

SAFETY ALERT

Shearer operator crushed by automated longwall roof support

INCIDENT

A mineworker received serious crush injuries while operating the longwall shearer. The mineworker was found between the longwall roof support and the spill plate of the Armoured Face Conveyor.

CIRCUMSTANCES

The mineworker was operating the trailing drum of the shearer using a remote control transmitter. For causes yet to be determined, the mineworker became crushed between an automatically advancing shield and the spill plate. He was found lying over a relay bar with his lower legs and feet trapped beneath the pontoon of an adjacent roof support.

The mineworker was found semi-conscious with serious crush injuries to his pelvis, femur and lower abdomen.

The longwall walkway area was found to be narrow in places, restricting access, and was not protected from the ingress of face stone and flyrock.

As an antecedent matter, emergency stop facilities were not readily accessible for the injured mineworker as he lay trapped on the ground.

INVESTIGATION

An investigation has been initiated by the Department's Mine Safety Operations and Investigation Unit.

RECOMMENDATIONS

Pending the outcome of the investigation, it is recommended that all mines utilising remote-controlled mining equipment and automated mining systems adhere to the following:

- Mine operators are to ensure that the hierarchy of controls is applied to risks in accordance with Clause 5 of the *Occupational Health and Safety Regulation 2001* in regard to longwall operation.
- Mine operators and managers of electrical engineering should be aware of the requirements of AS/NZS 4240.1:2009 *Remote control systems for mining equipment*. Section 2, clause 2.3.8.3 *Safeguarding machines operators using a portable remote controller* states:

“Safeguarding shall be provided to shut the machine down in the event of the machine operator being disabled or falling over while controlling the machine. Where continued operation of sequential equipment, eg shearer instigated roof support systems, can cause a hazard, the operation of the safeguarding shall cause sequential operations to stop.”

- AS/NZS 4240:1994 is a **mandatory** standard referred to in the NSW Government Gazette No. 24, page 664, dated 2 February 2007: *Requirements Before Use of Plant* (refer to attached Gazette notice).
- Review risk assessments and ensure they identify and address all risks associated with remote controlled equipment operating within automated mining systems.

In particular, there is a need to ensure that persons are not put at risk by the operation of automated equipment. Any analysis needs to consider persons who may be lying on the ground as a result of some personal condition, or as a result of being struck by something or simply by assuming a position as part of their work.

- Adequate access and egress needs to be maintained on the walkway along the longwall face. When seeking guidance, standards such as AS 1657 can be referenced. Whilst this is not a mandatory standard it specifies that:

“Where guard railing is provided on both sides of a walkway, the clear width of the walkway measured between the inner edge of the guardrails shall be not less than 550 mm.”

Regardless of the actual configuration and dimensions of the access, it needs to exhibit certain attributes. For example, persons must be able to pass safely and easily through and there needs to be sufficient room for any rescue operations.

- The accessibility of emergency stop systems must be considered for all positions of persons on the longwall face. This includes persons who may not be in a standing position, or injured in some way.

It should be noted that several other Safety Alerts have been issued by the Department regarding remote controlled equipment. These must be considered in all reviews and risk assessments about remote controlled and automatic plant and equipment operations made by mines.

Other Safety Alerts published that may be relevant to this topic include:

- SA 09-05 Mine worker crushed against rib by remote-controlled continuous miner
- SA 08-07 Operator crushed between longwall roof support and AFC panline
- SB 08-01 Operator Behaviour around remote control equipment
- SB 07-03 Unplanned movement of plant
- SA 07-01 Miner fatally injured in remote controlled loader incident
- SA 06-01 Dangerous unplanned movements – shuttle cars and continuous miners
- SA 02-02 Unplanned movements of longwall chocks
- SA 01-18 Alternate radio transmitter signals start machine
- SA 01-09 Unplanned movement of remote controlled mining machine
- SA 00-14 Unplanned movement caused by faulty transmitter
- SA 98-06 Remote control machine

NOTE: Please ensure all relevant people in your organisation receive a copy of this Safety Alert and are informed of its content and recommendations. This Safety Alert should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's notice board.

Signed



Rob Regan
DIRECTOR
MINE SAFETY OPERATIONS BRANCH
INDUSTRY & INVESTMENT NSW

View more safety alerts at www.dpi.nsw.gov.au/minerals/safety/safety-alerts. If you would like to receive safety alerts by email, enter your contact details at www.dpi.nsw.gov.au/minerals/safety/signup

- (b) remotely controlled plant to which Australian Standards AS/NZS 4240:1994 Remote controls for mining equipment applies (referred to in this notice as remotely controlled plant), and
- (c) fixed gas monitoring plant.

Dated this 29th day of January 2007.

ROBERT REGAN,
Chief Inspector,
NSW Department of Primary Industries

SCHEDULE

1. The records must be kept in a form that can be directly imported into a published electronic format without any modification, and

Note: published means published by the Department of Primary Industries

2. The records must contain the following fields in the following order:

- (i) Name of coal operator
- (ii) Plant type, as per the Regulation ('mobile plant', 'remotely controlled plant', 'fixed gas monitoring plant')
- (iii) Legal name of the plant manufacturer
- (iv) Model number of plant
- (v) Serial number of plant
- (vi) Legal name of owner of plant
- (vii) Date plant was put to use by the coal operator or arrived at the mine site
- (viii) Name of a competent person who has inspected the plant and who has confirmed that the plant is safe to operate at the mine
- (ix) Date of such inspection referred to in (viii) above
- (x) Legal name of the employer of the competent person referred to in (viii) above
- (xi) Date plant was removed from use by the coal operator or removed from the mine site, if applicable

3. In the case of mobile plant, the records must contain the following additional fields:

- (i) Description of the mobile plant, as described by the mobile plant manufacturer (for example; rear dump truck, six wheel drive articulated truck, load haul dump, wheeled loader, etc.)
- (ii) Unladen mass of the mobile plant
- (iii) Maximum payload of the mobile plant
- (iv) Maximum number of people the mobile plant is designed to transport
- (v) Design registration number of the diesel engine system, where applicable
- (vi) Item registration number of the diesel engine system, where applicable

4. In the case of remotely controlled plant, the records must contain the following additional fields:

- (i) Legal name of the remote control system manufacturer
- (ii) Type of remote control system (radio, umbilical chord, infra red etc)
- (iii) Model number of the remote control system

- (iv) Serial number of the remote control system receiver and ALL associated transmitters
- (v) Legal name of owner of the remote control system
- (vi) Date the remote control system was put to use by the coal operator or arrived at the mine site

5. In the case of fixed gas monitoring plant, the records must contain the following additional fields:

- (i) Plant location
- (ii) Type of gas detected

COAL MINE HEALTH AND SAFETY ACT 2002

Notice under Clause 76 of Coal Mine Health and Safety Regulation 2006

Requirements Before Use of Plant

I, ROBERT REGAN, Chief Inspector, pursuant to Clause 76 of the Coal Mine Health and Safety Regulation 2006, by this notice, specify the requirements set out in the Schedule below (as applicable to the plant) as the requirements that must be met prior to the following plant being used at a coal operation:

- (a) mobile plant that has the capacity to transport one or more people (other than plant that is registrable under the Road Transport (Vehicle Registration) Act 1997) (in this notice referred to as mobile plant),
- (b) remotely controlled plant to which Australian Standard AS/NZS 4240:1994 Remote controls for mining equipment applies (in this notice referred to as remotely controlled plant),
- (c) fixed gas monitoring plant.

Dated this 24th day of January 2007.

ROBERT REGAN,
Chief Inspector
NSW Department of Primary Industries
(by delegation)

SCHEDULE

1. Mobile plant intended to be used only on the surface parts of a coal operation must be assessed against the relevant requirements (as applicable for the hazards at the particular coal operation) of MDG 15 Guideline for mobile and transportable equipment as amended and the applicable Australian Standards listed in Table 1 below.

2. Mobile plant intended to be used in the underground parts of a coal operation must be assessed against the relevant requirements (as applicable for the hazards at the particular coal operation) of the published guidelines applicable to the mobile plant and the applicable Australian Standards listed in Table 1 below.

Note: (i) published means published by the NSW Department of Primary Industries.

3. Remotely controlled plant must be assessed against the relevant requirements (as applicable for the hazards at the particular coal operation) of the Australian Standards listed in the Table below.

4. Mobile plant, remotely controlled plant and fixed gas monitoring plant must be inspected by a competent person. The competent person must record in writing

that the plant is safe to use. Any record or report by the competent person must be kept in the plant safety file at the coal operation.

Table 1 – Australian Standards

AS 4242-1994	Earth-moving machinery and ancillary equipment for use in mines - Electrical wiring systems at extra-low voltage,
AS 60204.1-2005	Safety of machinery - Electrical equipment of machines - General requirements
AS 60204.11-2006	Safety of machinery - Electrical equipment of machines - Requirements for HV equipment for voltages above 1000 V a.c. or 1500 V d.c and not exceeding 36 kV
AS/NZS 4871.1:2002	Electrical equipment for coal mines, for use underground - General requirements
AS/NZS 4871.4:2002	Electrical equipment for coal mines, for use underground - Mains powered electrical mobile machines
AS/NZS 4871.5:2002	Electrical equipment for coal mines, for use underground - Battery powered electrical mobile machines

AS 1873.2:2003	Powder-actuated (PA) hand-held fastening tools - Design and construction
AS 1873.3:2003	Powder-actuated (PA) hand-held fastening tools - Charges
AS 1873.4:2003	Powder-actuated (PA) hand-held fastening tools - Fasteners

2. Testing requirements

- (1) The explosive-powered tool including its associated range of explosive charges and fasteners as intended for use in the underground mine at a coal operation must be tested to determine if the explosive-powered tool is likely to ignite an explosive atmosphere.
- (2) Such testing must be carried out:
 - (a) by TestSafe Australia or by an alternative testing authority acceptable to the Chief Inspector, and
 - (b) in a manner acceptable to the Chief Inspector in accordance with the following:
 - (i) the explosive tool is to be placed in a small flameproof test chamber which is filled with a mixture of 7.5% by volume ethylene in air.
 - (ii) the tool is to be loaded with the range of relevant strip-mounted cartridges and range of relevant sized fasteners for which registration is sought.
 - (iii) testing is to be performed at maximum and minimum power selections, using short and long fasteners firing into a range of target materials.
 - (iv) where applicable, the tool is to be tested with supplied extension trigger assembly fitted and magazine.
 - (v) when the explosive powered tool is fired in the test chamber, the surrounding ethylene environment must not ignite.

3. Matters for assessment

The following documents must be provided for assessment with the application under clause 107 of the Regulation for registration of plant design:

- (a) a detailed description and specification of the fastening tool system including tool, fasteners, charges, magazines(s) and extension trigger assembly where supplied,
- (b) identification of the explosive-powered tool and its components including number(s) for the tool and fastener(s) and the supplier whose name must be inscribed on a durable plate fixed in a prominent position on the tool,
- (c) detailed drawing(s) to clearly identify all component parts of the tool and system,
- (d) performance and testing certificates for the test stipulated in item 2.0 above and demonstrating the unit has passed all test criteria.
- (e) all documentation that will be supplied to users of the tool as required by clauses 105 and 122 of Regulation, and
- (f) evidence the explosive-powered tool is being manufactured in a recognised quality system.

OCCUPATIONAL HEALTH AND SAFETY ACT 2000

Notice under Clause 112A of Occupational Health and Safety Regulation 2001

Requirements for Registration of Explosive-Powered Tool Design

I, ROBERT REGAN, Chief Inspector under the Coal Mine Health and Safety Act 2002, pursuant to Clause 112A of the Occupational Health and Safety Regulation 2001 (the Regulation), by this notice, specify the requirements set out in the Schedule below as the requirements that must be met prior to explosive-powered tools used in underground mines at a coal workplace (referred to in this notice as explosive-powered tools) being registered under Subdivision 1 of Division 3 of Part 5.2 (as modified by Schedule 4A) of the Regulation.

Dated this 29th day of January 2007.

ROBERT REGAN,
Chief Inspector,
NSW Department of Primary Industries
(by delegation)

SCHEDULE

1. Design etc requirements

All explosive-powered tools including the characteristics of the explosive charges and the fastening tool system must be designed, manufactured, constructed and supplied in accordance with the following standards:

AS 1873.1:2003	Powder-actuated (PA) hand-held fastening tools - Selection, operation and maintenance
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