

ARC FLASH STUDIES

PCE can help to identify arc flash hazards and make recommendations and plans to minimise the risks posed by arc flash.

Power Control Engineers Pty Ltd (PCE) provide detailed system modelling and study services to customers Australia wide from many industries utilising proprietary software (SKM Power®Tools and Paladin EDSA). System studies and design work include earthing, load flow, volt drop, motor starting, harmonic, fault level, protection studies and arc flash analysis. The topic of arc flash has been highlighted by the most recent update to the Australian Wiring Rules (AS/NZS 3000:2007).

ARC FAULTS

Arcing faults occur when the current passes through vapour between two conducting materials resulting in a high temperature arc between the two conductors. There are several possible causes of an arcing fault including contact with live parts typically from dropping tools or loose parts, insulation failure, over-voltages, dust, corrosion or condensation. Arcing faults can cause fatal burns even when standing several feet from the arc. The electrical arcs also shower droplets of molten material in the surrounding area, causing further hazard.

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During a fault, incident energy increases with both time and fault current. An arcing fault current is smaller than a traditional bolted fault current because the vapour acts as impedance between the conducting materials. However, the arcing fault current is often below the instantaneous trip setting of protective devices and for these cases a lower fault current will result in a longer trip time and more energy release. It is not possible to predict whether a higher fault current or a lower fault current will produce the worst-case incident energy.

Arc Flash Studies are used to estimate incident energy exposure from potential arc sources and to identify potential hazards under arc fault conditions. Studies combine short circuit calculations, empirical equations and protective device operating times to estimate incident energy and then determine risk levels and protective clothing requirements at typical working distances.

The arc flash study results are used to help prevent worker injury or death, avoiding litigation expenses, minimising equipment damage, minimising system down time, complying with codes and safety regulations (OSHA, NFPA, NEC) and meeting insurance requirements.

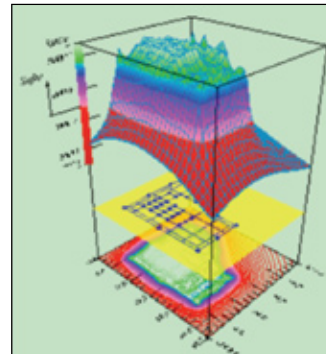
HOW CAN PCE HELP?

PCE are experts in power system studies with a wealth of experience and can undertake studies on behalf of clients. Once arc flash hazards are identified PCE can make recommendations and plans to minimise the risks posed by arc flash. Some hazard minimisation methods include:

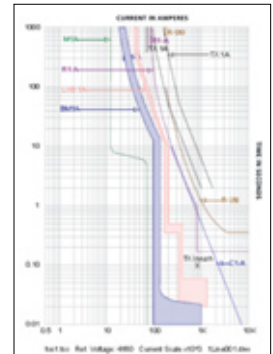
- i Use remote electric close and trip control.
- ii Use a remote, or longer operating arms, when racking in or opening/closing breakers. PCE have developed a portable remote racking unit for circuit breakers to enable operators to move out of the danger zone when racking.
- iii Place shields between operators and equipment.
- iv Review protective devices to see if they can be lowered in time and picking-up.
- v Operate with open bus ties to reduce fault levels.
- vi Review protective fuse sizes.
- vii Change relay settings when working on equipment.
- viii And, as a last result identify possible hazards and specify levels of PPE that must be worn while operating the device.




Portable remote racking unit developed by PCE allows operators to move out of the danger zone



3D Earth potential profile, touch potential and step potential plots



System Study - Typical protection coordination curves

PCE specialise in conducting complete system studies as well as undertaking detailed earthing studies and earth grid designs. Earthing systems are critical to power systems, protective devices rely on efficient earthing to operate correctly and reliably, and yet earthing systems are often overlooked and poorly understood. PCE are experts in the design and analysis of customised earthing systems. 

For further information or to find out what Power Control Engineers can offer your business, please contact Ken Bode.



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