

eSafetyLine Article

Be Safe-Electrically

Accidents involving electricity are commonplace. With this in mind, both qualified electricians and the unqualified should review the basic accident prevention measures that can protect everyone from electrical hazards.

Before work begins, it's important to be certain that the following five protective methods are in place:

1. Provide ground fault protection. There are two options, Ground Fault Circuit Interrupters (GFCIs) or an Assured Equipment Grounding Conductor Program (AEGCP). A GFCI will detect an imbalance between the energized conductor and the return neutral conductor. An imbalance occurs when the current leaks from a tool through the body of a person who is grounded. At this point, the GFCI trips and immediately stops the flow. GFCIs are available as portable devices or can be installed in a circuit. An AEGCP is a written company procedure that requires periodic testing of all cords to ensure no faults will occur. Records must be kept of the tests.
2. Ensure Proper Insulation. Insulation on conductors is a simple yet often overlooked method that provides protection from electrical accidents. It should be checked each day. Any cord with exposed wires or scuffed or cut insulation should be removed from service. Depending on the task at hand, employees may need to use insulated shoes, gloves, and hand tools.
3. Observe Guarding Requirements. Regulations provide employee protection by limiting access to energized conductors and equipment by location such as overhead lines or by installation of covers or other permanent barriers. Whenever it's necessary to work in these areas, on scaffolding or lifts, employees should know the minimum approach distances and personal protective equipment needed.
4. Maintain Grounding. Grounding may be the most fundamental element of electrical protection. That third neutral conductor in cords we often ignore is critical to ensuring employees are protected from electric shock, the likelihood of fire is minimized and electrical equipment is protected from damage. Employees must check all cords and equipment to ensure the ground is in place. Qualified electricians must also ensure grounds are properly applied when deenergizing to perform repairs.
5. Prevent current overload. Devices are available, like fuses or circuit breakers, to protect circuits that function by limiting or cutting off the flow of electricity when a short circuit or overload occurs. They can also prevent accidents by protecting conductors and equipment from overheating. It's important to be sure that the

proper device has been installed or has not been circumvented. For example, homeowners often use an extension cord that is not made for the current it needs to carry and yet the load may not exceed the breaker resulting in disaster. To ensure employees' safety, it's vital to be sure wiring and breakers are compatible with work to be performed.

Even when these safe work practices are carefully followed, accidents do happen resulting in potentially serious, even fatal injuries. Electrical shock injuries occur when some part of an employee's body becomes part of the circuit. The electric current enters the body at one point and exits at another. Other common hazards from electricity include burns, arc blasts, explosions and fires.

Shocks can occur when:

- Both wires of an electric circuit are touched
- One wire of the circuit is touched and the employee is in contact with the ground
- An employee is in contact with a metallic part that is "hot" due to contact with an energized wire and the ground

Shocks can range in severity from a faint tingle to loss of muscular control to severe burns, cardiac arrest and even death. The seriousness of the injury depends on how much electricity passes through the body, the path the electricity takes and how long the body is part of the electric circuit. The electric current passes through the body's internal structures, much of the damage isn't visible however destruction of tissues, muscles, nerves and other internal organs occur along the path. Secondary injuries are very likely to occur from the initial shock. These include falls, cuts, broken bones and most commonly burns.

The most common types of burns common are electrical burns, arc burns and thermal contact burns. Electrical burns are the result of current moving through the body's tissues and bones causing heat to be generated damaging the involved tissues. These burns typically need immediate medical attention. Arc burns, or flash burns, occur when an electric arc or explosion resulting in very high temperatures near the body. Thermal contact burns will occur when skin comes in contact with hot surfaces of overheated electrical components.

Another danger results when high-energy arcs cause fires or explosions. This can damage equipment causing metal fragments to fly in all directions like shrapnel causing potentially fatal injuries.

Although electricity is a necessary evil at every jobsite, the potential dangers and injuries must be acknowledged and care taken to minimize their occurrence. A minor electrical mishap can result in a fatality.

For additional help with safety and OSHA compliance, take advantage of the resources available through NCMA. These resources include the NCMA Block Plant Safety Software. The software is available from NCMA at (703) 713-1900 at a cost of \$150 for up to 3 plants/year (nonmember \$450).