

Working safely with electricity

by Ranzy Brown

Before you begin

Review the following statistics. The Bureau of Labor Statistics website states in 2008 there were nearly 2,500 lost workday injuries resulting from electrical shock.¹ During the same time period,² electricity killed an additional 192 workers. The characteristics and power that make electricity so useful in our everyday lives also make it dangerous. This is true when we are in its path or become exposed to its energy.



Introduction

To protect people from electrical hazards, codes contain strict requirements for the design, size and installation of electrical equipment. The most widely used code is the National Electrical Code (NEC). The NEC contains requirements such as maintaining cord insulation and enclosing live electrical components so people cannot contact electrical energy accidentally.

Regardless of our level of electrical knowledge, these codes make it possible for everyone to work safely around electricity. Manufacturing and installing components according to code allows non-electricians to work with everyday electricity.

OSHA

The Occupational Safety and Health Administration (OSHA) creates rules to protect workers in their workplaces. To help with this, OSHA adopted parts of the NEC and made them workplace laws. The same design and installation requirements that protect us in our homes also enable employees who are not electricians to work safely with electricity in the workplace.

However, what happens when the installation codes no longer provide protection? For example, once you remove an electrical panel, you expose anyone in the area to the electrical energy inside. Under these circumstances, a different set of OSHA rules apply — the Electrical Safety Related Work Practices. These rules require training, proper protective equipment and procedures that allow people to work safely around exposed electrical energy.

When it comes to working around electricity, workers are either qualified or unqualified. Depending on the type of job, it is possible for a worker to be both. For example, a person who welds could be qualified to work around live welding leads, but not be qualified to work on the electrical power supply for his or her welder.

Training

When working around live electrical parts, qualified and unqualified workers must receive training on all safety-related work practices necessary to perform their jobs.

Do you think you're not affected? Think again. Every time you plug a cord into an outlet or an employee works around live electrical parts you are affected. Part of the required training is to inspect the cord for defects like damaged insulation or a missing ground pin.

Employees are qualified when they receive additional training to recognize and avoid electrical hazards for those tasks you assign them to perform. The additional training needs to include:

- o Distinguishing live parts from other parts;
- o Determining the voltage of those live parts;
- o Understanding the appropriate minimum clearance distances;
- o Using proper protective clothing, tools and equipment.

De-energize

OSHA regulations require you de-energize all exposed electrical components before an employee works on them or near them. An exception to this requirement is if de-energizing the circuit results in an increased or additional hazard, or it is not feasible. For example, this may include shutting off life-support systems, critical ventilation systems or troubleshooting that employees must do with the power on.

A loss of production cannot justify live electrical work. If you cannot avoid working on energized electrical components, then you must wear appropriate protective clothing and personal protective equipment (PPE). In addition, you need to use insulated tools rated for the voltage.

Electricity can cause injury not just by direct contact (shock) but through arc flash as well. You must wear PPE to protect against both. When working on exposed equipment you must wear the following PPE until you verify it is de-energized:

- o Voltage-rated gloves;
- o Flame-resistant (FR) clothing;
- o Eye, face and head protection.

Conclusion

It is also important to keep unprotected and unqualified people out of the work area. Set up barricades to indicate how closely an unqualified person can get to live work. More details on what specific clothing, procedures and equipment meet these rules is in a publication called *NFPA (National Fire Protection Association) 70E - Electrical Safety Related Work Practices*.

Group activity discussion

What do you look for when inspecting electrical cords?

Inspect cords before each use for damaged (breached) outer insulation, and you can see the inner insulation or wires. In addition, you must check cords for damaged or missing pins on the plug. These inspection requirements apply to all equipment cords as well as extension cords.

Who may open electrical panels?

Only authorized persons with training may open electrical panels. Until you verify the panel is de-energized, those persons working on electrical panels must have proper PPE and tools.

Do barricades keep people away when employees are working inside electrical panels?

In the event of an arc blast, set up barricades far enough away to keep unqualified people from being injured. Until you verify the equipment is off, use them any time that equipment is exposed and energized.

Does your workplace have voltage-rated gloves and tools, fire-resistant clothing, and other PPE for energized electrical work?

Energized work includes troubleshooting and any work done until you verify the equipment is de-energized.

References

Websites

¹<http://www.bls.gov/iif/oshwc/osh/case/ostb2115.txt>

²<http://www.bls.gov/iif/oshwc/foi/cftb0240.pdf>

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