



POWER CONTROL ENGINEERS

ARCFLASH: SOME PRACTICAL STEPS

POWER CONTROL ENGINEERS ARE INVOLVED WITH MANY ASPECTS OF ELECTRICAL SYSTEMS INCLUDING THAT OF ARC FLASH EVALUATION. THOUGH ARCFLASH AWARENESS IS GROWING, WE HAVE FOUND THAT MANY SITES MAY NOT FULLY APPRECIATE THE RISK POSED OR WHAT TO DO ABOUT IT. IN THIS ARTICLE WE HAVE OUTLINED SOME RELEVANT INFORMATION THAT MAY HELP TO GET STARTED.

Arcflash is an electric arc in air which can cause severe thermal radiation, overpressure and projection of molten metals that can destroy equipment, start fires, burn and even kill exposed persons. Many images exist on the internet such as this one showing the problem.

Even if a site has operated without incident for many years, or site personnel are very experienced, things can go wrong. For example if the system is old then chances are that upgrades such as increased size transformers, more load and upgraded Utility Supply have occurred over the years - all of which place more stress on the system.

Part of the responsibility (WHS) for an electrical system includes the safety of people interacting with it and maintaining equipment availability. Arcflash is a common risk to both. So if Arcflash is an identified hazard, how can it be eliminated or minimised if you have a limited budget?

Here is a way to proceed - given you can't turn off or remove the entire electrical system to eliminate it. The steps are graded from most immediate to longer term actions:

1. GUARDING

Make certain that all doors, hinges, latches and bolts are in good condition and are kept securely closed. Panel doors often have most of the closure bolts hanging loose. Fix those heavily modified doors with inadequate patches over holes no longer needed. Check the overpressure vents are free to open. Ensure that site personnel know that arcflash danger is significantly less if they keep doors securely closed.

2. IDENTIFICATION LABELLING

Ensure all panels and equipment are correctly and clearly labelled to minimise risk of work in the wrong panel.

3. IDENTIFY ALL TASKS THAT REQUIRE PANEL DOORS TO BE OPENED.

Common ones are: testing for dead, fault finding, resetting overloads, maintenance, circuit breaker racking in/out. These can be hazardous and need controls. Stop these tasks being done until controls are in place.

4. IDENTIFY HOW MUCH AF HAZARD THERE IS AT EACH LOCATION.

Arc flash energy depends on fault current and time taken to turn off. One panel may look the same as the next but can be much more hazardous just because of clearance time. Ideally an arc flash study to determine the hazard at each location should be done. This takes time to do rigorously but simplified calculation tools and software are available.

5. LABEL HIGH RISK PANELS

Label high risk panels according to AF Hazard so site personnel know where special procedures apply.

6. CHANGE TASKS IF POSSIBLE SO SITE PERSONNEL ARE NOT EXPOSED.

For example provide means to remotely rack breakers, or a means to test for dead without opening panels.

7. IMPROVE ARRANGEMENT OF PANELS

Improve internal arrangement of high risk panels if possible to minimise chance of arcing. For example insulate busbars, install shrouds and phase separators on terminals, clean out panels so there are no loose items, filings, swarf etc left inside.

8. REDUCE FAULT CLEARANCE TIMES

Reduce fault clearance times as far as possible to minimise AF hazard even at the expense of protection grading.

9. PROVIDE TRAINING

Provide training to site personnel on arc flash causes, consequences, mitigation, and procedures especially test-for-dead procedures.

10. FLAME-RETARDANT CLOTHING

Adopt a minimum standard of flame-retardant clothing for electrical workers. Provide higher rated clothing & PPE where needed. Typically this includes face shield, leather gloves, flame retardant overcoats.

11. CONTINUALLY EVALUATE AND UPDATE

Steadily Update the above as site information improves.

If you would like further information or would like assistance contact Power Control Engineers.

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