



Mines Safety Significant Incident Report No. 190

Serious high voltage (HV) arc flash incident results in injuries

Summary of incident

A worker was performing a process (not electrical) isolation associated with the scheduled change-out of a high voltage (HV) 550 kW, 6.6 kV pump motor. As part of verification testing, a “bump” test was performed to confirm the motor was rotating in the correct direction. This test required the motor to be decoupled from the pump, which meant that after successful completion of the test, the motor needed to be isolated before being recoupled to the pump.

The first stage of this isolation procedure involved opening the main 6.6 kV isolating switch for the motor. When this isolator was operated, there was a large arc flash and blast, forcing the switchgear cabinet door partially open and damaging the switchgear (Figure 1). The worker operating the isolator received a hand injury and superficial burns.



Figure 1 Photograph of the switchgear cabinet showing damage from the arc blast

Probable causes

Direct:

- The main isolating switch was operated while the motor was still rotating. This resulted in reactive current flow through the associated slip recovery drive system and main isolating switch (Figure 2), even after the main contactor had been de-energised.
- The main isolating switch could not break the highly reactive current flow as it had not been designed to do so.

Indirect:

- The switchgear cabinet did not contain the arc blast.
- The indication on the switchboard was misleading — the motor’s run indication was off, even though the motor was still coasting down.

- The switching program did not take into account the design and operation requirements for this type of drive.

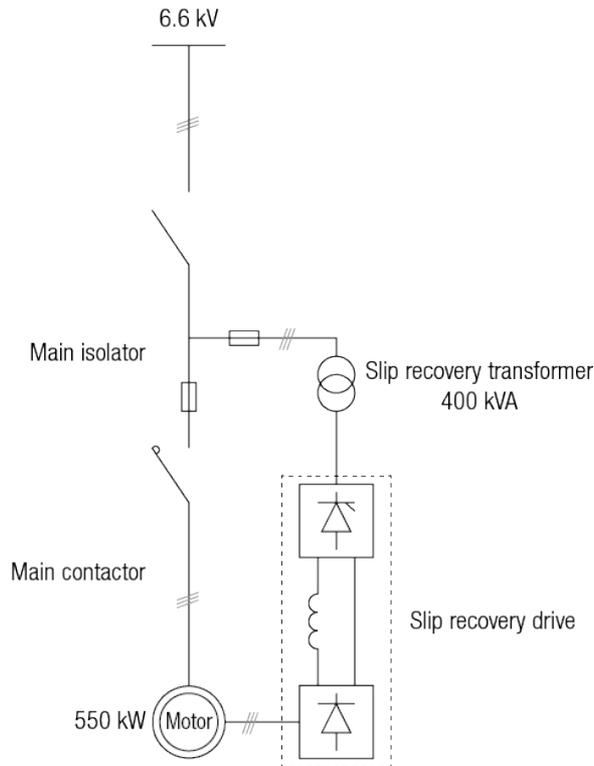


Figure 2 Simplified circuit diagram showing pump motor

Actions required

Electrical safety awareness is particularly important for tasks involving HV equipment. Relevant safety measures must be known, understood and applied appropriately by all. To achieve this:

- incorporate design, operation and maintenance information developed at the time of installation into operational instructions
- develop the operational instructions by consultation between design, site engineering and operations personnel
- record installation design drawings and operation and maintenance manuals
- develop, implement and maintain competency-based training systems so that workers are aware of the critical tasks involved with HV equipment.

Note: Under regulations 5.10 and 5.11 of the Mines Safety and Inspection Regulations 1995, the statutory electrical supervisor is responsible for ensuring that electrical equipment and installations are maintained in a safe working condition. For very large sites, this may require the appointment of a senior electrical supervisor, commonly known as an electrical engineering superintendent.

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