

ELECTRICAL SAFETY & LOCK OUT, TAG OUT

We all use electricity daily. Most of the time, electricity and electrical tools are perfectly safe. There are certain conditions that can occur that make electrical equipment very dangerous. It is important for us to discuss these conditions and work hard to prevent them.

I. What are some hazards associated with electricity?

A. Electric Shock

What causes us to be shocked by electricity? Electric shock is caused by your body coming into contact with any source of electricity that has sufficient current to penetrate your skin. Not all electrical currents can electrocute us. If that was the case, we would be shocked by touching a 9v battery. Our skin, clothing, and our environment all have various levels of resistance to electrical current. This resistance keeps current from flowing into and through our bodies. Take the same 9v battery and put it on your tongue. Chances are, you will receive a shock because the resistance on your tongue is much lower than your hand. Also, each person has different levels of resistance. Just because you come into contact with live electricity and do not receive a shock, does not mean the person next to you will not receive a shock.



B. Associated Injuries with Shock

Injuries from shock can be as minor as a slight tickle to severe burns and even death. What are some factors that could affect the severity of injury related to electricity? There are three different ways electricity can hurt us in the event of electrocution.

- i. Cardiac Arrest: Cardiac arrest is the abrupt loss of heart function. This is different from a heart attack. Heart attacks are caused by a blockage that stops blood flow through the heart. Cardiac arrest is a malfunction of the heart's electrical system.
- ii. Muscle, nerve, and tissue destruction: Severe damage to internal tissue can be a result of electrocution. Often damage of this kind cannot be observed from the outside.
- iii. Thermal burns: Burns on the outside of your body from current entering and exiting your body. Burns are usually caused by the resistance your skin and body have to electricity. As the electricity passes through and overcomes the resistance, it creates heat. That heat can easily burn you.

When electrocution occurs, we must also consider additional injuries. Be mindful of your work positioning and environment when authorized to perform work on electrical equipment. Being shocked is bad enough without combining it with a fall from heights.

C. Arc Flash

Arc flash is an extremely dangerous condition that has the opportunity to severely injure you, electrical components, and potentially create a large explosion that could affect the entire facility. The best way to protect yourself from arc flash is to not perform work you are not trained and authorized to perform.

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II. How do we prevent electrical shock or arc flash?

Now that we know some of the injuries that can occur from electric shock, let's turn our focus to preventing these injuries.

A. Using GFCIs

GFCI stands for Ground Fault Circuit Interrupter. A GFCI should always be used when working in wet environments. Additionally, it is a good idea to use a GFCI any time you are using an extension cord.

GFCI outlets (or breakers) work by detecting and imbalances in the amount of current between the hot and neutral sides of a circuit. If there is any imbalance, the device will "trip" and shut off the circuit.

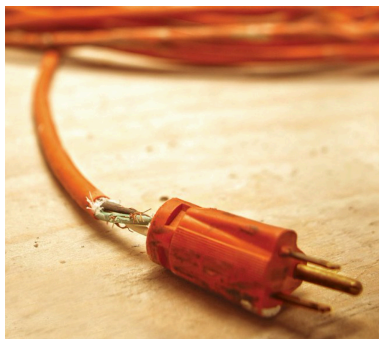
B. De-Energizing Electrical Equipment (Lock Out Tag Out)

The best way to protect ourselves from electrical shock is to completely shut off the power to the area or equipment we are servicing. We have lock out tag out procedures and a permit that must be filled out each time a lock out occurs.

Where is the lock out tag out equipment at your facility? Who normally uses it? It is very important to remember that the employees completing the work are the ones who are to put their lock and tag on the device to shut off power. Only the person who installed the lock should have a key, and they are the only one allowed to remove the lock when work is done. If multiple people are working, multiple locks are needed.

C. Equipment Inspection

Always inspect extension cords and power tool cords before use. Also, never leave cords across walkways or driveways as they can become damaged and create a trip hazard. What are some evidences of damage you have seen on cords? Do we have any cords that look like the pictures below? If so, remove them from service immediately.



D. Overhead Lines

Be wary of overhead electrical lines. Many of us use cranes, lifts, forklifts, loaders, and augers every day. Always be on the lookout for electrical lines above you. Sprayers and spreaders also can become caught in overhead lines while making applications at the field.

If you get tangled in power lines, TRY TO DRIVE AWAY. It is better to pull down power lines, than stay caught in them and risk electrocution.

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If you cannot get untangled, call management/911 and wait for the power company to de-energize the system. If a fire starts, you must exit the vehicle. Here are the steps you must take to reduce your likelihood of electric shock:

1. Remove all loose items of clothing;
2. Jump as far as you can away from the vehicle and try to land with both feet together;
3. Keep your feet together and shuffle or bunny hop away from the vehicle.

Remember, you want to prevent grounding yourself to the vehicle that is in contact with the power lines. Also, electrical current can travel through the ground. Keeping your feet together is a way to reduce the chance of electrical current making a circuit through your body.

III. What should we do if someone has been electrocuted?

We have discussed how to prevent electric shock and what happens if we are electrocuted. It is important to mention what to do in case a co-worker is electrocuted.

- A. Do not touch the person: If the person is actively being electrocuted, you could also be shocked by making a circuit when touching any part of their body.
- B. Turn off the power: The best thing to do would be to turn off a breaker or switch to cut power to the area. This will allow you to safely reach the victim.
- C. Call 911
- D. Begin CPR if necessary

IV. Is this applicable at home?

All the items we discussed today are definitely applicable at home. Who has children at home? One of the most important things you can do to protect your children is to prevent them from accessing electrical outlets and live electrical equipment. Both pets and kids can damage electrical cords, causing them to be shocked as well. Be sure to check the condition of all cords and keep cords out of reach when possible.

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