

Toolbox Talks 2

042: Unsafe Acts: Switchboard Installation

Discussion leader duties for this session:

Think about the various dangers possible with switchboard work, from pinched fingers to back sprains, and what unsafe acts might result in those.

What this Safety Talk covers:

Most injuries occur not due to unsafe conditions, but due to unsafe acts. This Safety Talk addresses unsafe acts when installing switchboards.

Discussion notes:

Background

A switchboard enclosure is large and heavy. Inside, you may find circuit breakers, switches, metering equipment, monitoring or control equipment, and instruments. The work involves setting the unit in place, making the various internal connections, wiring the unit to the load, wiring it to the supply, and energizing it.

Some unsafe acts in switchboard installations

- Failing to assess the work area for required PPE, location of fire exits, and emergency notification systems. For example, do you need an escape respirator because of proximity to a chlorine tank?
- Failing to plan the route, remove obstacles, and roping off as necessary, before moving switchboard sections to the installation area.
- Trying to muscle an enclosure into place. Use a prybar or other tool, to reduce possible strain to your shoulders and back. This will also protect your fingers.
- Inserting or removing leveling shims with your fingers. To prevent getting your skin pinched, use pliers.
- Stringing power cords in walkways, allowing them to sit in water, or draping them over running machinery. Follow power cord safety practices, and consider using battery-powered tools where practical. Route temporary power cords so they don't present a tripping hazard and to protect them from damage.
- Working with insufficient light. What you can't see *can* hurt you.
- Running a temporary generator (e.g., for power and light) without adequate ventilation. If possible, locate the generator outdoors and run power cables to it.
- Breaking connections for neutral or ground, without first providing bypass jumpers or performing lockout/tagout on the affected loads.
- Modifying panels, busses, or other components in any way.
- Energizing before verifying the wiring and connections. It takes only a few minutes to check these.
- Interconnecting with transformers, other panels, or other energized equipment before first ensuring there are no ground faults in the newly installed panel.
- Working around any open enclosure covers for energized panels, capacitors, switches, or other equipment without providing barriers. You could easily make inadvertent contact. Also consider arc blast hazards, and wear the right PPE.

Review and discussion

1. You've been sent out to a new location. You've never worked on this particular site before, and your first job is installing a switchboard at the new service entrance. Before setting up for the job, you need to look around the area and determine a few things. What are those?

2. What should you do before moving switchboard enclosures to the installation area, and why?
3. The lift truck operator set your panels almost perfectly in place. You need to move them only a few inches to correctly position them. How can you reduce the chances of injuring your back or shoulders?
4. You've got three cabinets set in place, and the pad isn't quite level. To get the cabinets level, you need to slip shims under the mounting feet. What's the safe way to handle the shims?
5. Why should you not modify a panel? *[Note to presenter: This voids the UL or other listing, violates the NEC, and voids the warranty on that equipment. While a modification may seem perfectly safe, you don't have a means of testing it properly. Any modification poses a liability risk to your company and you personally, even if it is technically safe.]*
6. It's cold outside and you need to run a generator for power and light. How can you make sure you can stay warm while still properly ventilating the generator? *[Note to presenter: The easy solution is to locate the generator outdoors. But if it's raining or extremely cold, this presents additional problems. The strategic use of fans to direct the fumes outdoors can help. It may be necessary to erect a temporary shelter for the generator outdoors, or to erect a fume hood for it indoors.]*
7. You need to reconfigure the neutral and ground connections, so that your new switchboard is properly wired to the existing system. Before you break any connections, what should you do?
8. You're installing switchboards near an overhead door, and the natural light coming in is fine for the front of the panels. You have worked by flashlight before, and you have a magnetic flashlight with you. It would save time not to run temporary lighting back there. Would it also be safe? *[Note to presenter: The problem with working by flashlight is only a very small area gets lit up. To be able to see inadvertent grounds, tools left lying across busbars, or bolted connections made for purposes of shipping, you need to properly light up the entire enclosure.]*
9. Your work procedures may call for extensive tests to be completed prior to energizing your new panelboard. But if they do not, what is the very least you should do to ensure you won't have a ground fault or other catastrophic failure? *[Note to presenter: Your company policies should address this. If they don't, this may be a good time to gather ideas to submit to management.]*
10. You have to remove covers on various other panels, so you can verify connections and get things properly labeled in the new panel. What precautions should you take, with covers removed? *[Note to presenter: It's inherently dangerous to be near energized equipment with covers removed. Keep exposure as short as possible. Use the proper PPE for arc blast protection and shock protection.]*

Participant's Signature and Date
