At Risk?***

If the crane is in contact with the source of current, and if it is insulated, then a person can become the critical link in a deadly chain. The person can become the short circuit path to ground. The current can also find a path down a rope tagline held by a person, or through anyone who is in contact with the load line or crane and ground. The crane operator will not be harmed when the crane becomes energized. The operator is safe in the cab.

Only when the operator tries to exit the crane, and is in contact with the crane and ground, will the short circuit be complete. Many accidents have occurred when operators try to exit cranes. If an operator must exit the rig, only by jumping *away* from the crane, without touching the crane and ground, will electrocution be avoided.

### ***Minimum Distance Requirements***

Power lines forty feet high seem to be at a safe height until a crane pulls in. Then, the distance rapidly fills up with crane equipment. OSHA has some very specific requirements for safe use of cranes near power lines (for the construction industry, these regulations are published at 29 CFR 1926 Subpart N, Cranes). Use good planning to maintain adequate distances; this is the best prevention for crane boom power line contact.

### ***What To Do If Contact Is Made***

If a crane should become energized by power line contact and the operator cannot safely re-position the crane boom to break contact, only a qualified person should attempt to remove the power source. Secure the area, and do not allow any one to attempt to contact the crane. Notify the power company and police, and keep the area secured.

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