

Toolbox Talks 2

019: Electrical Hazard Prevention

Discussion leader duties for this session:

Review your company's procedures that relate to shock prevention, arc flash protection, and arc blast protection. Be prepared to give some specific rules from these.

What this Safety Talk covers:

Practices that eliminate or reduce exposure to some common electrical hazards.

Discussion notes:

Electrical hazard facts

Electrical hazards come in three forms:

- Shock. Electricity runs through your body. This is typically caused by contact with an energized conductor. The main danger is electrocution.
- Arc flash. Electricity jumps from a point of higher potential to a point of lower potential, creating a flash. The main danger is eye injury. A secondary danger is ignition of combustibles, including your clothing.
- Arc blast. A huge energy release occurs, vaporizing metal and anything else in its path. The main danger: catastrophic injury and massive burns.

Best practices

Most of these serve to prevent arc blast, arc flash, and shock. Some don't prevent all three, but still provide valuable protection.

- Be thorough with lockout/tagout procedures, so circuits aren't inadvertently energized when you are working on them.
- Always verify the de-energized state by measuring the actual voltage (phase-to-phase, phase-to-neutral, and phase-to-ground).
- Don't confuse bonding with grounding. Article 100 of the NEC defines these clearly. Of the two, only bonding will eliminate differences in potential.
- When measuring, lift one probe at a time. This prevents the creation of an ionization trail, which can cause enough of a short circuit to trigger an arc blast.
- When measuring, keep one hand behind your back so you use only one hand on the measuring probe. This prevents you from creating a current path across your heart.
- Use PPE, test equipment, and tools rated for the voltage you are working with.
- Wear flash and blast protection PPE where required. If you are working in a room where voltages higher than 120V are present, assume this protection is required and find out specifically what is needed.
- When operating a disconnect, switch, or circuit breaker, stand to one side of it rather than in front of it. Disconnects are designed for left-hand operation, with the operator standing to the left of the handle.

Review and discussion

1. What is the main cause of electrical shock? What are some examples of shock hazards you have protected yourself from recently, and what methods did you use?
2. What is the main cause of electrical arc flash? What are some examples of arc flash hazards on this job or a previous job?
3. How do you reduce the chance of electrical flash?

5. What are some high risk locations on this job for arc blast? *[Note to presenter: If this job doesn't have any high risk areas (MCC rooms, service switch gear, MV breakers, HV breakers), ask for examples from previous jobs].*

7. Why should you try to use only one hand, wherever possible, for taking electrical measurements?

9. If you identify the breaker for a given circuit, open it, lock it out and tag it, does this mean that circuit is now safe to work on? If not, why not and what additional step should you take?

Participant's Signature and Date

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