

Toolbox Talks 2

011: Assumptions That Can Kill You: Equipment Energization

Discussion leader duties for this session:

Review your company's startup procedures.

What this Safety Talk covers:

Dangerous assumptions that people make when energizing equipment.

Discussion notes:

Background

Human error is the main cause of accidents that occur during equipment energization. Miswiring, for example, is why bolted faults happen and why wiring must be checked prior to energization. Dangers also exist when people damage components or conductor insulation during installation, or leave tools inside equipment after the installation.

Cautions

- Inventory your tools before and after the work. This helps prevent leaving tools lying across conductors you are about to energize. Inspect test equipment leads and tool insulation prior to use, to prevent shock.
- When energizing equipment for the first time, try to be as far away from it as you can. Energize it remotely, if possible.
- Wear PPE appropriate to the location you are in when energizing equipment.

Assumptions

- "I'm smart not to install and secure all panels, covers, and doors prior to energization, because I'd have to remove them again to check voltages and phasing immediately after energizing." The truth is that panels, doors, and covers are designed to contain the forces and shrapnel of an explosion. Failure to completely install them creates an enormous hazard.
- "PPE isn't necessary when energizing brand new equipment. What can go wrong with new stuff?" Plenty can go wrong. PPE is your last line of defense.
- "The upstream protective device will clear any fault and will protect me." On a low level fault, the breaker might never open (or the fuse might not blow). Don't depend on the fuse or breaker to make up for safety errors.
- "Electrical tests aren't necessary on new equipment that has been tested at the factory." Pre-energization electrical testing is the only reliable way to detect various kinds of wiring errors. Insulation resistance testing and point to point resistance tests are two examples of such testing.
- "Someone must have checked that the CTs are either connected or shorted." The potential across an open CT can be lethal. Check CTs, rather than assume some else "must have."
- "I don't need to wear PPE because I'm just taking a few measurements." PPE doesn't protect you from *what you are doing*. It protects you from *the hazard you are exposed to*. Wear the correct PPE for the location, regardless how simple the task is.

Review and discussion

1. What is the main cause of accidents that occur during equipment energization?

2. What are some errors people make during installation and startup that might result in an accident during equipment energization?

3. Why should you inventory your tools before and after working on a given panel or other equipment that will later be energized? *[Note to Presenter: Most experienced electricians do this routinely. They can look at their tool pouch and tell you exactly which tool is missing. So by “inventory” we really mean that you need to know which tools go where so you know when something isn’t where it’s supposed to be.]*

4. Why should you completely install and secure all panels, covers, and doors prior to energization? *[Note to Presenter: This means installing and tightening down all bolts, also. The last thing you want is for a blast to tear a cover loose and fling it at you.]*

5. What tasks are necessary for your protection when energizing brand new equipment?

6. What are some dangerous things that can go wrong with new panel boards? New transformers? New breakers?

7. Can a breaker stay closed if there's a fault? What does this mean about relying on the upstream breaker instead of diligent safety practices?

8. What are two common electrical tests and what problems can they reveal prior to energizing equipment?

9. What kind of transformer should you always check before working on switchgear? *[Note to Presenter: Current Transformers (CTs) need to be disconnected or shorted to prevent a shock hazard.]*

10. If you're just going to take a thermographic picture, you don't need a blast suit, correct? *[Note to Presenter: We remove covers to perform thermography, so what does that tell you? It's dangerous! Wear the PPE that protects you from the hazard you are exposed to. An arc blast will not decide to go around you just because you are holding a piece of test equipment or pointing a camera at it.]*

Participant's Signature and Date

[illegible]