



# Working Near Power Lines

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## WORKING NEAR POWER LINES

### SCOPE

Electrocution is one of the top five causes of workplace deaths in North America. Electricity always seeks the easiest path to the ground by following a conductor, such as metal, wood, water, or a human body. If a worker is grounded and touches equipment that is in contact with a power line, electricity will instantly pass through them causing a harmful or fatal shock.

### DEFINITIONS

Distribution Lines: Power lines that carry 50 kV or less. The most common size of line used by utility companies.

kV: Unit of 1000 volts

Limit of Approach: The minimum clearance distance that must be maintained from all energized power lines. This distance is established by law. Only qualified workers can work within the Limit of Approach.

Qualified Worker: A competent worker employed by the utility company that owns the powerline. This is the only category of worker who can work within the Limit of Approach.

Transmission Lines : Power lines that carry more than 50kV. The utility company must be contacted to determine the exact voltage.

Volt: Unit of electrical force that will move a current of one ampere through a resistance of one ohm.

### PLANNING

- \* Survey the work site carefully before work begins and anticipate potential safety problems.
- \* Consider all overhead lines to be energized power lines, no matter what they look like. Note a danger zone around power lines and stay outside it. Have lines barricaded or temporarily de-energized, if possible.
- \* Call the local gas, electric, telephone, and cable TV utilities in advance to locate and mark underground lines. (Some utilities participate in one-call system for locating underground cables, wires, and pipelines).
- \* Report activities that could damage power poles, such as excavations that might reduce pole stability, to the local utility company. Temporary bracing may be necessary.
- \* No personnel shall work within the limits of approach of power lines until all necessary clearances and permits are in place.
- \* When permits are obtained, they must show names and phone numbers of utility company contacts.
- \* Determine the distance between ground level and the lowest sag point of power line (the utility company will provide this service).
- \* Determine height of all equipment and material. Ascertain highest possible equipment or material to be used to make sure clearances are observed.
- \* Establish critical area under power lines where equipment cannot operate unless accompanied by a competent safety watch. Mark off the area.
- \* A pre-job safety meeting must be held at the start of each shift to remind everyone of the hazards.

### SITE WORK

Ensure that the minimum clearance distance can be maintained at all times. This distance is measured from the extreme outside dimension of the work platform, equipment, the safety lines, cables, materials or tools

handled to the nearest energized conductor. This conductor could be a wire, a transformer or any other energized component.

\* When the minimum distance cannot be maintained because of the circumstances of the work, the types of tools used or where an unplanned movement of workers or equipment can cause contact with the energized conductor, STOP ALL WORK.

\* Call the authority controlling the system and arrange for a meeting at the work site to decide whether the energized electrical conductors can be:

- de-energized
- effectively guarded
- displaced or re-routed.

\* Get assurance in writing, which of the three actions will be taken and when. This assurance must be signed by the owner of the electrical system.

Safe Limit of Approach Distances from Overhead

Power Lines for Persons and Equipment

Operating Voltage Between Conductors of Overhead Power Line Safe Limit of Approach Distance for Persons and Equipment

NO MATERIALS ARE TO BE STORED WITHIN THE SAFE LIMITS OF APPROACH FOR POWER LINES.

### **CRANES, MOBILE DRILL RIGS, AND OTHER MOBILE EQUIPMENT**

High voltage contact is the largest single cause of fatalities associated with cranes. All can be prevented. Utility companies have procedures for shutting down or moving a power line if sufficient advance notification is given. If it is not possible to have the line moved or power shut off then strict procedures must be set up and enforced by the job supervisor and followed by all operators. A pre-job meeting must be set up and all hazards taken into consideration when work is taking place near a power line.

\* Surrounding every live power line is an area of safe limit of approach. It is STRICTLY forbidden to move any crane boom or mobile equipment, such as a truck with the dump box elevated, within the area of safe limit of approach.

\* All wires and electrical equipment should be treated as energized unless reliably informed otherwise.

\* Ground rods, proximity devices, hook insulators, insulating boom guards, limit switches or any other similar device must not be relied on for safety.

#### Safe Limit of Approach Distances

### **IF CONTACT IS MADE**

\* Everyone must be instructed to stay away from the machine and the load. THE COMPLETE MACHINE, LOAD, AND SURROUNDING GROUND WILL BE ENER-GIZED.

\* Have the operator try to disengage the machine from the contact.

\* If the machine cannot be moved, instruct the operator to remain in the machine until the line is de-energized and declared safe.

\* Have someone call the Power Company immediately to shut off the power. Call for medical help if there are injuries.

\* Warn everyone away from the load, guide wires, equipment, and anything in contact with the equipment, all

of which could be conducting a deadly amount of electricity.

\* An operator must only leave the machine in contact with a power line if absolutely necessary. The operator must jump clear and remain upright. Contact with the ground while still in contact with the machine must not happen as that person will provide a path for the electricity to travel to ground. The operator must keep the feet together and hop or shuffle in small steps to a safe distance from the machine.

\* A crane must be completely inspected and re-certified after a power line contact. Wire rope must be replaced if contact is made.

\* All contact with power lines must be reported immediately to the Utility Company, Electrical Authorities and to Management, as well as the Occupational Health and Safety Authority.

## **SIGNALLING**

At all times when an operator's view is obstructed a signal person must be employed. The signal person must not have any duties, other than prescribed signal duties, to perform.

The signal person must:

\* Be fully qualified by experience with the operation and must know the standard hand signals for controlling operations.

\* Wear highly visible gloves and vest and remain in full view of the operator.

\* Be responsible for keeping the public and all unauthorized personnel outside the radius of operation.

\* Direct the load in such a manner that it does not pass over anyone.

\* Be in constant communication with the operator either visually with hand signal or audible by radio throughout the operation.

\* If the operator loses contact with a signaller for any reason, the equipment movement must be stopped until communication is restored.

\* If it is necessary to clarify any signal to the operator, the operator must first be signaled to stop all movement.

\* Adequate signalling and lighting arrangements must be available for night work and operations must cease when either is inadequate.

## **ELECTRICAL EMERGENCIES**

Shock - Never touch a fallen power line, or anything or anyone in contact with a power line. Instead, call the power company to de-energize the line.

Electrical Fire - Call the fire department immediately. If necessary, use a CO2 or dry chemical extinguisher; do not use water.

First Aid - Call for help immediately. If the individual is free from the power line, check the following:

\* Breathing: Use mouth-to-mouth resuscitation, or cardiopulmonary resuscitation (CPR) if needed.

\* Shock: Signs include cold or clammy skin, weakness, shallow breathing, rapid pulse. Loosen clothing. Keep victim horizontal and warm until help arrives.

\* Burns: Cool minor burns with cold, running water. Don't touch the burn, break blisters, or remove burned clothing. Get medical help; electrical burn damage may not be immediately apparent.

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