

Alaska Municipal League Joint Insurance Association

Loss Control Incentive Program FY 2021

SAFETY BRIEF: ELECTRICAL SAFETY

Electrical safety is extremely important in today's modern technological environment. Machines, computers, tools, household appliances—everything runs on electricity. If electricity is properly controlled, it's very useful, but if you don't treat it with respect and follow the rules, it's very dangerous.

Electricity is the movement of charged particles (electrons) through conductive materials such as water or metal. When these charged particles move in unison, they create an electrical current. Electricity travels better through some materials (conductors) and poorly or not at all through others (insulators). Steel, copper, aluminum, silver, iron, and other metals are good conductors because electricity passes through them very easily. This is why most wires, used in electronics, are made of metal.



Non-metallic materials like wood, rubber, plastic, glass, porcelain, and fiberglass act as insulators. Electricity has a difficult time passing through these materials. Wires are encased in rubber/plastic to keep the electric current on its path and help prevent shock or fires. If you see wiring that is cracked, exposing the wire inside, do not touch the wire, as you might receive a shock. Tell a qualified electrician or supervisor about this hazard immediately.

Unfortunately, the human body is a relatively good conductor of electricity. Moist or wet skin is very conductive. In fact, wet skin is over 100 times more conductive for electrical current than dry skin. Use extra caution when working with electricity when water is present in the environment or on the skin.

Although electricity flows in a path or circuit, it is always looking for a short cut to get to its destination. In addition, it will always take the path of least resistance. If you happen to become a part of the circuit, your body may become part of the short cut, causing injury to you! An electrical shock is received when an individual is in contact with the ground and also contacts:

- both wires of an electric circuit; or
- one wire of an energized circuit and the ground; or
- a metallic part that has become energized by contact with an energized conductor.

The three main types of electrical protective devices are fuses, circuit breakers, and ground fault circuit interrupters. Fuses, which can only be used once, and circuit breakers, which are reusable and may be reset, are designed to protect equipment and facilities. Ground fault circuit interrupters, on the other hand, are specifically designed to protect people.

Electrical receptacles located around water, such as those found near sinks or outside, require a device called a GFCI, or ground fault circuit interrupter. This device acts extremely fast so if there is a malfunction of electrical equipment, the electricity will be shut off before it can reach the equipment, thus saving someone from an electrical shock. Here's an example: A bare wire inside an appliance touches its metal case. The case is then charged with electricity. If you touch the appliance with one hand while another part of your body is touching a grounded metal object, such as a water faucet, you will get shocked. If the appliance is plugged into an outlet protected by a GFCI, however, the power will be shut off before a fatal shock can occur. Portable GFCIs are also available to provide on-the-spot ground fault protection



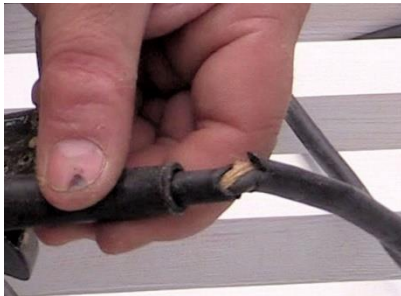
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even if a GFCI is not installed on the circuit. Ground fault circuit interrupters must always be used for all outdoor construction activities, in garages, wherever water or wet conditions may be present, or whenever a water source is within six feet of an outlet.

When working around electricity, always use tools made of a non-conductive material or those that have a nonconductive plastic coating. Stay away from metals such as aluminum and steel, which are highly conductive and greatly increase your chances of getting a shock. Metal ladders should never be used around electricity. A wood ladder is a good alternative when working with electricity, but it could still be conductive if it is oily, dirty, or painted.

Inspect your tools and equipment to make sure all the cables are in good condition and the ground prong



is in place and not missing. If this ground wire is missing, the electricity could flow through your body in the case of a short or malfunction. Do not use a tool that has a frayed cord, damaged plug, loose connection, or missing parts. Likewise, don't use any tool that smokes, smells, sparks, or shocks. Such a tool should be tagged "Out of Service" and reported to your supervisor immediately. Never try to repair electrical cords by wrapping electrical tape around the cord. Frayed, cut or damaged cords must be replaced or repaired by a trained and authorized electrician.

Extension cords are for temporary use; never use an extension cord as a substitute for permanent wiring. If you must use an extension cord, use the shortest one for the job. Never plug one extension cord or power strip into another, a dangerous practice called daisy chaining or piggybacking. Heat producing appliances such as space heaters, microwaves, and coffee pots should always be plugged directly into electrical outlets—do not use extension cords—and only one appliance per outlet to prevent wiring from overheating.



Overhead powerline hazards. Most electrocutions involving overhead powerlines are caused by failure to maintain proper work distances. Shocks and electrocutions occur where physical barriers are not in place to prevent contact with the wires. When dump trucks, cranes, work platforms, or other conductive materials (such as pipes and ladders) contact overhead wires, the equipment operator or other workers can be killed. The minimum distance for voltages up to 50kV is 10 feet. For voltages over 50kV, the minimum distance is 10 feet plus 4 inches for every 10 kV over 50kV. Never store materials and equipment under or near overhead powerlines.



In addition to keeping your equipment in good condition, housekeeping is important. Keep areas clear around electrical panels and other electrical equipment. OSHA standards require at least 30-inches clearance around electrical panels for emergency access. On electrical panels, be sure all circuit breakers are properly labeled. In an emergency, or in normal maintenance, it's important to know what breaker controls what machine or other electrical equipment. Naturally, if you're performing maintenance on electrical equipment, be sure the energy source is locked out and tagged. Lockout/tag-out prevents someone from inadvertently turning on the power during maintenance.

Remember, only qualified workers can perform electrical maintenance and repairs. OSHA defines qualified workers as those who have been fully trained to identify exposed live electrical parts and their



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voltage, and who have learned what procedures they must follow when they work on exposed live parts or are close enough to be at risk. All other workers without specialized electrical training are “unqualified” and should not attempt to repair electrical equipment. According to one study, 41% of workplace electrocution victims had been on the job less than one year, so make sure electrical safety is included in your new employee orientation.

Want to learn more? The AMLJIA has free online training, including more than 50 health and safety topics. Electrical Safety is a 1-hour course which covers the basic rules of electricity, how electricity impacts the human body, how to recognize electrical hazards, and basic electrical safety prevention methods. If you need to set up new learner accounts for online training, call 1-800-337-3682 or email sharont@amljia.org.

