THINK SAFETY

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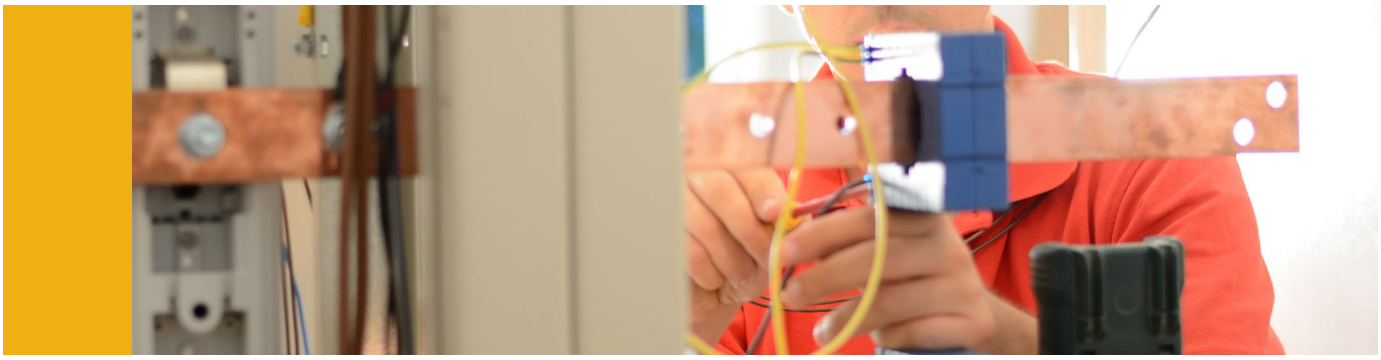
Electrical safety—best practices



Electricity is used, in one form or another, 24 hours per day. Within that same time frame, at least one construction worker dies or is severely injured from an electrical accident, making electricity the fourth-highest cause of occupational death among construction workers.

The top four causes of an electrical-related death include:

1. Contact with overhead power lines.
2. Failure to de-energize equipment.
3. Mistakenly thinking the equipment is de-energized.
4. Contact with underground power lines.

Types of electrical injuries

There is a variety of injuries that can occur from electricity, including:

1. Electrocution: This is death by electrical shock.
2. Electrical shock: This occurs when an electrical current passes through the body. The degree of damage depends on the path the current takes and the size and length of exposure. The longer the exposure, the more severe the injury and potential for death.
3. Burns: This is the most common type of electrical injury—usually non-fatal.
4. Falls: Once shocked, a person may also sustain an indirect injury caused by a loss of balance, which can result in serious injury or death.

Best safety practices with pre-job planning

Many electrical accidents occur due to poor or inadequate planning. The Occupational Safety and Health Administration (OSHA) has established rules and guidelines for safely working with and around electrical systems.

Through careful planning, you can:

1. Reduce the risk of injury to yourself or others.
2. Reduce the risk of damage to property and equipment.
3. Identify the potential hazards of the job and make arrangements to control them, including:
    a. overhead and/or underground power lines,
    b. the need for specialized equipment, such as scissor lifts or ladders, and
    c. the use of personal fall protection equipment.
4. Reduce the waste of time and materials.

Evaluate hazards

Overhead power lines:

1. Identify where the power lines are in the immediate area.
2. Be alert to where ladders, scaffolds and scissor lifts are placed.
3. Use fiberglass ladders.
4. Know the proper distance from power lines to ensure safety.

Power tools:

1. Use a power cord with three prongs—one must be a ground prong.
2. Always plug portable tools into a grounded circuit.
3. Work with double-insulated tools.
4. Inspect all tools prior to use and do not use damaged tools or equipment.

De-energize equipment:

1. Utilize a lockout/tagout program. This guarantees that a person knows the circuit or equipment is safe to work on.
2. Inspect equipment to ensure there is no other stored hydraulic, gravity or pneumatic energy built up in the machine. This built-up energy may activate, resulting in injury or death.
3. Ground the equipment. This will prevent static or stray voltage from potentially shocking anyone.

Underground power lines:

1. Always utilize the local or state locate service prior to excavation or trenching.
2. Best practices include following the 1926 Standard for Trenching and Excavating OSHA.
3. Hand dig within two feet of the locate line to prevent equipment from hitting the power line.

Extension cords or temporary wiring:

1. Do not use these in places where there is permanent wiring.
2. Protect wiring from accidental damage caused by sharp edges, vehicle traffic or pinch points.
3. Use a ground lug for cords and use the correct size wiring for the application.
4. Plug all cords into a ground fault circuit interrupter (GFCI) or other protected outlet.
5. Inspect cords prior to each use for frayed ends, cuts or exposed wires. Fix damages or replace the cord.

Electrical safety—best practices

Equipment grounding:

1. Ground properly all equipment or circuits being worked on.
2. Reduce the chance of electric shock by grounding equipment, such as electrical boxes or metal conduit. This allows stray currents to easily travel to the ground.
3. Verify that proper grounding requirements for specific voltages and equipment have been met.

Arc flash/arc blast:

1. Arc flash occurs when high voltage exists across a gap between conductors, resulting in the current traveling through the air. The arcing gives off high amounts of heat (thermal radiation) and intense light, which can result in severe burns.
2. Arc blast is produced from high voltage that results in a pressure wave. The pressure wave can project melted aluminum and/or copper components from the electrical equipment, traveling up to distances equal to or greater than 10 feet. In the absence of proper body protection, these flying molten metal objects become shrapnel, resulting in burns and/or other bodily injuries.
3. Proper protective equipment (PPE) should always be worn for the appropriate voltage and conditions of the job.

Personal protective equipment:

1. All protective equipment used in areas where there are potential electrical hazards should be inspected for damage prior to each use.
2. Use appropriately rated equipment and PPE for different voltages.
3. Refer to 29 CFR OSHA 1910.335 and 29 CFR OSHA 1910.333 for additional standards and guidelines for training and safe work practices.

Applicable standards/references:

1. 1910 Over 600 Volts 29 CFR OSHA
2. 1910 600 Volts and Under 29 CFR OSHA
3. 1910 Hazard Assessment 29 CFR OSHA
4. 1910 Personal Protective Equipment 29 CFR OSHA
5. 70E National Fire Protection Association