



Significant Incident Report No. 245

Subject: Worker injured by low-voltage switchboard arc flash

Date: 17 August 2016

Summary of incident

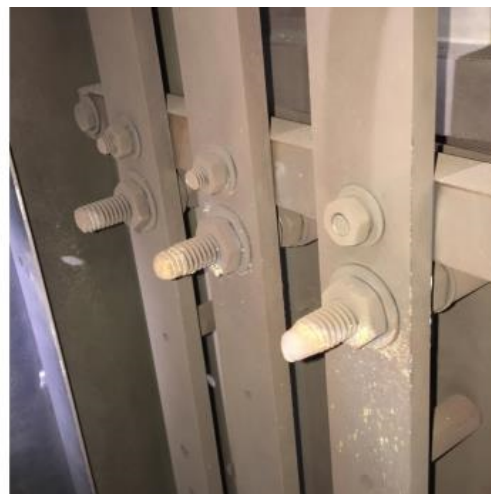
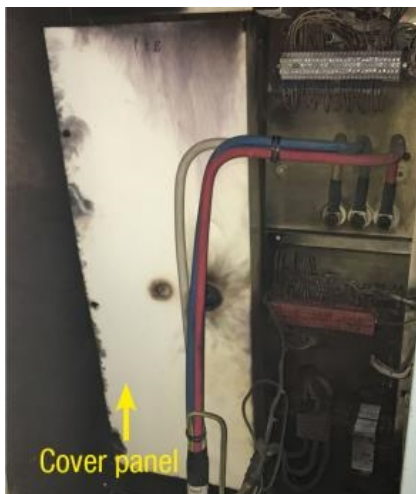
Note: The Department of Mines and Petroleum's investigation is ongoing. The information contained in this significant incident report is based on materials received, knowledge and understanding at the time of writing.

In June 2016, an electrician was performing wiring modifications to a low voltage (415 VAC) motor control centre (MCC). The power to the front compartment switchboard had been isolated and the busbars in the rear compartment remained energised.

On removing the doors of the rear compartment to identify control cable core numbers, the electrician noticed that the busbar cover panel inside the compartment was not positioned correctly.

As the electrician touched the cover panel to check if it was secure, it moved and there was an arc flash and blast. He received minor flash burns to his right forearm and left hand. The worker was not wearing personal protective equipment (PPE) that was adequate for the energy released in the arc flash.

The subsequent investigation found that the cover panel had come in contact with fuse-holder bolts protruding from the energised busbars behind the cover panel.



Left. Arc flash damage to the rear compartment of switchboard. Right. Protruding fuse-holder bolts in busbars.

Direct causes

- The loose busbar cover panel was moved, making contact with the fuse-holder bolts protruding from the energised busbars.

Contributory causes

- The busbar cover panel was not secured.
- Moving the cover panel was not in the original scope of work.
- The busbars in the rear compartment were not isolated prior to moving the cover panel.
- The electrician was not wearing PPE that was adequate for the energy released in the arc flash.

Actions required

The following actions are recommended to reduce the potential for arc flash incidents.

Design and installation

- Design, install and maintain electrical installations and equipment in accordance with Australian Standard AS/NZS 3000 and other relevant standards, and complete to a trade finish.
- Maintain required clearances in a switchboard by rigidly fixing exposed energised and/or conductive parts.
- Conduct an arc flash energy assessment of all switchboards and MCCs, and attach arc flash hazard labels so workers are aware of the hazards and can use appropriate arc flash PPE.

Safe systems of work

- Develop, implement and review safe work procedures for conducting electrical maintenance tasks.
- Undertake a risk assessment prior to conducting electrical tasks (e.g. testing, fault-finding, commissioning, maintenance) and when the situation or scope of work changes.
- Isolate the power supply where possible before working near exposed conductive parts. Additional risk control measures may include reducing the protection tripping level and operating time, and installing temporary barricades or shields.
- Wear appropriate and adequate PPE where there is the potential for arc flash or inadvertent contact with energised parts.

Supervision, training and maintenance

- Provide sufficient and appropriate levels of supervision for electrical work.
- Train workers in electrical tasks as required and assess as competent before undertaking those tasks.
- Report defects or damage to electrical equipment to the manager or electrical supervisor.

Further information

- EnergySafety, www.commerce.wa.gov.au/publications

Safe low voltage work practices by electricians – code of practice

- Standards Australia, www.standards.org.au

AS/NZS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules)

- Department of Mines and Petroleum, Mines Safety Alerts, www.dmp.wa.gov.au/Safety/Mines-safety-alerts-13194.aspx

Mines Safety Significant Incident Report No. 239 *Low-voltage arc flash during switching operation*

Mines Safety Significant Incident Report No. 224 *Underground workers injured by arc flash and blast from motor control centre (MCC) cubicle*

This Significant Incident Report was approved for release by the State Mining Engineer on 17 August 2016