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PRESS RELEASE

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ELECTRICITY: UNDERSTAND ITS HAZARDS

Electricity is a powerful tool when that energy is properly applied. However, serious electrical hazards can occur when electricity is improperly used, or electric power sources are damaged or deteriorated. Pain may be the least result of a significant electric shock.

“Care must be taken to avoid potential injury or death from exposure to electrical circuits,” Dee Jepsen, Ohio State University Associate Professor and State Safety Leader, says. “Electrical injuries can be grouped into two subtypes: direct, which may result in electrical shock, burns or electrocution. Indirect electrical injuries can occur when someone is shocked and falls from an elevated location as a result.”

Understanding basic electrical terms can help reduce potential for electrical injury. Among those terms are:

Voltage: Electrical fore and potential, measured in volts.
Current (amps): Volume or intensity of electrical flow (flow of electrons).
Power (watts): Power consumed (measure of work).
Resistance (ohms): Restricted flow of a current (higher resistance = lower current).
Hot conductor: A conductor that carries the electrical current.
Grounding conductor (neutral): Carries the current in normal operation but is connected to the earth (zero volts/potential).
Ground: Physical connection to the earth, which is zero volts.

“People experience electrical shock when part of their body completes a circuit between an electrical source and a ground,” Jepsen says. “Our skin has little or no resistance to electrical current flow, increasing the danger of electrical shock or burns, it’s important to avoid damp or wet areas when working around electricity.”

Electric shock may be limited to a tingling or jolting pain, such as from static buildup discharging from our body. As electric current is conducted through a material, any resistance (opposition to the flow of electrons) results in dissipation of energy, generally in the form of heat. When the conductor is human tissue and amount of heat generated is sufficient, the tissue may be burned. The effect is similar to exposure to an open flame or other high-temperature heat source. The exception is that electricity has the ability to burn tissue well beneath the skin of a victim, even burning internal organs.

High voltages increase the risk of death as a result of electrical shock, but even very small currents can result in death.

A serious hazard to the human body as a result of electric shock is the effect on the nervous system.

Within the body is a network of special cells, nerve cells, which process and conduct a multitude of signals responsible for many body functions. The nervous system communicates with the brain, spinal cord and sensory/motor organs in the body so we can move, respond, think and remember.

If a high enough jolt of electricity is conducted through a living creature (human or otherwise), tiny electrical impulses normally generated by the neurons are overridden. The nervous system is overloaded, and internal signals aren't able to function. When muscles are triggered by an external shock, they involuntarily contract. A shock victim won't be able to prevent the response.

This involuntary response is especially dangerous if a shock victim contacts an energized conductor with their hands. Finger muscles, typically stronger than arm muscles, clench the fingers into a fist, worsening the situation by forcing the hand to grasp the source of energy. Once the current stops, the victim may not have voluntary control of muscles for a period of time.

This kind of current can also impact the heart muscle and diaphragm muscle controlling the lungs, in effect freezing them. Even relatively low currents can often disrupt nerve cell signals, preventing the heart from properly beating. When the current is strong enough, death from asphyxiation or cardiac arrest are the general result.

"The severity of an electric shock depends on the path of the current through the body, the amount of the current flowing through the body, and the duration of the shock," Jepsen says. "Some people have survived shocks of several thousand volts, while others have been killed by voltages as low as twelve volts. To prevent electrical shock, keep body parts from contacting the circuit or becoming part of the electrical flow and a path for the current."

Steps to help reduce electrical hazards include:

1. Inspect electrical power areas to identify hazards such as exposed wires or damaged electrical boxes.
2. Be aware of and avoid contact with overhead wires when working with ladders, pruning shears, saws or when operating tall equipment.
3. If an electrical fire breaks out, do NOT use water to help contain it. This can result in fatal electrical shock. Use a fire extinguisher that is approved for electrical fire.
4. Inspect all power cords and electric outlets before each use. Repair or replace damaged wires or plugs. Do not place tape over gashes in electric cords or splice electric wires.
5. Ensure that extension cords used outdoors are approved for that kind of use. Make sure the electrical load does not exceed the cord's rated capacity.
6. Avoid using multi-plug adaptors or plugging multiple extension cords together. Circuit overloading can increase fire risk.
7. Use only double-insulated power tools or equipment with three-prong plugs. Don't use equipment with broken plugs and immediately stop using any electric tool if a tingling sensation is felt while it's in use.
8. Don't use electrical equipment in damp or wet areas. Protect plugs and outlets from moisture and don't leave a plug connection in a puddle or other collection of water. If these conditions cannot be avoided, us a GFCI (ground fault circuit interrupter), which shuts off electric power when it detects an imbalance between the outgoing and incoming current.

If someone receives an electric shock from faulty equipment, immediately call for help. If the victim is unable to pull away from the current source, stop the flow of electricity in

the victim's body by disconnecting or de-energizing the circuit.

Do NOT try to remove a victim of electric shock from the current source. Touching the victim could cause the rescuer to be shocked as well.

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