NSW DEPARTMENT OF PRIMARY INDUSTRIES

SAFETY ALERT

Dangerous Unplanned Movements Shuttle Cars and Continuous Miners

INCIDENT

Recently there have been three unplanned movements of coal mining machinery that had the potential to seriously injure or kill mineworkers. One unplanned movement involved a shuttle car and two unplanned movements involved continuous miners. The three accidents occurred at different mines.

CIRCUMSTANCES

All the incidents related to the restoration of power to a circuit breaker.

Shuttle car incident:

(i) A shuttle car had exhibited problems with the tramming function and the tramming circuit breaker for some time. The tramming circuit breaker tripped off, the operator then left his driving seat, went to the panel and reset the breaker, whereby the car immediately commenced tramming. The car travelled approximately 10 metres before crashing into the rib.

Continuous Miner Incidents:

(ii) The first continuous miner had been parked in a Safe Zone for a planned shutdown. When the operator restored power to the machine and selected conveyor start, it was noted the cutter/conveyor circuit breaker was open. When the cutter/conveyor circuit breaker was closed the conveyor immediately started.

(iii) The second continuous miner had tripped off at the distribution control box. On restoring power to the continuous miner, the cutting heads operated immediately.

INVESTIGATION

(i) The shuttle car foot switch had jammed in the full “on” position due to incorrect component repair.

(ii) The first continuous miner conveyor control interlock on the circuit breaker failed.

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Prepared by: S Maginnis & J Waudby
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(iii) The second continuous miner cutting head contactor failed in the “on” position.

These three incidents are the most recent, where a single failure of an electrical component has initiated a dangerous unplanned movement of a machine.

RECOMMENDATIONS

All mines need to review mobile machinery design to establish that the safety-related functions and safety-related electrical control systems are adequately designed. The following points should be considered in that review:

General:

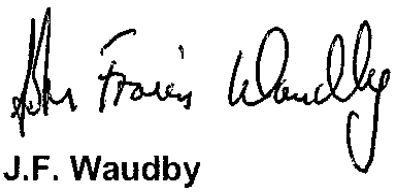
- Involving the machinery designer,
- Involving the machinery manufacturer,
- The use of AS61508, IEC62061, AS4024 as appropriate (the particular standard used depends on the complexity of the machinery and associated safety-related electrical control systems), and
- The use of AS/NZS4871 and AS60204 as appropriate.

Specific:

- Shuttle car foot switch circuits are assigned and designed to an appropriate safety integrity level (refer AS61508 and IEC62061) or category (refer AS4024).
- Continuous miner circuits for conveyors and cutting heads are assigned and designed to an appropriate safety integrity level (refer AS61508 and IEC62061) or category (refer AS4024).
- Mine Standards of Engineering Practice address competency, supervision and authorisation for inspection, maintenance, repair, modification and commission of safety-related electrical control systems.

Attached is a list of incidents where similar failure has resulted in extreme danger.

Signed



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SIMILAR EVENT PRECIS

- The foot switch on a shuttle car failed “on” when the springs collapsed. It drove uncontrolled into the rib (design, maintenance and commissioning failures).

- Modified controls on a shuttle car allowed the conveyor to start without pump operation (design, overhaul and commissioning failures).

- Failed contactor allowed a shuttle car to continue to tram when all circuits requested it stop (design, component change and commissioning failures).

- Modifications to cable reel design resulted in cables being over-tensioned and failing in service, producing arcing (design, overhaul and commissioning failures).

- Welding repairs to the operator’s compartment on a shuttle car allowed the shuttle car to tram uncontrolled when energised. This was due to incorrect setting up of the foot switch (repairs, commissioning failure).

- Ingress protection rating of a radio-controlled shearer transmitter was compromised and when in service the shearer accepted multiple commands, resulting in unplanned functions (design, operation, commissioning failure).

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