

Toolbox Talks 2

005: Assumptions That Can Kill You: Arc Blast

Discussion leader duties for this session:

Review your company's arc fault and arc blast protection policies.

What this Safety Talk covers:

Assumptions that can expose you to a lethal arc blast.

Discussion notes:

Some arc blast facts to think about

- An arc blast can be 35,000° F, which is hotter than the surface of the sun.
- The force of an arc blast can splat you against a wall 10 feet away.
- The intense light and sound of an arc blast can destroy your vision and hearing instantly.
- The average cost of a major arc flash incident with personal injury is 25 million dollars. This includes fines, medical bills, equipment replacement, and legal fees.

Cautions

- Read any arc blast warning placards prior to starting work. Make sure you have the proper personal protective equipment (PPE) for the equipment being worked on.
- The location may not have the arc blast PPE requirements posted. This doesn't mean they don't apply. Find out what they are, and review them with your foreman.

Assumptions that can leave you burned

- "The breaker will protect me." Unlikely. In fact, a circuit breaker or fuse may hold for many seconds on a low grade fault, allowing electricity to continue flowing in the circuit.
- "Because it's bulky, wearing the recommended PPE makes the job more dangerous than not wearing any PPE." The evidence shows otherwise. Also, PPE is increasingly being designed to be easier to work in. So the answer may simply be a PPE upgrade. But if the PPE is so bulky that work is difficult, the equipment should probably be de-energized. Coordinate de-energization with the operators.
- "Only the person directly working on the device is at risk." Everyone in the arc blast zone is at risk. Don't allow untrained, unprotected persons in the danger zone at any time. You do not want to be working alone, either. Your partner should be positioned to assist if needed. This person may be the one who saves your life.
- "The lower the available fault current, the less energy an arc blast will produce." The energy from an arc blast is a function of the available fault current *and* the fault duration. Breaker trip settings affect duration; don't adjust them.
- "I cleared the device so I know it's de-energized." Use your meter to verify. The disconnect may not have fully opened or it may not remove other power sources such as potential transformers or control circuits.
- "I'm just checking voltages, so there's no real danger." Anytime you work on energized equipment, an arcing fault is possible. Wear your PPE, regardless of how simple the task is.

Review and discussion

1. What are some things we know about arc blasts that give us an idea of how serious and dangerous they are?
2. What information should arc blast placards provide, and why should you read them?
3. If an arc blast placard isn't present or one that is present doesn't list any arc blast PPE, what does this mean? *[Note to Presenter: It means the information you need isn't there. You need to get that information. It doesn't mean you don't need arc blast protection. In fact, the absence of such information says something about that particular facility's emphasis on safety or lack thereof. Even if a placard is posted, the information it contains may not be up to date. Breaker settings may have changed or other changes may have been made since the placard was posted. You may need a higher level of PPE than the placard indicates. You could find out from the owner if the placard matches the present equipment configuration, and ask the owner to explain how this information is known to be correct. Or, you could do an arc blast PPE analysis and use the placard information if it exceeds what the analysis shows. The point is "don't assume."]*
4. Can you count on a circuit breaker to protect you from a fault? Why or why not?
5. What should you do if wearing the recommended PPE makes the work seem more dangerous than using the next lower level of PPE or using none at all? *[Note to Presenter: Ask this question out, also: "If an astronaut can work in space with extremely bulky PPE, can an electrician work in a blast suit?"]*
6. Why is following arc blast safety procedures not a "personal decision?"
7. You've just finished working on Switchboard A, wearing the correct PPE following an arc blast analysis. Switchboard B has less than half the available fault current as Switchboard A. Why is it not necessarily true that you can wear the same PPE to work on Switchboard B?
8. How do you know a circuit or device is de-energized?
9. You just need to hang a current clamp on a cable, so suiting up in a blast suit is a needless waste of time, right? Why or why not?
10. Because thermography is a non-contact procedure, it doesn't require arc blast PPE. Is that statement true? Why or why not? *[Note to Presenter: To perform thermography, you must remove the equipment covers that would otherwise provide some protection from arc blast. Just because you aren't touching things doesn't mean they won't blow up. It's also true that getting a good thermographic image may require moving some cables to one side or reaching into an energized cabinet for some reason. The reaching in/not reaching line of thought is pointless. An arc blast can kill you from several yards away. Wear the PPE for the conditions that exist at the time you are in the same room as the equipment, regardless of what you are doing.]*

Participant's Signature and Date
