

Summary

Investigation Report

Into the death of Jason Symonds at
PERILYA MINE on 09 January 2007

Investigation report for the Director General of NSW Department
of Primary Industries.

Investigation Unit

West Pennant Hills

MARCH 2008



NSW DEPARTMENT OF
PRIMARY INDUSTRIES

Title: Investigation report

Author: Paul Raftery, Senior Investigator, Investigation Unit, West Pennant Hills

© State of New South Wales through NSW Department of Primary Industries
2006

This publication is copyright. You may download, display, print and reproduce this material in an unaltered form only (retaining this notice) for your personal use or for non-commercial use within your organisation. To copy, adapt, publish, distribute or commercialise any of this publication you will need to seek permission from the Manager Publishing, NSW Department of Primary Industries, Orange, NSW.

For updates to this publication, check <http://www.dpi.nsw.gov.au/>

Published by NSW Department of Primary Industries

First Published April 2008

ISBN

Acknowledgements

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 New South Wales Department of Primary Industries or the user's independent advisor.

TRIM reference: 07/545

CONTENTS

Overview	1
General Information	1
System of line of sight remote operation	2
Description of Incident	2
Investigation of Incident	4
Expected Controls	4
Basic Causal Factors	4
Actions taken post incident	5
Related Publications	5

OVERVIEW

Perilya Mine (Southern Operations) is located at Broken Hill, Western NSW. In January 2007 the mine directly employed about 600 people and indirectly employed about 200 contractors, producing about 1.8M tonnes of ore per year.

At that time, employees were working a "5 on 5 off" roster, meaning they worked continuously on the basis of 5 day shifts (7am to 7pm), followed by 5 days off, followed by five night shifts with a further 5 days off to complete the cycle.

On the 9th January 2007 Jason Symonds was operating a remote controlled loader to remove ore from a draw point underground at the mine.

The radio remote control of the loader relied on line of sight for the operator to monitor the work. Symonds was working alone and unobserved.

At some time during the shift Symonds became entrapped between the loader and the wall of the drawpoint access drive.

Although the precise events leading to Symond's death can never be known, it is clear that the incident arose as a result of the deceased and the loader coming within an unsafe distance of each other.



Photo 1

Remote controlled loader at the accident scene.

Photo shows width of loader in relation to the side wall of the drive..

GENERAL INFORMATION

Perilya mines a large underground orebody. To do this they drive tunnels to the selected level of the orebody. The portion of the orebody to be mined at the location is called a 'stope' which is usually a vertical or semi-vertical block of ore.

In one mining method used, the ore in the stope is drilled and blasted and falls to the bottom where it is extracted from the stope using one of the tunnels, called a 'drawpoint'.

An underground front end loader is used to dig out the broken ore and transport it to a loading point. Radio remote control systems are fitted to underground loaders to allow the machines to go into underground stopes and under unsupported backs (roof), while allowing the operator to remain in a safe location.

There are broadly two styles of remote operation in general use. One is line of sight (LOS) where the operator has visual contact with the machine. The other is tele-remote, where the operator monitors the machine using closed circuit television monitors from a remote location.

Usually ore is reasonably well fragmented and picked up in the bucket of a loader. This work is done with the operator at the controls of the loader.

As the stope is being emptied of ore, the rock level lowers to the point where the drawpoint is no longer filled (or covered) with rock, creating a potential hazard. The remaining rock in the stope is removed using a loader in remote control mode to protect the operator from falling or moving rock. At the time of the incident the

stope was being emptied and the drawpoint was fully open with the loader entering the stope. During ore removal from the stope large rocks may be encountered that the loader cannot handle and blasting may be involved.

SYSTEM OF LINE OF SIGHT REMOTE OPERATION

The radio remote control system consists of a remote control transmitter, carried by the operator using a shoulder harness, and a radio receiver installed on the loader. The system was designed to AS/NZS 4240 - Remote Controls for Mining Equipment.

The system incorporated a number of safety features designed to shut the loader down or inhibit movements in the event of a malfunction of the radio system or an unsafe condition.



Photo 2

Remote control transmitter with harness as worn by operator.

The Perilya procedure required a refuge caddy or large concrete block to be provided at each work location to protect the operator from contact with the loader.

The operator was allowed to leave the safe work location, when necessary, to gain a better view of the machine's operation.

If the loader was 5 metres or more from the operator he could leave the safe work location and continue to operate the loader. The procedure did not allow the loader to be driven within 5 metres of the operator.

Other persons are prevented from entering a remote loading area by a "No Access" sign and flashing red light whenever remote control operations are being used. Persons are required to make radio contact with the loader operator before entering.

DESCRIPTION OF INCIDENT

Symonds began his shift at 7 pm on 09 January 2008. His task was to conduct remote loading at the incident location stope drawpoint.

At the worksite he met with his supervisor who took over the operation of the remote to show Symonds where a large stone in the stope was buried. The plan was to dig out the stone so it could be blasted.

The supervisor did not consider the task to be hazardous but acknowledged that it might be difficult. The supervisor remained with Symonds for about 20-30 minutes. He operated the loader on remote control and did not note any issues with its operation. He then continued on his rounds.

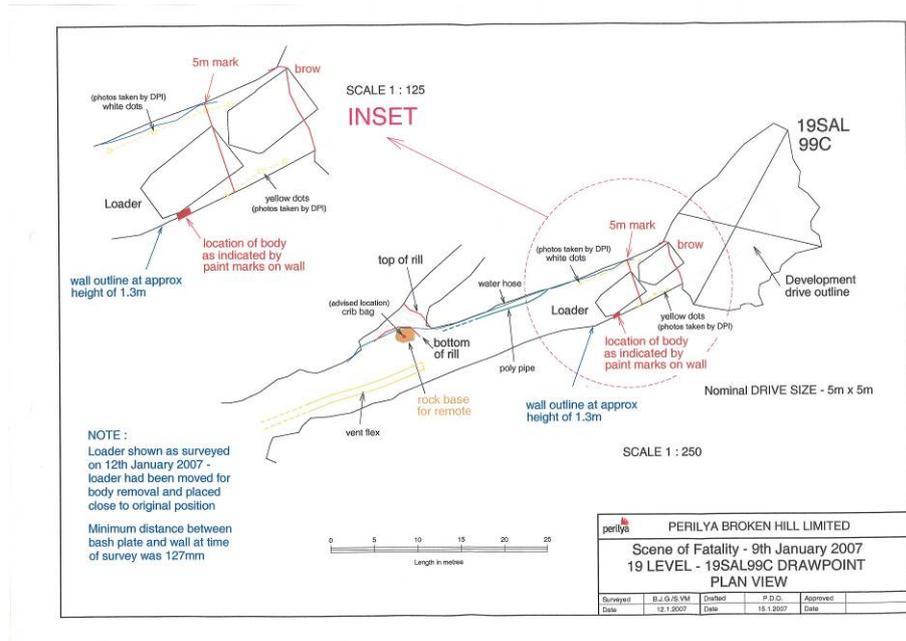


Photo 3 - Plan of incident site showing location of loader.

The plan also shows the operators cuddy

Later in the shift a geological sampler and his trainee arrived at the sign blocking entry into the remote loading area. They tried to call Symonds on the radio a number of times and received no answer. They heard the loader revving up and down and formed the opinion that Symonds was operating the loader remotely and could not respond to the radio which was located in the loader. Not being able to raise Symonds they decided to return later.

Shortly afterwards two workmen arrived at the stope location to relieve Symonds for a meal break.

On arrival at the entry barricade sign they tried calling Symonds and received no answer. They drove through the "No Access" sign into the work area and found Symonds pinned against the right hand wall by the rear of the loader.

The loader engine was not running, which can be explained by the tilt switch in the remote control shutting the loader down if it is tilted by around 45°.



Photo 4

View of cuddy and access drive showing loader after it had been moved.

INVESTIGATION OF INCIDENT

The incident was investigated by Paul Raftery of the DPI Investigation Unit. The investigation took place during 2007 and 2008, and relied on examination of the scene and the equipment, discussions with witnesses, examination of documents and records, and examination of the mine's safety management systems.

Extensive testing was carried out on the radio remote control system. No evidence of equipment failure or malfunction was found.

The loader was also extensively tested. An incorrect electrical relay was found in the interface between the radio system and loader hydraulics. The effect of the incorrect relay was to cause steering to the right to be "on/off" rather than proportional. The different RH steering response was not noticeable to all operators and did not cause the operators to stop using the machine.

No other evidence was found of any significant equipment failure or malfunction.

EXPECTED CONTROLS

Control measures that would be expected to reduce the risk of this type of incident were identified in:

- MDG 5002 Guidelines for the use of remote controlled mining equipment in underground metalliferous mines
- AS 4240 Remote Controls for Mining Equipment
- AS 4024 Safety of Machinery

Radio remote control of machines is reasonably common in underground mining. Over the years there have been a number of fatal accidents in Australia and overseas as a result of unsafe proximity between workmen and machines. A number of safety alerts have been produced by regulators dealing with hazards related to remote control of machinery.

BASIC CAUSAL FACTORS

The investigation identified a number of causal factors that were correctable by readily available control measures.

1. Insufficient engineered risk controls

The operator was physically able to move from a position of safety to a forward position where he was able to operate the remote control transmitter in close proximity to the loader. There were no barricades, interlocks or other engineered controls in place to prevent the free movement of the operator around the machine, or to prevent the machine from operating when the operator was in close proximity to it.

2. Insufficient measures to ensure documented procedures are followed.

There was no system in place able to detect whether the mine's documented procedure was being followed in practice. Supervision was not ordinarily able to monitor practices at the drawpoint. Supervisors were unable to enter the workplace until the operator had been contacted and he had given advice that it was safe to do so. Communications with the operator was only available via the radio transceiver located on board the loader, and accessible only when the driver could enter the loader cabin.

3. Unfounded confidence in procedural risk controls.

OHS legislation provides a hierarchy of risk controls that prioritises engineered risk controls above administrative controls.

ACTIONS TAKEN POST INCIDENT

After the fatal incident Perilya discontinued line of sight remote loading pending a review of associated safeguards.

Checks of all remote equipment were conducted by specialists before further use.

New risk assessments for each remote loading operation were conducted to identify hazards and provide appropriate controls, inclusive of remote cuddies and remote blocks.

The mine increased the reliance on teleremote method of remote control.

Perilya developed a new procedure for line of sight remote loader operations.

The revised procedure required:

- Two laser beam barriers across the drive connected in series. If either laser barrier is breached by the loader or mineworker the power is cut off to the transmitter, the loader shuts down and the brakes apply.
- The transmitter to be connected by a cable to the laser control box which is secured to the wall in the safe area. This means that the operator cannot move more than 5 metres from the safe area while carrying the transmitter. This ensures that an operator carrying a transmitter cannot proceed as far as the first laser barrier.
- The operator to be provided with a portable radio for communication.

RELATED PUBLICATIONS

MDG 5002 Guidelines for the use of remote controlled mining equipment in underground metalliferous mines

AS 4240 Remote Controls for Mining Equipment

AS 4024 Safety of Machinery

Powerpoint Presentation - Perilya 09-01-08

Safety Alert SA 07-01 Miner fatally injured in crush accident.

MDG 5004 - A study of the risky positioning behaviour of operators of remote control mining equipment

WA Safety Bulletin 38 – Use of remote controlled mobile plant in underground mines