Managing Electrical Power Line Hazards

By George Kennedy

Many construction operations require workers to perform their jobs in proximity to overhead and underground power lines. It is therefore imperative that construction workers, equipment operators, truck drivers and others be trained to recognize the dangers of letting their bodies, equipment, tools or vehicles make contact with, or come too close to, power lines.

Unfortunately, the reality is that while electrical utility workers are routinely trained to recognize and manage electrical hazards, most construction workers are not. That lack of knowledge of the potential electrical hazards present in their work environment makes them more vulnerable to electrocution, electric shock, burns and falls caused by contact with electrical energy.

For example, many construction workers do not know that the coating on overhead power lines is only there to protect the conductor from the weather; it is not electrical insulation. Nor do they know that most construction electrocutions are due to equipment making contact with a power line, which in turn electrocutes workers working in contact with the equipment or materials being handled. Even a brief contact with low-voltage lines can kill a worker or result in serious, disfiguring and/or debilitating injuries.

The data clearly show that a high number of construction workers have been killed or seriously injured due to contact with power lines. For example, in 2005, the Bureau of Labor Statistics (BLS) reported that 107 construction workers were fatally injured by contact with electricity. Of the 107 workers killed, 49 died because of contact with overhead power lines. An additional 627 were seriously injured when they contacted power lines — 313 through contact with overhead lines, 314 with underground lines. According to the National Institute for Occupational Safety and Health (NIOSH), electrocutions from contact with overhead power lines result on average in 128 work-related fatalities per year.

Managing the Hazard

All power lines present a potential hazard. The first step in controlling electrical hazards is to assume that all power lines are energized and avoid making contact — unless the electric utility company has verified that the lines have been de-energized and grounded.

Notify the power company before starting the work and give them an opportunity to reduce the hazards and make the power line electrically safe. Although it is often difficult and may be impossible for the power company to de-energize the lines, there are other things it might be able to do to reduce the exposure, such as place protective covers over the lines or temporarily relocate lines. However, employees should be made aware of the fact that insulating sleeves alone might not allow equipment and workers to work safely close to lines.

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This NIOSH photo captures the aftermath of a fatal accident in which a crane boom made contact with an overhead power line.

OSHA currently requires a minimum safe distance of 10 ft for voltage up to 50kV and an additional 0.4 in. for each additional 1kv. Local conditions may require greater distances, so it is a good idea to check with the power company for their recommendations. Additionally, a trained, qualified worker should be assigned to observe the clearance of equipment operating near overhead power lines when it is difficult for the operator to judge and maintain the required distance.

Contact the power company for assistance; it might be willing to install non-conductive flags or warning tape to assist the operator in judging the distance. Electronic warning devices that can be installed on cranes or other equipment are also available and can be used to alert the operator if the boom is coming too close to an energized line.

Before excavating around underground power lines, contact the Dig Safe One-Call System (call 811 anywhere in America) at least 48 hours (some states have different requirements) before you dig. It will arrange to send out a locator from the power company to mark the lines.

Once the lines have been marked, excavators are required to hand dig or vacuum excavate (not permitted in some states) when working within the tolerance zone established by state laws. Most states require excavators to maintain an 18-in. tolerance zone around the line and other states require that a greater distance be maintained. Check local requirements and make sure that workers know what they are.

If Contact Is Made

Power line contacts will sometimes cause the lines to temporarily de-energize, but they will also reset automatically, often more than one time. Therefore, if equipment makes contact with a power line, everyone should move away without touching the equipment, attachments or rigging. If a power line is down, everyone should be kept away. Only qualified personnel from the power company should touch or attempt to move a fallen power line. (Note: Damaged underground power lines present similar electrocution hazards.)

The equipment operator should attempt to break contact with the power line without breaking the line. If that is not possible, the operator should remain in the equipment until the line is de-energized by the power company — unless there is a fire or the equipment is in danger of being struck by the power line. If the operator must exit the equipment, he/she should jump off the equipment, landing with both feet together.

No part of the individual's body should touch the rig and the ground at the same time, or the individual could become a path to ground and be electrocuted. After getting off the equipment, the operator should hop or shuffle away from the equipment with feet together to avoid becoming a conductor between two areas of energized ground. The operator should not return to the equipment until the power company says it is safe to do so.

Conclusion

Because electricity is such a familiar part of our surroundings, it often is not treated with the respect it deserves. Overhead and buried power lines on the jobsite are especially hazardous because they carry extremely high voltage.

Fatal electrocution is the main risk, but burns and falls from elevations are also hazards. Using tools and equipment that can contact power lines increases the risk. All this and more must be conveyed to workers, equipment operators, truck drivers and others who perform their jobs in proximity to underground and overhead power lines.

To assist employers in meeting the requirements and establishing relevant safety policies and procedures, OSHA offers an online Construction eTool on electrical safety at *www.osha.gov/SLTC/etools/construction/electrical_incidents/mainpage.html*, and NIOSH a Safety and Health Topic page at *www.cdc.gov/niosh/injury/traumaelec.html*.

In addition, a DVD titled "Contractor Safety – Preventing Electrical Injuries" is available through the Burn Foundation (215) 988-9882. NUCA members may also access a toolbox talk titled Overhead Power Lines in the members-only section of the NUCA Web site at *www.nuca.com*.

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