



Industry &
Investment

Summary Investigation Report

Serious injury involving longwall service
cassettes at the Beltana Mine on

21 August 2008

Report prepared for the Director General of the
Department of Industry and Investment by the
Investigation Unit, Thornton

Mine Safety Investigation Unit

Title: Summary Investigation Report,
Serious injury involving longwall service cassettes at the Beltana Mine on 21 August 2008

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Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information on which they rely is up to date and to check the currency of the information with the appropriate officer of NSW Department of Industry and Investment or the user's independent advisor.

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Overview

The mine

Beltana Mine is an underground coal mine located about 18 kilometres south west of Singleton in the Hunter Valley of New South Wales. It forms part of the Bulga Underground Operations and mines about 8 million tonnes of coal per year by the retreat longwall method of extraction.



The incident

On 21 August 2008, at about 5.30 pm, Mr Gregory Thomas received serious injuries to his lower right leg. The injuries resulted from his leg being crushed between the couplings of two longwall service cassettes that were being joined together on the surface of the Beltana Mine in preparation for being taken underground for a longwall move.

Mr. Thomas, a 52 year old mine worker and employee of UGM Engineers Pty Limited, was working at the mine as supplementary labour hire.

General Information

The Beltana Mine

The mine:	Beltana Mine
Mine location:	Broke Road Singleton NSW 2330
Ultimate holding company:	Oakbridge Pty Limited
Colliery holder:	Bulga Coal Management Pty Limited
Operator of coal operation:	Beltana Highwall Mining Pty Limited
Number of employees at coal operation:	165

The mine

Beltana Mine is an underground coal mine located about 18 kilometres south west of Singleton in the Hunter Valley of New South Wales. It forms part of the Bulga Underground Operations which is 100% owned by Bulga Coal Management Pty Ltd and is managed by Xstrata Coal NSW (XCN) on behalf of the Bulga Joint Venture (BJV). The Beltana Mine commenced operations in June 2003.

Beltana uses a Highwall or 'punch' mining technique in the Lower Whybrow seam, where possible. The technique involves adits being driven directly from the base of the open cut pits into the longwall development headings. This eliminates the need for main roadways between development headings as the floor of the open cut pit provides similar functionality to a conventional underground main roadway system. Coal is mined by the retreat longwall method of extraction, with a typical longwall face being around 246 metres wide. The lengths of the longwall blocks are up to 3.3 kilometres.

The Mine will extract 21 – 30 million tonnes of run of mine (ROM) coal from the Whybrow seam during its life. The principle product being thermal coal. Production for the 2008 financial year was 7.8 million ROM tonnes.

Beltana Highwall Mining Pty Ltd employs about 170 people. Labour-hire is engaged to assist with outbye services, longwall moves and manpower shortages.

The company

Beltana Highwall Mining Pty Limited is the nominated operator of the Beltana Mine. The colliery holder is identified as Bulga Joint Venture (BJV) because it is a joint venture of Oakbridge Pty Ltd and Nippon Steel Australia Pty Ltd.

Beltana Highwall Mining Pty Limited operates the mine on behalf of the joint venture partners. The major shareholder, and ultimate holding company, of Beltana Highwall Mining Pty Limited is Oakbridge Pty Limited.

The employer

Employer:	UGM Engineers Pty Limited
Employer's head office:	248 High Street Maitland NSW 2320
Injured employee's relationship with employer:	Employed as mineworker Supplied to Beltana Mine as supplementary labour to assist with the longwall relocation

The employer and supplier of supplementary labour

UGM Engineers Pty Limited (UGM), who employed Mr Gregory Thomas, is an Australian Proprietary Company.

It is an engineering company and contractor that provide a range of services to the underground coal industry in both New South Wales and Queensland. These services include:

- Conveyor installation and maintenance

- Construction and installation of ventilation appliances
- Coal production and maintenance of associated plant and equipment
- Labour hire and supplementary hire.

As well as undertaking its own projects, UGM is a supplier of supplementary labour to underground coal mines in NSW.

The incident

Incident outline	<p>On 21 August 2008, at about 5.30 pm, Mr Gregory Thomas received serious injuries to his lower right leg. The injuries resulted from his leg being crushed between the couplings of two longwall service cassettes that were being joined together on the surface of the Beltana Mine in preparation for being taken underground for a longwall move.</p> <p>Thomas, a 52 year old mine worker and employee of UGM Engineers Pty Limited, was working at the mine as supplementary labour hire.</p>
Setting up for the longwall move	<p>Mr Thomas was working afternoon shift as an outbye labourer and assisting with setting up for the longwall move. The shift started at 3.00 pm that day. Along with other UGM employees at the mine, Mr Thomas attended the regular pre-shift talk by the Beltana Shift Undermanager at the surface muster area. At about 4.00 pm Mr Thomas and another UGM mineworker (who will be called Mineworker 1) went underground and assisted the longwall crew with the longwall monorail flit (move). A third UGM mineworker (Mineworker 2) went to the workshop to collect the Juganaut (Jug-A-O), leaving it at the surface. This mineworker then went underground to help with the monorail flit.</p>
Connecting the longwall service cassettes	<p>At about 5.30 pm the three UGM mineworkers were told to bring in the longwall service cassettes by the Beltana Longwall Deputy. They walked to the surface where Mr Thomas and Mineworker 1 went to where the cassettes were parked. Mineworker 2 got into the Juganaut and drove it up to where the cassettes were located.</p> <p>Mr Thomas was to assist with connecting the two uncoupled longwall service cassettes while Mineworker 2 drove the Juganaut to push the cassettes close together ready to be joined. Mineworker 1, who had only been at the mine and in the industry for six weeks, was to stand nearby as an observer to relay communications between the Juganaut operator, Mineworker 2, and Mr Thomas.</p>
Lining up cassettes SB3 and SB2	<p>Using the Juganaut Mineworker 2 towed Cassette SB3 closer to the other two cassettes, SB1 and SB2. These cassettes were already coupled together and almost in line. After unhitching the towing chain, Mineworker 2 used the Juganaut to push cassette SB3 closer and in line with SB2 to allow joining. He did this with raised Juganaut bucket placed against the centre post of SB3.</p>

Coupling the cassettes

Mr Thomas was standing on the deck at the front of SB2 cassette above the coupling, ready to join the coupling of the two cassettes when they were in position. As SB3 cassette was being pushed by the Jugonaut Mr Thomas lent down to pick up the coupling as it appeared to him that the cassette was going to be pushed perfectly into place.

Leg crushed between two cassette couplings

As Mr Thomas lent down to pick up the coupling he put his right leg on the ground next to the front of the coupling of SB2 as shown in the next photo. He lifted the 18 kg coupling and lug (a 9kg lift) to about horizontal position. As SB3 cassette was pushed closer (from the right of Mr Thomas' position) it swung clockwise toward the join area. SB3 continued to move past the coupling joint point and caught Mr Thomas' leg between the two cassette couplings. The crushing force of the impact caused several compound fractures to Mr Thomas' right lower leg.

Impact on victim

After being flown to the John Hunter Hospital at Newcastle NSW, Mr Thomas underwent a series of operations to clean the wounds and to insert metal rods into his leg.

In September 2008 Mr Thomas under went further plastic surgery to the leg wound. A muscle was taken from under his arm and a skin graft from his upper thigh for treatment of the lower right leg.

Mr Thomas has suffered ongoing issues with the skin grafts and swelling of his foot.

His doctor has advised him that, most likely, he will not be able to return to underground work.



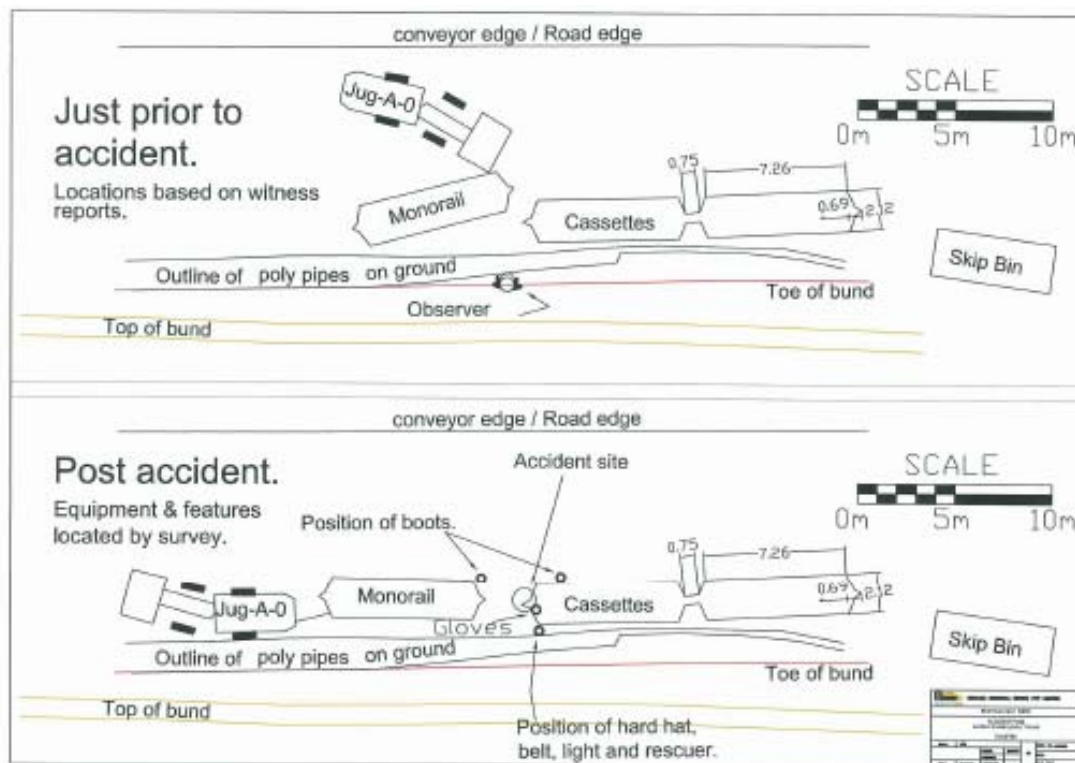
Photo showing re-enactment of lifting the cassette coupling

(Photo taken by Beltana Longwall Coordinator, 22 August 2008)



Photo showing cassettes with joined couplings

(Photo taken by Beltana Longwall Coordinator, 22 August 2008)



Plan of incident supplied by Beltana Highwall Mining

Immediate responses

Beltana Highwall Mining Pty Limited undertook the following remedial measures following the incident:

- Scene preservation and restricted access to the site
- Upon withdrawal of the section 89 Notice by the Department's Inspector an assessment of joining longwall service cassettes was undertaken by the mine
- Beltana reviewed the longwall service cassette couplings and developed a system to support the coupling so people are no longer required to support it manually
- Beltana completed a job safety analysis (JSA) for the task of coupling the longwall service cassettes and made it available on the company intranet to all personnel and contractors.

The investigation

The Department's authority

The Department has authority to investigate the incident as it occurred at an underground coal mine.

The Department's inspector who led the investigation into the incident, Mr Mark Freeman, holds an appointment as an investigator under section 145 of the CMHSA. Inspector Freeman also holds an identification card issued under section 48 of the Occupational Health and Safety Act (2000) (OHSa).

As a result Inspector Freeman is authorised to exercise functions under the OHSa with respect to a coal workplace, and other premises, for the purpose of investigating any matter under the OHSa in relation to a coal workplace.

Investigator Freeman commenced the investigation on 22 August 2008.

The lines of inquiry

The investigation focussed on the man-machine interaction and the method of connecting the longwall service cassettes used at the mine.

Lines of inquiry included:

- Site inspections
- Obtaining information from management and employees of the mine and the employer
- Examination of documents and records – with a focus on safety around mobile plant, safe work arrangements and supervision
- Inspection and testing of the jigsaw and cassette couplings
- Meetings with the original equipment manufacturer (OEM).

System documents and records

The documents and records examined during the investigation include:

- Extracts from the Beltana Highwall Mining Health and Safety Management Plan
- Transport Management Plans, operational standards and safe work procedures
- Reports related to labour-hire and contractors
- Supply contracts for labour hire
- Audit reports and risk assessments
- Extracts from the UGM Engineers Safety Management System
- UGM Engineers project reports and safe work method statements
- UGM Engineers Board minutes and reports
- Employment and personnel records for UGM mineworkers
- Maintenance records for longwall service cassettes.

The document review indicated that safety management systems were in place at the mine and by the employer at the time of the incident in regard to the labour hire mineworkers.

Findings

Summary of findings

Primary cause failure to identify risk	The primary cause of the incident was the failure of the operator of the coal mine to identify the potential risk of crush injury while connecting together longwall service cassettes.
Inadequate instruction and supervision	The Beltana supervisor failed to give adequate instruction on how to connect the longwall service cassettes. The supervisor did not identify the hazards associated with the task or ensure that appropriate controls were available to prevent injury.
No written instructions for the task	In particular, there was no safe work procedure or written instruction on how to safely couple together the longwall service cassettes. As a result, 'no go' zones in and around the cassettes had not been identified and communicated to personnel to reduce the risk of a person being trapped or crushed.
Responsibilities to employees	UGM Engineers have responsibilities to their employees as a labour hire agency, including: <ul style="list-style-type: none">• Consulting with workers on OHS matters• Taking reasonable steps to ensure risks are controlled at the host (Beltana) workplace, and• Monitoring and reviewing the effectiveness of measures to protect workers.
Assessment and monitoring safety of the workplace	<p>The investigation has shown that UGM Engineers may not have taken action to establish that the workplace and its operations were safe before placing their employees at the mine.</p> <p>The review of evidence shows that UGM Engineers did not monitor the situation by visiting the underground and surface workplaces of its employees to ensure that adequate risk controls were in place, even though supervisors and regional managers visited the mine regularly.</p>
Inductions and training records	<p>The investigation has determined that safety and health inductions were conducted by both UGM Engineers and Beltana Highwall Mining for new employees and contractors to site.</p> <p>In addition, UGM kept training records and records of competency to ensure its workers could work safely at host mines.</p>

Best practice to prevent recurrence

A series of crush or struck by incidents Recently there have been four incidents investigated by the Investigation Unit in which mine workers received serious injuries as a result of being struck by or crushed by mobile plant or equipment.

The safe operation of mobile plant is identified on the Department's internet site as a mechanical engineering key risk. Associated with the operation of mobile plant is the towing of trailers, sleds and other conveyance appliances for the movement of equipment in and around the mine. (*Mechanical engineering key risks* DPI Publication: <http://www.dpi.nsw.gov.au/minerals/safety/resources/mechanical/key-risks>)

Transport management plans are a requirement The Coal Mine Health and Safety Act 2002 and Coal Mine Health and Safety Regulations 2006 require the operator of a coal mine to prepare a health and safety management system that includes major hazard management plans. Underground mines are required to have transport management plans for underground and surface transport included in the mine's major hazard management plan.

Risks involved in towing There is a need to ensure that transport management plans include all activities associated with transport, including those involved in towing. In particular that:

- Risk assessments must identify all potential hazards associated with transporting equipment from one location to another at a mine. There must be recognition of increased risk of persons being crushed or struck by machines or equipment when in proximity of those machines. Any towing task that requires large equipment, such as trailers, transportation sleds, cassettes or pods to be joined, whether to each other or to the mobile plant that is doing the towing, and that requires a person to interact with the machine and equipment for the joining or unjoining must be considered high risk. Whilst the probability of persons being crushed between equipment may be considered low the consequences will be, at least, serious bodily injury; and
- Adequate information, instruction and training must be provided to the persons involved with the joining of the equipment and mobile plant doing the towing. This must include the safe method of joining and unjoining the equipment and how mobile plant is used for the task.

Equipment guidelines Coupling systems such as 'chains' and 'link and pin' couplings should not be considered as a safe system of joining towing machines and transport equipment. Equipment designers, manufacturers and suppliers should look toward other systems of couplings. Preference should be given to 'knuckle-type' automatic coupler or similar towing devices that do not require persons to go between the towing machine and the transportation

equipment. (It should be noted that knuckle-type automatic couplers, such as the Janney and AAR coupler, were invented in 1873 and have been in use on train rolling stock in the USA since 1893.)

**Providing
information,
instruction and
training**

The investigation of this incident showed that the Beltana Mine had no written procedure for joining, towing and uncoupling of the longwall monorail cassettes. The process of towing of longwall monorail cassettes had not been identified as potentially hazardous and so had not been subjected to a risk assessment.

Risk assessments must be conducted to identify how LHDs, Juggernauts or other mobile plant are used to position longwall transportation sleds and the associated risks. Appropriate controls must be put in place to restrict people from entering areas where they may be exposed to risk during the coupling process.