

Toolbox Talks 2

032: Test Equipment Safety

Discussion leader duties for this session:

Review any test equipment safety procedures you may have on hand.

What this Safety Talk covers:

Safety practices for commonly-used test equipment.

Discussion notes:

Non-contact test equipment

DMMs are available as clamp-on devices. This does not make them hazard-free. You may still have to reach into an energized enclosure. Or you may need to disturb nearby cables so you can put the clamp around the cable under test. Wear the same PPE for arc blast and shock prevention as with the DMMs that use test leads. An arc blast doesn't care what kind of instrument you are using.

Test equipment best practices

- Don't use cheap imports. Look around at what the pros are using for DMMs and other test equipment. The name brands are built to much higher safety standards than the cheap knockoffs are.
- Use the correct test equipment. For example, don't try to use a 480V phase rotation tester as an MV voltmeter. Know the voltage and what is under test before selecting the test equipment.
- Use properly rated test equipment. A meter rated for 600V may not be suitable for testing at a 480V service entrance. Why? Because there is also a Category rating. In this example, a meter would need to be Cat IV. You can use a Cat III meter on internal distribution, such as feeders, but not at the service. Also, wear the PPE for the voltage you are exposed to.
- Check test leads before use. Test leads should be pliable and show no visible signs of insulation damage. Hot sticks must be defect-free. Check PPE, too.
- When using a DMM, use only one hand to measure with whenever possible. This will require using at least one clip, rather than two probes. It eliminates a current path across your heart. Best practice: put the other hand behind your back.
- If using two probes, put one probe in place first and then the other. Putting both probes in place at the same time means there's a current path across your heart as you enter the energized space.
- If using probes, fully remove one probe first and then the other. Removing both probes at the same time can create an ionization trail between them, creating a complete circuit between the two points that were under test. The results can be as catastrophic as if you had a bolted connection.
- Be leery about measurements from phase to ground. Unless you can verify a "ground" point is bonded back to the supply, don't use it as reference. If testing to verify a circuit is de-energized, measure phase-to-phase and phase-to-neutral as well as phase-to-ground.

Review and discussion

1. What are some hazards you can encounter when using a clamp-on meter?
2. How can you protect yourself from these hazards?
3. You found a meter that has the same features list as your foreman's

meter, but at less than half the price. Is this a good deal? [Note to presenter: You get what you pay for. That meter isn't inexpensive, it's cheap. And cheap can be very costly. A meter that blows up in your hand and takes several fingers with it is no bargain.]

4. Before selecting the test equipment for taking a voltage measurement, what must you look at?

5. What is the Category rating? [Note to presenter: The product manual for the test equipment under consideration should explain the Category rating for that equipment. If it does not, then you must assume the equipment is rated for the lowest energy level. Choose another piece of equipment that does have the correct rating for the application.]

6. What's the role of PPE when using test equipment, and how do you select the correct PPE?

7. What should you do with test leads before use, and what do you look for?

8. Why should you use one hand, whenever possible, to make a measurement with a DMM?

9. Why should you remove DMM probes one at a time?

10. What is the problem with making measurements from phase-to-ground, and how do you avoid relying on incorrect readings?

Participant's Signature and Date

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