



# MineSafe

Western Australia



**Do you need a dangerous goods security card?**



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Department of Consumer and Employment Protection  
Government of Western Australia

Vol. 17, No. 1  
May 2008

Resources Safety 



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ISSN 1832-4762

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Comments and contributions from readers are welcome, but the editor reserves the right to publish only those items that are considered to be constructive towards mining safety and health. Reader contributions and correspondence should be addressed to:

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This publication is available on request in other formats for people with special needs.

Main cover photograph: DE

## In this issue

Three issues of *MineSafe* will be published in 2008 – the second is planned for August, and the final issue will be available in December. This issue starts with the regular section by State Mining Engineer Martin Knee, who explores why story telling is such an important tool in raising safety awareness.

We cover amendments to the *Mines Safety and Inspection Act 1994*. One section is dedicated to the recently proclaimed *Dangerous Goods Safety Act 2004* and associated regulations. Further information is also available from the website and you are invited to the Dangerous Goods Safety Roadshows to be held in late May to early June in Kalgoorlie, Karratha, Newman and Perth.

The occupational health news ranges widely from hazardous manual tasks, lifestyles and FIFO to radiation safety. If you have ever wondered about the effectiveness of training, there is an article summarising a postgraduate study of MARCSTA by Ian Douglas, who also has an interesting story to tell about his career pathway so far.

In the safety and health representatives section, we find out about a company forum run in the Pilbara late last year, and there is information about formal recognition of introductory training. In an effort to improve the quality of information contained in complaints received by mines inspectors and the resolution process, there is an FAQs page on resolving safety and health issues.

Read about a mineral sands company's emergency response team that was involved in a real-life rescue — it is also an opportunity to acknowledge the work done by companies in their local communities.

Some candidates for certificates of competency are not aware of how the experience requirements are determined by the Board of Examiners — the issue is clarified here, together with advice regarding an extension to examination content.

Three articles cover safety performances in mining. The first summarises reporting data compiled for Western Australian mines in 2006-07. The second overviews an independent review of safety reporting in Queensland containing some statistics, observations and recommendations that may interest readers. The final article summarises information and comparative statistics from a national report prepared by the Australian Safety and Compensation Council.

We report on the 2008 Chamber of Minerals & Energy Safety and Health Awards, and note that entry is now open for the Work Safety Awards WA 2008. There is also an item about risk communication, one of the presentations at the Chamber's recent Safety and Health Conference.

This issue contains Part 5 of the themed section on road safety on mine sites. Damir Vagaja expands on the traffic safety aspects of speed management. We also cover a local system for monitoring driving on unsealed roads.

There is a wealth of occupational health and safety information on the internet. We have assembled a few of the more useful resources to get people thinking about emergency safety showers and eye washes. The risk factors associated with lightning are summarised, with some recommendations on how to address them.

The Australian Centre for Geomechanics recently released a training DVD on tailings, which is reviewed in this issue.

The mine record book is an important aspect of all mine operations, including exploration. Resources Safety does not supply these books but many companies produce their own for internal use, and we feature one here to share practical advice.

Three significant incident reports are included — one is re-released and relates to a drilling incident, and the other two are new, covering mobile plant hazards and Tropical Cyclone George. There are two safety bulletins — one on unattended vehicles rolling away and the other overviews the *Emergency Management Act 2005*. The medical bulletin on cyanide has been reviewed, updated and re-issued.

Enjoy your reading.

### Malcolm Russell

Executive Director, Resources Safety  
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# Telling tales — sharing our experience of safety

Human beings are storytellers. Stories have been used throughout history to entertain, to inform and to provide a sense, of inclusiveness in the 'tribal group' or the whole of mankind. Examples abound — like the aboriginal dreaming stories, Greek myths, Norse sagas, popular fairy tales, fables, nursery rhymes and even TV soaps. Stories act as both mirrors and windows on the human experience, showing people either how to look at reality in a different way or suggesting alternative realities. Traditions of storytelling have enabled human beings to make sense of the world that surrounds them, and their place in it, for many thousands of years.

Stories work at a very different level than pure information-sharing because they deal not just with rational thought, but also with how we feel about what we have heard. Stories are able to move beyond the barriers people create, to touch not just our minds, but our hearts. Because of this, we should always be looking for an opportunity to tell each other stories about safety.

Stories have substantial potential to influence behaviour. It is difficult to consider another communication medium that can communicate beliefs, model behaviour, teach skills, provide behavioural cues, and simulate consequences of behaviours over time in as compelling a fashion.

Storytelling is often associated with entertaining or teaching children, but the adult's sense of story is fully developed, the attention span is long, and adults provide eager listeners if we take the time to seek out tales we need to hear. The love of stories is not lost when people grow up. In fact, it may be that adults are better listeners than the young.

Telling stories is a way of knowing and remembering information — a shape or pattern into which information can be arranged. It serves a very basic purpose; it restructures experiences for the purpose of 'saving' them (like a computer file) and it is an ancient, perhaps natural, order of

mind. By imposing the structure of a story onto some circumstance or happening, greater coherence is achieved within the event itself, and otherwise isolated and disconnected scraps are bound up into something whole and meaningful.

One of the simplest functions of stories is that they provide us with a way to better remember information. People pay attention and listen more attentively to stories. If paying attention and remembering what has been told are two keys to effective learning, then stories make learning not only possible, but increase the likelihood that people will learn.

Trying to change another person's behaviour permanently (one of the primary objectives of safety training) without obtaining their buy-in is impossible. It is true that people will change their behaviours to generally comply with imposed rules when they must (when the supervisor or the inspector is watching, for example), but when nobody is around to monitor their behaviour, they often revert to how things have always been done and how their occupational culture expects them to behave, particularly if their instructions are in conflict with culturally expected behaviours. To openly go up against a traditional norm, people have to be convinced that the new behaviour is a better choice and that the choice to follow it is their choice.

The key for a safety trainer, then, is to find the internal control switch in each trainee that responds to the question, 'Why should I care about this information?' and provides the answer, 'Because it makes sense for me to care. It may save my life some day.' Stories have the ability to do this.

Miners are natural storytellers. We need only spend time in the crib-room to observe that most miners interact with each other through the telling of stories. Such stories may be about how their footy team is shaping for the grand final or the hot tip on a horse that didn't come off; but very often they are about close calls they have had, about 'gun' miners

they have known and worked with (and in many cases, learned from), about someone they knew who made an error in judgment and paid dearly for it, or about things they have seen and experienced as they have gone through their careers. The role of miners' stories is complex and includes the sharing and strengthening of the occupational culture, as well as the bonding that must exist to survive in a potentially hazardous environment.

A primary and most important role of storytelling, however, is the education of inexperienced miners. Experienced hands see these people as a potential hazard to everyone in the mine if the way they make decisions and carry out their work is not in alignment with acceptable practices. Experienced miners understand that one thoughtless or dangerous act can put everyone in peril. It is in their best interest to teach inexperienced workers how to do the job correctly. Their own lives may depend on it.

Stories turn impersonal statistics into faces — people just like the listeners — who may have suffered injury or death on the job. Because of the shared sense of hazard and the mateship felt in the culture of mining, it is not difficult for learners to transfer themselves into the story and think about how they would have reacted or what they would have done. This is immensely powerful when teaching 'Why should I care?' about safety.

### Why tell stories?

- Stories empower the speaker and the listener.
- Stories create an environment of trust.
- Stories create a bond among those who hear them.
- Stories engage the mind.
- Stories have a unique ability to defuse conflict and differences of opinion.
- Stories encode a lot of cultural information.
- Stories provide a way to learn from personal or vicarious experiences.

# Mines Safety and Inspection Act amended

The *Mines Safety and Inspection Act 1994* (MSI Act) contains the laws relating to safety of mines and mining operations, and the inspection and regulation of mines, mining operations and plant.

A statutory review of the MSI Act conducted by Robert Laing, a former Commissioner of the Australian Industrial Relations Commission, resulted in extensive amendments to the MSI Act that came into effect on 4 April 2005. A review was simultaneously conducted into the Occupational Safety and Health Act 1984.

The *Mines Safety and Inspection Amendment Bill 2007* (the Bill) was passed on 10 April 2008. It corrected a number of errors in the 2005 amendments and clarified provisions to reflect the intended outcome of those amendments.

Consultation on the Bill occurred through the tripartite Mining Industry Advisory Committee (MIAC).

## Key elements of the Bill

For the most part, the changes to the MSI Act represent a strengthening and improvement of existing provisions.

The amendments in the Bill covered the following broad areas:

- alternative labour hire arrangements;
- the Occupational Safety and Health Tribunal;
- safety and health representatives;
- review of notices;
- penalties in line with the general penalty provisions;
- clarification of the definition of exploration manager; and
- correction of typographical errors.

## Alternative labour arrangements

The Bill clarified provisions that deal with alternative labour arrangements, namely principal/contractor arrangements, arrangements that mirror a contract of employment and labour hire arrangements. The 'deeming' provisions in those sections made no reference to the offence provisions that apply to the cited duties of employers and employees. Amendments ensure that failure to fulfil the duties constitute a breach.

## Reference of matters to the OSH Tribunal

The Bill clarified provisions that deal with the Occupational Safety and Health Tribunal (OSH Tribunal). These provisions cite relevant matters in the MSI Act that may be dealt with by the Tribunal. Due to an oversight no reference was made to the relevant regulations. Such a reference is required to give effect to the government's policy intent that certain matters previously dealt with by a Magistrate would instead be dealt with by the OSH Tribunal.

## Safety and health representatives

Elected safety and health representatives (SHRs) who have completed the relevant training have the power to issue provisional improvement notices (PINs) requiring employers to address specific safety and health matters at the mine. The provisions to issue PINs were placed in a part of the Act dealing with notices rather than that dealing with the functions of SHRs. The changes in the Bill refer to 'Act' rather than 'Part' to ensure that SHRs are protected from civil liability arising from the performance of their functions under the MSI Act.

The PINs provisions are an important reform and the amendments ensured that all parties have confidence that the rights and responsibilities of SHRs in exercising their functions are protected.

## Penalties

The 2005 amendments introduced a new penalty regime. A number of provisions in the Act still referred to the old general penalty. The Bill brought these provisions into line with the new general penalty provisions.

## Exploration Manager

The Bill clarified provisions that deal with the duties of exploration managers. There were concerns that the definition of 'manager' could be interpreted to exclude any manager who was not a registered manager. These amendments addressed the issue and ensure that an exploration manager has duties and that exploration operations are carried out in accordance with the applicable provisions of the MSI Act.

## Availability of legislation

Hardcopy versions of the MSI Act and regulations are sold by the State Law Publisher, but legislation may be freely downloaded from the SLP website.

State Law Publisher – Western Australia  
Ground floor, 10 William Street  
Perth WA 6000

**Telephone:** 08 9321 7688

**Facsimile:** 08 9321 7536

**Email:** sales@dpc.wa.gov.au

**Website:** www.slp.wa.gov.au

## What is an SRS?

The following substances, other than Class 1 dangerous goods, are security risk substances for the purposes of the dangerous goods safety legislation in Western Australia:

- solid mixtures containing more than 45% ammonium nitrate; and
- ammonium nitrate emulsions, suspensions or gels.

Note that this does not include single-phase, homogenous (as opposed to multiphase, heterogeneous mixtures) aqueous solutions of ammonium

nitrate as commonly used in fertigation applications or as hot, concentrated solutions (UN 2426) for making ammonium nitrate emulsion explosives. However, it does include calcium ammonium nitrate (CAN), which is not a dangerous good under the UN classification system.

## New dangerous goods safety legislation

### Dangerous Goods Safety Act and regulations

The Dangerous Goods Safety Branch of Resources Safety is responsible for the administration of the *Dangerous Goods Safety Act 2004* (the DGS Act) and associated Dangerous Goods Safety Regulations 2007 covering the storage, handling and transport of dangerous goods, including explosives and security risk substances.

On 1 March 2008, the DGS Act and associated regulations replaced the *Explosives and Dangerous Goods Act 1961*, *Dangerous Goods (Transport) Act 1998* and associated regulations. The new regulations reference the latest standards and codes, and are a significant reform of dangerous goods regulation in Western Australia.

To support the regulations, Resources

Safety has been working on drafting a comprehensive package of guidelines, codes of practice and other guidance material, including templates, to assist industry stakeholders adjust to the changes.

There are implications for those working with explosives and security risk substances, with the introduction of security clearances. This will affect shotfirers, fireworks operators, and users of security risk substances.

Philip Hine, Director of the Dangerous Goods Safety Branch, recently conducted information sessions as part of the Chamber of Minerals and Energy's 2008 Safety and Health Conference. There have also been other presentations to industry associations and more are planned.

'We now have a big challenge ahead of us over the next 12 months in implementing the regulations and getting industry used to the new rules,' Philip said.

'But I am fortunate to have an experienced team of highly knowledgeable professionals. The plan is to start getting out and about as soon as possible to spread the message and work on our core function – improving dangerous goods safety.'

Further information on the new Act, regulations and guidance material is available from Resources Safety's website in the dangerous goods section at [www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety)

### Do you need a dangerous goods security card?

In response to the increased threat of terrorism, the Council of Australian Governments (COAG) agreed to adopt improved security measures for explosives and other substances considered to pose a security threat.

The new dangerous goods safety legislation introduces the new measures to Western Australia. This includes the security clearance of holders of licences for the storage, handling, transport, manufacture, sale, import and use of explosives and security risk substances (SRS), as well as people with unsupervised access to explosives and SRS.

The security clearance is initiated by lodging an application form for a dangerous goods security card. The security clearance is conducted by the WA Police. It does not involve Resources Safety, except that the Chief Officer issues a dangerous goods security card on the advice of the WA Police. Once individuals are security cleared, WA Police may monitor their status to ensure that they remain suitable to hold the card.

#### What does it look like?

The dangerous goods security card is a plastic photo ID card that is valid for five years from the date of issue.

A current card is proof of security clearance and is transferable between employers.

#### So who needs the card?

Anyone over 18 working in the mining, transport and farming industries and those involved in the manufacture, sale and import of explosives and SRS could be affected by these regulatory changes. In terms of the mining industry, the new requirement for a security clearance affects shotfirers, users of SRS, and the associated transport and storage industry.

All explosives and SRS licence holders will require the card, as will people with unsupervised access who work for a licence holder.

However, people with access to explosives or SRS in the normal course of their work will not require a dangerous goods security card if it can be shown that they are 'in the presence of' or 'under the control of' a person who already holds a dangerous goods security card.

Interstate licences with similar security requirements are recognised in Western Australia provided the holder does not reside here (e.g. fly-in fly-out employee from another State or Territory).

#### What about unsupervised access?

The card by itself is not an authority to be in possession of explosives or SRS, only a necessary precondition. The card holder also requires authorisation from their

employer to have unsupervised access to explosives or SRS. This establishes that the employee has an operational need and the competence to have unsupervised access to explosives or SRS, and gives the employee the legal status of a 'secure employee'.

Before lodging an application, employees should consult their employer to determine if the employer needs them to be security cleared.

#### What is the application procedure?

The application form is only available at participating Australia Post outlets (phone 13 13 18). You will need proof of identity and must lodge the application in person at a participating office.

Guidance on the application requirements for a dangerous goods security card is located in the dangerous goods FAQs section of the Resources Safety website, as well as sheets containing more detailed information on the following topics:

- Overview of Explosives Regulations;
- Overview of SRS Regulations; and
- Meaning of 'controlled by the other person' for security purposes.

Further information on the licensing requirements may be obtained by phoning Resources Safety on 9358 8001 or emailing [ResourcesSafety@docep.wa.gov.au](mailto:ResourcesSafety@docep.wa.gov.au)

# 2008 Dangerous Goods Safety ROADSHOW

The **Dangerous Goods Safety Act 2004** was proclaimed on 1 March 2008. The changes in regulatory obligations arising from this Act and associated regulations are substantial.

A major change has been the introduction of new security requirements for explosives and ammonium nitrate, in addition to a new risk management approach for the safety and security of dangerous goods. There are also 12-month transitional arrangements that help industry to phase in new requirements.

Significantly, the Mines Safety and Inspection Regulations 1995 have been harmonised with the Dangerous Goods Safety (Explosives) Regulations 2007.

The aim of the 2008 Dangerous Goods Safety Roadshow is to assist employers and employees in understanding the new legislation and how it may impact on them.

The following Resources Safety staff will be available at each venue from 8.00 am to 12.00 pm to answer individual queries:

- **Philip Hine**, Director Dangerous Goods Safety Branch
- **Lawry Lim**, Principal Dangerous Goods Officer
- **Henry Zuidersma**, Principal Explosives Officer
- **Russell Park**, Project Manager Business Systems

Russell Park will be available throughout the morning to provide information on the new dangerous goods licensing system and answer specific queries about the application process.

There will also be three 15-20 minute presentations, repeated once, starting at 8.30 am and every half-hour thereafter, finishing at 11.30 am.

## Dates & venues

**KALGOORLIE - Wednesday, 21 May**  
WMC Conference Centre  
44 MacDonald Street

**KARRATHA - Friday, 23 May**  
All Seasons Karratha  
Lot 179 Searipple Road

**NEWMAN - Thursday, 29 May**  
Seasons Hotel Newman  
Newman Drive

**PERTH - Tuesday, 3 June**  
Goodearth Hotel Perth  
195 Adelaide Terrace

There is no need to book. Just turn up at a time convenient to you. Make the most of this opportunity to speak in person with a senior Dangerous Goods Officer or licensing representative.

### 8.30 am and 10.00 am

Overview of legislation – Philip Hine's presentation focuses on the key aspects of the new Dangerous Goods Safety Act 2004 and a brief introduction to the regulations.

### 9.00 am and 10.30 am

Storage, handling and transport of dangerous goods – Lawry Lim's presentation covers the application of risk management principles to the storage and handling of dangerous goods, the introduction of new major hazard facility (MHF) regulations, and key changes in the new Australian Dangerous Goods Code, 7th Edition (ADG7) for dangerous goods transport.

### 9.30 am and 11.00 am

Explosives and SRS – Henry Zuidersma's presentation discusses the new security arrangements under the Explosives and SRS Regulations. The management of explosives at mine sites will also be covered.



# Managing hazardous manual tasks

### What is a hazardous manual task?

*Manual task* replaces the term 'manual handling' and is a label given to any activities that require a person to use their physical body (musculoskeletal system) to perform work. This includes work that involves the use of force for lifting, lowering, pushing, pulling, carrying, moving, holding or restraining anything. It also includes work that involves repetitive actions, sustained postures and concurrent exposure to vibration.

Almost every activity involves some form of manual task. To distinguish between those tasks that are potentially a problem and those that are not, the term *hazardous manual task* is used. Hazardous manual task refers to any manual task with certain characteristics that increase the risk of injury; for example:

- repetitive or sustained application of force;
- repetitive or sustained awkward postures;
- repetitive or sustained movements;
- application of high force;
- exposure to sustained vibration;
- involve handling of person or animal; or
- involve handling of unstable or unbalanced loads that are difficult to grasp or hold.

*Manual task injuries* — musculoskeletal disorders from performing manual tasks — are a significant problem in the Western Australian resources industry. About two-thirds of all reported manual task injuries are serious, keeping injured employees from performing their normal duties for at least 14 days. Detailed accident statistics are provided in the mining industry performance section of the Resources Safety website.

### Legal requirement to manage hazardous manual tasks

Resources Safety administers the *Mines Safety and Inspection Act 1994* (MSI Act) and Mines Safety and Inspection

Regulations 1995 (MSI Regulations). This legislation aims to promote and improve the safety and health of all people working or visiting mining operations and exploration sites in Western Australia.

### MSI Act

Under the MSI Act, all duty holders have a legal obligation to protect workers from hazards, including hazardous manual tasks. An employer is anyone who employs a person at a mine. This may be under an employment contract, apprenticeship or traineeship scheme. Employers and self-employed persons have a legal obligation to provide and maintain a working environment to protect the health and safety of themselves and their workforce. The MSI Act (sections 9 and 12) requires employers to:

- provide and maintain workplaces, plant and systems of work;
- provide information, instructions, training and supervision; and
- consult and cooperate with safety and health representatives and employees so that employees are not exposed to hazards.

Employees also have a legal obligation to take reasonable care to ensure their own and others' safety and health. In addition to taking reasonable care, section 10 requires cooperation with employers and other employees to follow instructions for their own and others' safety or health.

There is also a legal obligation to report, to their immediate supervisor, any situation they believe to constitute a hazard or one with the potential to cause a serious occurrence (section 11). The person who receives the report is required to investigate the hazardous situation, determine what action is required and then notify the person who made the first report of the final determination.

Following an accident where an employee is unable to perform their normal duties, the manager is legally

obligated to notify the district inspector and, if requested by the injured person, a trade union representative (section 76). The accident must also be recorded in the accident log book (section 77). Contractors and their employees, labour hire agents and workers; and people involved in the design, supply, installation and maintenance of plant also have prescribed duties of care under the MSI Act. Refer to the Resources Safety guideline *General duty of care in Western Australian mines* for more information.

### MSI Regulations

Part 6 of the MSI regulations describes the legal obligations of duty holders in relation to certain types of plant in mines. Plant includes machinery, equipment, appliance, implement, or tool and any component or fitting or accessory to any such article. These regulations require that all practical measures are taken to provide and maintain a safe working environment in relation to all plant. Similar to all other hazards associated with plant, managing manual task hazards requires a systematic approach to identification, assessment and control (regulation 6.2) to ensure they are conducted in a safe manner.

### The challenge

If you undertake a manual task in your workplace with one or more of the characteristics that comprise a hazardous manual task, consult your supervisors, safety and health representatives, health and safety officers, employers and other employees about how to do the job better. Where possible eliminate the hazardous manual task. When the hazardous manual task cannot be eliminated then change the task to remove or reduce the risk arising from the hazards associated with the task. If you are involved in the design, supply, installation or maintenance of plant to

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the mining industry, your challenge is to consult with industry members to identify hazardous manual tasks associated with your products. Such a consultative approach has been developed through the Earth Moving Equipment Safety Round Table (EMESRT) that was formally established in 2006 by a group of major mining companies from around the world. The purpose of EMESRT is to accelerate the development and adoption

of leading practice designs for earth moving equipment in order to minimise the risk to health and safety. This is done by engaging original equipment manufacturers (OEM) and users. For more information on EMESRT Design Philosophies, visit the MIRMGATE website at [www.mirmgate.com/emesrt.asp](http://www.mirmgate.com/emesrt.asp)

### Review scoping study completed

In November 2007, Resources Safety commissioned a review of musculoskeletal injuries arising from mining employees performing manual tasks at work. The *Review of Manual Task Injuries in the WA*

*Mining Industry* report generated 12 recommendations for presentation to the Mining Industry Advisory Council (MIAC) for endorsement on 21 April 2008. More information on the findings of this review will be released in future *MineSafe* articles, with reference sheets and updates to be posted on the Resources Safety website.

For more information on the next stage, contact Lindy Nield, A/Principal Scientific Officer (phone: 08 9358 8088; email [lnield@docep.wa.gov.au](mailto:lnield@docep.wa.gov.au)).

## Mining lifestyles and health project underway at UWA

The following information was contributed by Susan Clifford, a PhD student at The University of Western Australia. Susan invites readers and their partners to participate in a project relating to the mining industry, and will summarise the results for *MineSafe* magazine when available.

A large research project, *Lifestyles and Health of the WA Mining Community Project*, at The University of Western Australia (UWA) is currently investigating how stressful it is to work in the Western Australian mining industry. We are asking mining employees and their partners (if applicable) to describe their experiences of 12-hour shifts, compressed rosters, night shifts and/or fly-in/fly-out (FIFO) travelling. The project aims to investigate how mining working arrangements affect stress levels, relationships, lifestyle and health, and to identify ways that people cope with the working arrangements.

We are recruiting any mining employees working in Western Australia, including those who are single, in relationships, living locally, using FIFO travel, and working any job or roster. Importantly, we are also inviting any partners of mining employees to also participate.

Participating in the study simply involves completing an anonymous questionnaire. The questionnaire can be completed in 30 minutes or less, and is available by mail, email or on the internet. Over 200 people have already participated. All respondents have a chance to win a stay at a luxury Perth hotel.

The project is being conducted to investigate many anecdotal claims that mining employees are less healthy, more likely to binge drink and take drugs, and more likely to have relationship break-ups than other people in the community. Although these things are commonly talked about,

hardly any research has been undertaken in Western Australia to examine the broad lifestyles and health of over 50,000 mining employees. This project will collect objective data to accurately describe the stress levels, lifestyles and health of mining employees and partners to assist employers, employees and families make practical, evidence-based changes to minimise work-related stresses.

The project is independent from any external companies or organisations, and has been approved by the UWA Human Ethics Committee. The project forms a major part of Susan Clifford's PhD in UWA's School of Anatomy and Human Biology.

Those interested in the project should visit UWA's Integrated Human Studies website at [www.ihs.uwa.edu.au/research](http://www.ihs.uwa.edu.au/research) or contact Susan for more information ([sc Clifford@anhb.uwa.edu.au](mailto:sc Clifford@anhb.uwa.edu.au), phone 08 6488 2712).

### Joint publications

The code of practice on *Working hours* and guidance note on *Alcohol and other drugs in the workplace* are issued jointly by WorkSafe and Resources Safety, and may be freely downloaded from the Resources Safety website.

Hardcopies of these publications are available from WorkSafe at \$3.30 a copy. The order form is available in the publications section of the WorkSafe website at [www.docep.wa.gov.au/worksafe](http://www.docep.wa.gov.au/worksafe) or contact the WorkSafe Publications Officer:  
Phone 9327 8721  
Fax 9321 6658  
Email [safety@docep.wa.gov.au](mailto:safety@docep.wa.gov.au)





# Managing NORM — new guide

Radiation protection guidelines for mineral sands mining and processing industry were initially developed by the Western Australian Department of Mines between 1986 and 1997. There was a clear need to review and update the guidelines to ensure that they reflect current radiation safety standards and practices.

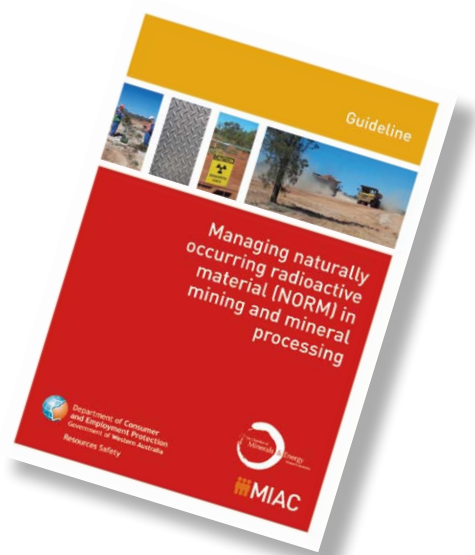
As a result of a joint project between Resources Safety and the Radiation Industry Group of the Chamber of Minerals & Energy Western Australia, all guidelines have been revised, updated and collated into an online publication for managing naturally occurring radioactive material (NORM) in mining and mineral processing.

The revised publication was prepared by Nick Tsurikov of Calytrix Consulting Pty Ltd and Ivan Fetwadjieff of Resources Safety under the direction of the Radiation Industry Group.

A number of national and international

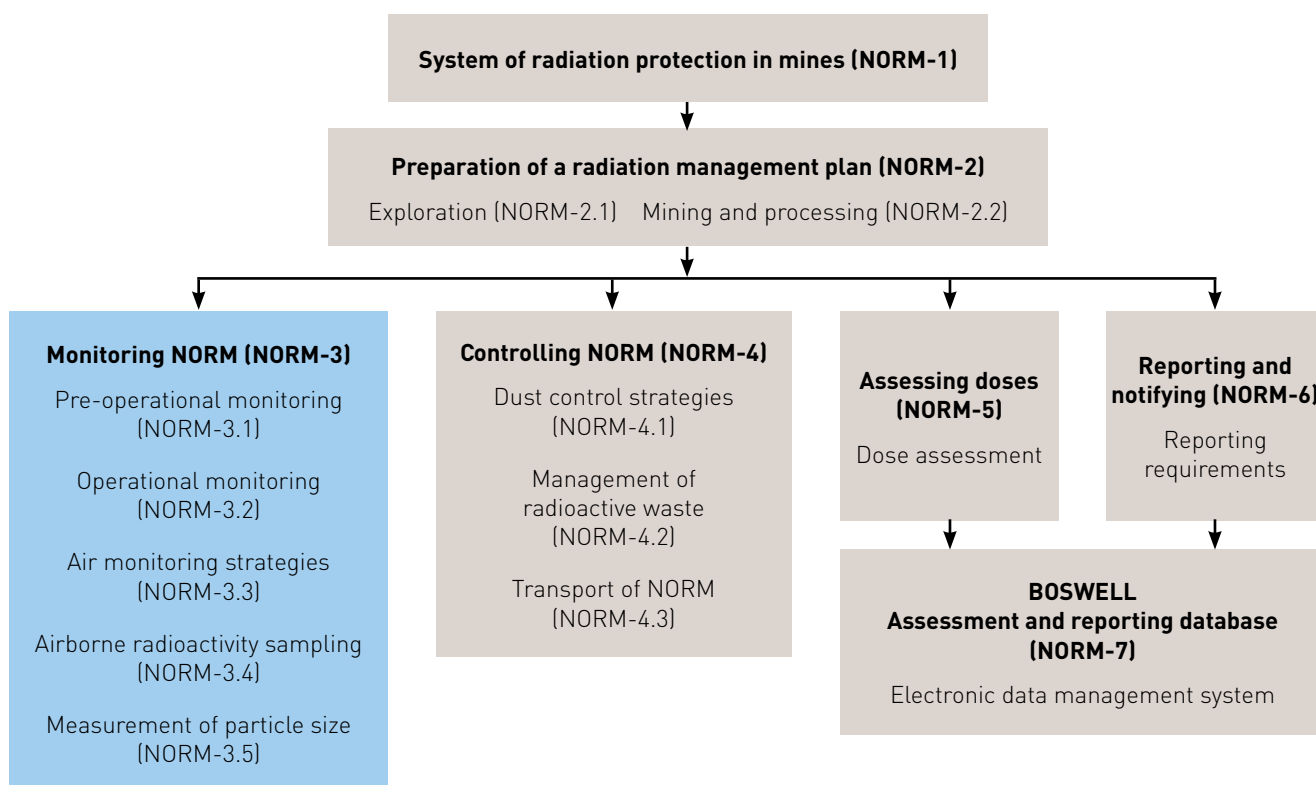
developments in the area of NORM were considered as part of the review and revision process, and the new suite of 'NORM guidelines' addresses not only issues associated with the mineral sands industry but other situations in mining and mineral processing where NORM can present as an occupational and/or environmental hazard.

The publication describes acceptable methods for addressing radiation safety requirements under Part 16 of the Mine Safety and Inspection Regulations 1995. It provides details for developing and maintaining a system of radiation protection at mining and processing operations through a radiation management plan and specific processes for monitoring, controlling and assessing radiation doses, transport, and regulatory reporting and notification requirements. In addition to mineral sands, the NORM guidelines apply to



uranium exploration, tantalum mining, rare earth element mining and fused zirconium processing.

*Managing naturally occurring radioactive material (NORM) in mining and mineral processing — guideline* will be published online in May at [www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety) in the occupational health section under mining guidance material and publications.



## Occupational health news

### CME releases FIFO report

According to a 13 February media release by the Chamber of Minerals and Energy of WA (CME), the fly-in/fly-out (FIFO) work arrangement has become a key strategy in attracting skilled workers into the Western Australian resources sector, as indicated by a new CME report *Fly-In, Fly-Out in the Western Australian Resources Sector*.

The report details the sophisticated application of FIFO practices used in



resource industry operations across the State.

'The FIFO option has contributed greatly to the remarkable growth in Western Australia's resources sector and is critical in making many remote mining operations viable,' said CME Chief Executive, Reg Howard-Smith.

'This latest report documents some of the strategies adopted by a number of resource companies in Western Australia to make FIFO a more sustainable and rewarding lifestyle for our industry employees and families,' he said.

'CME member companies are responding to the issues of isolation and distance through a range of measures including providing site visits for family members, ensuring access to email and internet

communication, and applying flexibility to rosters to cater for emergencies and special occasions at home. The report demonstrates the broad social commitment by the resources sector in committing to support both its residential and fly-in, fly-out workforces.'

'Fly-in, fly-out services also underpin the success of Western Australia's regional aviation network. Airline and charter operations work closely with communities to enhance services to remote and regional areas and this provides additional opportunities for tourism, business and the broader community.'

Copies of the report are available from the CME website at [www.cmewa.com](http://www.cmewa.com)

## MARCSTA — spent force or shining star?

Ian Douglas recently completed an extensive study of MARCSTA on whether it was still relevant in the arena of worker occupational health and safety induction training. He has summarised below the results of his PhD research. More detailed information may be obtained by contacting Dr Douglas directly (phone 0420 549 601, email [ido格拉斯@safetydoctor.com.au](mailto:ido格拉斯@safetydoctor.com.au)).

After more than ten years in metalliferous mining induction training and having trained over 160,000 trainees during that time, there are some who feel that the Mining and Resource Contractors Training Associations (MARCSTA) program may have run its course and become irrelevant or a 'time-waster' (Buckley-Carr, 2005).

A recently completed independent research study conducted by Ian Douglas, a PhD student at Edith Cowan University, into the MARCSTA system showed that this assumption may not be

valid. The three-year study (2004–2007), which involved surveying more than 1,600 randomly selected trainees from Western Australia and Tasmania, found that the MARCSTA program can be empirically shown to be a leader in 'closed-market' occupational health and safety (OHS) induction training programs. Analysis of associated research data validates MARCSTA as a leader in this area for not only the Western Australian and Tasmanian metalliferous mining industries but for other primary industries throughout Australia.

### Study design and research methodology

The research project was based on the collection and analysis of qualitative and quantitative data. This empirical study was of a descriptive-observational nature using survey and case study research principles.

Five survey questionnaires were designed using four questionnaire

formats — multiple forced choice, Likert, fill-in and true-false (Berdie and Anderson, 1974).

### Results

Data gathered from the reaction level volunteers indicated that two-thirds of respondents thought the course learning outcomes were clearly explained before the course commenced, and 80% felt that those outcomes had been met. Seventy-five percent of respondents thought that the OHS information they had received was not only relevant to the mining industry but would be important in their future work within the industry.

OHS-specific knowledge gained by people attending a MARCSTA general induction course for the first time was evaluated by conducting pre- and post-training testing. Study participants demonstrated a significant improvement in OHS knowledge (60%) across all age groups.

## MARCSTA — spent force or shining star?

Several participants reported that they had applied the knowledge gained from the MARCSTA course to their home environment, leading to improved safety around the house, and they had shared this information with other family members. This is a very positive side effect of the MARCSTA course. One example given was wearing ear-muffs and eye protection when mowing the lawn. This precaution was reported to have prevented a relative from possibly receiving an eye injury from flying material flicked up while mowing the lawn.

Furthermore, an evaluation of the Western Australian metalliferous mining industry's OHS outcome performance indicators (OPIs) data demonstrates a strong temporal relationship between the introduction and continued use of the MARCSTA program and statistical improvements in OHS-related OPIs. The data also show how successful this industry has been in reducing OHS-related OPIs compared to other primary industries on both a state and national level. With none of the other national primary industry groups having the benefit of a 'closed-market' induction program for the last ten years, a strong case could be put that a similar course or program is the missing variable when comparing these groups (particularly the six mining sectors – open-cut and underground metalliferous mining, open-cut and underground coal mining, extractive industry, and smelting and refining industries).

As part of the research, the MARCSTA training manual was the subject of a cohort study to validate it as a learning resource. The results indicated that the course training materials supplied to trainees were extremely high quality and there was the potential for the course information to be taught on a remote or correspondence teaching basis.

The refresher component of the program was also evaluated and, far from being seen as irrelevant by course attendees, the MARCSTA refresher course retained strong support from trainees attending for the third and fourth occasions.

Anecdotal data from the research suggest that, presently, many

metalliferous mining industry employers are only paying 'lip-service' to the ongoing provision of employee OHS training. As many respondents said, 'You don't get any further OHS specific training on the job after your site-induction is over'. The consensus was that the only ongoing training being delivered was related to changes in work systems or technological change and, although these may have OHS components, the training was not specifically OHS related. The only course of this nature attended by respondents was their biennial MARCSTA refresher course.

### Recommendations

The major recommendations derived from this research are listed below.

- The design of any refresher course needs to be tailored to meet the needs of each individual group of workers after a trainee has attended more than three such courses. The content of the program needs to be developed in conjunction with all in the training group but primarily the trainees themselves.
- Constant auditing, vigilance and management by the controlling body over the information being delivered by facilitators during training is crucial to ensure that the original intent of each program is not lost.
- As the numbers of facilitators authorised to deliver a particular course grows, so will the need for the originating organisation to maintain strict quality control over the information that must be covered by trainers during the delivery of the course.
- Where the opportunity exists, ideally both 'white' and 'blue' collar employees should attend these generic industry-based OHS training courses so that everyone is known to be at an accepted knowledge level regarding OHS for a particular industry. The knowledge should not be localised to an industry section.
- The use of a 'closed-market' industry passport system as opposed to the 'open-market' type

is to be encouraged as the preferred option. The use of this styled system should ensure the course content is kept relevant to the industry for which it was developed, and not become a general course for several different industries as evidenced by some courses worldwide.

### Conclusion

This unique national research study into an industry-based 'closed-market' generic OHS training passport system operated by MARCSTA clearly indicates that, from the workers' point of view, it has a crucial role to play. These types of training programs are designed to provide the potential employer with an assurance that new employees entering their industry who have completed the course have attained a recognised minimum acceptable basic level of knowledge relating to generic OHS hazards and risks commonly found throughout that industry.

With the Australian Safety and Compensation Council (ASCC) already concentrating on OHS induction passport systems in the national construction industry, it would be rash to think that the Council will not eventually look at introducing these national OHS passport induction training systems to other industries — including the other sectors in mining. The findings of the research presented here should assist future development efforts along those lines from being misdirected, and could even facilitate the early successful introduction of similar industry-based programs for other industries.

Talk from metalliferous mining industry participants that the program may have 'run its course' is simply generated from those who fail to see the value of the MARCSTA course to their present and potential employees, which is unfortunate as the workers surveyed here support the program's continuation.

*References — Berdie, R.D., and Anderson, J.F., 1974. Questionnaires — Design and Use. The Scarecrow Press, Metuchen, 225 pp.*

*Buckley-Carr, 2005. Time waster. Kalgoorlie Miner, 3 May 2005, p. 1.*

## MARCSTA — spent force or shining star?



Photo courtesy of Ian Douglas

Ian Douglas has had an interesting career pathway, as MineSafe editor Dr Susan Ho discovered when she spoke with him about his experiences in mining and what led him to a PhD on occupational health and safety.

### Who is Ian Douglas?

#### **QUESTION:** *What is your industry background?*

**ANSWER:** I spent 25 years working in the resource, mining and construction industries as a machine operator operating draglines, mobile plant and cranes up to 400 tonne SWL [safe working load].

I was also a union organiser for three years, from 1990 to 1993 with the CFMEU [Construction, Forestry, Mining and Energy Union].

#### **QUESTION:** *When did your interest in occupational health and safety first come to the fore?*

**ANSWER:** One of my first jobs, in 1973, was at BHP's Newcastle steelworks in the blast furnace section as a crane operator charging the 200 tonne furnace. This is where I first became interested in worker or workplace safety after seeing many serious and sometimes fatal accidents occur on a far too regular basis.

#### **QUESTION:** *When did you become more formally involved in this field?*

**ANSWER:** I spent ten years, in the mid-80s to mid-90s, as the TLC's [Trades and Labor Council, now known as UnionsWA] representative on the WorkSafe (WA) panel responsible for reviewing workplace incidents and accidents involving cranes and lifting equipment throughout WA.

When I was an activist with the union movement, I attended three OHS seminars at Clyde Cameron College in Wodonga during the mid- to late-80s, which was when the first OHS Acts were being introduced in each State.

In my role as chairman of the CFMEU crane committee during the mid-80s to 1990s, I was responsible for the development and successful introduction of many improvements in operator safety, including items like permanent ladders and landings on tower crane supporting structures, tinted glass for the operator cabin windows, air conditioning, fire extinguishers, effective two-way communication systems for crane crews, to name a few.

I am a Registered Safety Professional (RSP) of Australia, and have been a Member of the Safety Institute of Australia for 8 years, and am now a Chartered Professional Member.

I have also had 'train the trainer' and 'workplace assessor' qualifications since the mid-90s.

#### **QUESTION:** *How have you 'spread the word' about OHS issues?*

**ANSWER:** I have delivered multiple professional presentations at various OHS conferences in States throughout Australia. Some of the topics I talk about are:

- the need for OHS refresher training in the mining industry;
- learning from other industries — construction;
- OHS rights and responsibilities at work; and
- an alternative approach for the delivery of OHS-related statistics to blue collar employees.

#### **QUESTION:** *What made you decide to enter academia with your so-called blue collar background?*

**ANSWER:** After successfully completing a national certificate and diploma with TAFE in 2000, I commenced the full-time Bachelor of Health Sciences course at Edith Cowan University [ECU], with a major in safety science and occupational health, and a minor in environmental health. I finished this undergraduate course in 2002 and spent another year studying to obtain first class honours. My honours thesis involved comparing the different types of competency assessment methods used for crane operator training and evaluations — accrued hours (pre-1996) versus competency based (post 1996).

Like so many mature age students attending university nowadays, I found the learning easy because of my passion and interest in the subject material being taught. I was there because I wanted to be there. This allowed me to maintain a high distinction course average throughout my undergraduate studies.

#### **QUESTION:** *What was behind your decision to do a PhD on OHS issues?*

**ANSWER:** To fulfil the requirements of both my Honours and Doctor of Philosophy degrees, I had to conduct a research project. My approach to research is that if you want to measure the effectiveness or otherwise of any worker-based OHS training program or system, then you survey the people for whom the course was designed — the workers.

I became aware during my undergraduate studies that there were few, if any, research findings in the field of OHS training using this research approach. Few researchers appeared to have ventured down a path where they ask the workers what they think about a subject, and where any analysis of their data becomes the foundation for the report and its recommendations.

I decided there was a gap in our knowledge of what did and didn't work in terms of OHS-related induction training in the mining industry — there was a lot of talk around the pubs but what was the situation really like? MARCSTA is a major player in the training field for mining, so it was an obvious choice for analysis.

## MARCSTA — spent force or shining star?

**QUESTION:** *How did you get the PhD project off the ground?*

**ANSWER:** When I was looking for a research topic, a suggestion from Dr Janis Jansz, a lecturer, led to a formal request being sent out from the Board of Directors through the CEO of MARCSTA, Mr Pat Gilroy AM, where the proposed research was outlined for the group's consideration.

I approached Dr Jacques Oosthuizen, an international recognised occupational hygienist from South Africa who now lectures at ECU, and Dr Jansz, who's an OHS professional and now senior lecturer at Curtin University, to be my supervisors.

I was awarded a full Edith Cowan University Postgraduate research scholarship in 2004. As far as I'm aware, I was the first — and am still the only — OHS student at ECU to have been awarded a first class Honours degree and PhD scholarship.

My PhD was granted early this year.

**QUESTION:** *What have you observed over the years in terms of the approach to OHS?*

**ANSWER:** Before the introduction of the Roben's principles of OHS, which has seen those who work with and create the hazards as the ones responsible for

their identification and control, I think that workplace and worker safety was a bit of a game of Russian roulette. You didn't know from one day to the next whether you would finish your shift without being injured. It should be remembered that in those days, some major contractors undertaking large infrastructure projects would include the loss of workers' lives in their tender submissions — which in itself explains their approach to workplace and worker safety at the time, with workers being seen as expendable.

During the late-80s and early 1990s, many employers still had to be 'dragged kicking and screaming' into complying with their statutory or regulatory obligations.

Now, the employer takes a far more proactive approach to the control of risk in the workplace.

Having spent my working life — more than 30 years — as a 'blue-collar' employee, recently supported by my academic studies, I have seen the evolution of a safety professional with an up-to-date academic and professional approach, in line with legislative responsibilities and requirements, needed when designing and delivering practical solutions to workplace OHS-related issues while at all times having employee safety as the prime objective.

**QUESTION:** *What has having such a varied career path enabled you to do that might not have been otherwise possible? What are you doing now?*

**ANSWER:** To transfer some of the practical and theoretical knowledge I've gained over the years, I recently started up my own business, The Safety Doctor, specialising in the development and auditing of OHS training, safety systems and risk management.

I now find myself in the unique position where I can audit an organisation's OHS performance from a blue-collar worker's perspective through the use of my WorkSafe (WA) certificates of competency, while at the same time being aware of the employer's needs from a professional level. For example, I can go onto a mine site or construction site as a crane or plant operator or into a logistics warehouse using my forklift certificate for a period of time and 'see' how employees are approaching workplace safety when they presume there are no bosses, supervisors, or OHS auditors around. This approach to 'real-time' auditing regularly produces results that often contradict the outcomes of more formal audits where the employees, or even the supervisors, are aware they are being observed.

## Minescapes feature in photo festival

*Australian Minescapes* is a new body of work by internationally renowned photographer Edward Burtynsky that was specifically commissioned for the 2008 FotoFreo Festival.

The exhibition, which is sponsored by BHP Billiton Iron Ore, is showing in the WA Maritime Museum at Victoria Quay, Fremantle, until 20 July.

Burtynsky presents a series of images taken in the Eastern Goldfields and Pilbara regions of Western Australia, continuing his examination of natural landscapes modified by mankind in the pursuit of the raw materials

required for our modern society.

However, Burtynsky's pursuit is that of finding beauty in the marks that mankind makes on the land.

The focus of his work is not the natural landscape but 'man-made landscapes' — in his words, 'manufactured landscapes'.

His photographic work has examined quarries, mine sites, industrial landscapes, oilfields and industrial landscapes in the third world.

'Nature transformed through industry is a predominant theme in my work. I set course to intersect with a contemporary view of

the great ages of man; from stone, to minerals, oil, transportation, silicon, and so on. To make these ideas visible I search for subjects that are rich in detail and scale yet open in their meaning. Recycling yards, mine tailings, quarries and refineries are all places that are outside of our normal experience, yet we partake of their output on a daily basis,' Burtynsky says.

His photographic depictions of global industrial landscapes are in the collections of several major museums around the world, including the National Gallery of Canada, the Bibliothèque Nationale in Paris, the Museum of Modern Art and Guggenheim Museum in New York.

# REG reps network for safety and health

The Resource Evaluation Group (REG), BHP Billiton Iron Ore (BHPBIO), contacted Resources Safety last year to request resource materials for a forum being organised for safety and health representatives. REG kindly agreed to provide an article on the forum for this issue of *MineSafe*.

BHP Billiton Iron Ore's Resource Evaluation Group (REG) facilitates the contract management and operational supervision of drilling expertise. REG personnel interpret data from sampling and logging to generate quality models to be used for future planning of resources. The group currently employs 100 BHPBIO personnel and about 200 contractors who are situated at hubs in the Pilbara, including Newman, Area C and Yandi.

REG held its first Health, Safety and Environment (HSE) Representative Forum in Newman on Tuesday 13 November 2007. The forum was attended by current and future HSE representatives, REG management and the REG HSE team. The forum aimed to introduce the safety and health representatives to each other and discuss their roles within REG. It also encouraged networking and helped demonstrate management's support of health and safety representatives.

Phil Wood, a current representative from the electrical department, spoke about his experience as a

HSE representative and his role in general. Phil was followed by Mines Inspector Jim Farnworth, who talked about the mines inspectorate and the importance of the safety and health representative's role.

A discussion on what representatives could contribute to improve HSE performance within REG generated many ideas, including:

- 'Gain relevant knowledge and information and pass on to the work group, this is also done by leading by example.'
- 'Encourage others to report events and hazards and ensure feedback is given to the work group.'
- 'Encourage work groups to conduct risk assessments e.g. Take 5s, JHA, and lead by example as well as help to facilitate.'
- 'Know who your fellow safety representatives are and provide support.'
- 'Encourage and support work groups to speak out or express concerns if they feel an aspect of their work environment is unsafe.'

A bi-monthly HSE representative meeting will continue to be held by REG where information will be shared and issues can be discussed. HSE representative forums will be held on a six-monthly basis to discuss HSE issues and solutions. This will enable the representatives to network and foster improved relationships.

*Attendees at the 2007 HSE Representative Forum. Standing left to right: Special Inspector Mines (Machinery) Jim Farnworth, Andrew Parsons, George Tabori, Brad Baker, Brett Poulsen, Lauren Gale, Adeline Brandsetter, Ralph Mongoo, Sandra Wood, Liz George, Sherelle Howitt. Front: Chelsie Bradshaw, Tania Paranihi, Davida Russell*

## Formal recognition of SHR introductory training

From September 2007, the accredited introductory training course for safety and health representatives was aligned with study units from the *Certificate III in Occupational Health and Safety*. This gives safety and health representatives an opportunity to attain formal qualifications in recognition of the vital role they play in creating a positive workplace safety culture.

Note that formal assessment is not compulsory for safety and health representatives and it is entirely up to the individual representative if he or she wants to seek formal recognition.

Representatives who have already completed the course and wish to have their learning recognised should contact their course training provider for further information.

Representatives yet to complete the training should let the training provider know if they are seeking formal recognition — the provider can then ensure that the appropriate assessment is undertaken. In accordance with current practice, skills recognition may occur following further workplace-based experience as a safety and health representative.



Photo courtesy of BHPBIO

## FAQs on resolving safety and health issues

In an effort to improve the quality of information contained in complaints received by mines inspectors in Resources Safety, and better achieve a clear resolution, the information below provides guidance for people thinking about lodging a complaint regarding workplace safety or health.

The emphasis is still on resolving the issue in the workplace first, with formal complaints to Resources Safety considered only after this process has been attempted. This does not mean that Resources Safety will not respond to complaints — rather, the aim is to provide information about and improve the resolution process, and ensure that any complaint has sufficient details to allow timely and satisfactory resolution of the issue.

### Who should I complain to first?

Occupational safety and health legislation is designed to ensure there is an opportunity for issues to be resolved in the workplace. To assist the resolution of issues process, your employer has obligations to attempt to resolve issues when they are brought to their attention.

Additionally or alternatively, elected safety and health representatives can be involved in the resolution process. Other options include discussing the matter with the safety and health committee, mine manager or employer.

You should be clear as to what the issues are and where they are located. Listing them on paper will help to ensure that all issues are covered and will assist the person you are dealing with.

### What if this does not work?

Section 24 of the *Mines Safety and Inspection Act 1994 (MSIA)* provides for a person to enquire with Resources Safety about occupational safety and health conditions in their workplace.

So, where the above methods have failed, the option to contact Resources Safety may be used.

The mines inspector may ask you what actions have already been taken to have the matter resolved in the workplace before he or she takes the issue further. They may also advise on other ways to resolve the matter in the workplace.

### Will my name be divulged to my employer if I make a complaint?

An inspector has an obligation to inquire into complaints and to take such steps as he or she considers necessary to investigate the matter. However, the name of the person who complained will

not be disclosed.

This is not to say that you will remain anonymous within the workplace environment. Workplace gossip or known previous complaints made directly by you may lead others to make assumptions about the source of the complaint.

An employer is prohibited from discriminating against an employee because that person has made a complaint to them, a fellow employee, an inspector, a safety and health representative or a member of the safety and health committee. [see section 69(1)(d) of MSIA]

### What should I tell the inspector?

Resources Safety may be contacted by telephone or in writing. If you have a complaint and choose to telephone, you will be asked for a number of details, including if you have attempted to resolve the issue through your supervisor or manager or with an elected safety and health representative.

If you choose to write about issues in your workplace, some basic information needs to be provided to enable the matter to be handled in an appropriate and timely manner.

It is useful to provide:

- correct name of the mine operator;
- specific location;
- company name of your employer; and
- when the issue(s) occurred.

Sufficient information about the matter you are raising also needs to be provided to enable the inspector to establish that there is a problem and deal with it appropriately. If insufficient information is provided then the matter may not be able to be resolved to your satisfaction.

It is important to provide some contact details to enable the inspector to confirm the issues raised if required, seek clarification and, if needed, provide feedback on the actions taken. Such details would include your name and a contact phone number (an after hours number is often useful for off-shift contact times) or mailing address. This information is not disclosed to the employer.

### What can I complain to Resources Safety about?

Resources Safety deals with occupational safety and health matters of persons engaged in mining operations.

### What can I do if I or someone else has been bullied in the workplace?

Resources Safety has a code of practice on the prevention and management of violence, aggression and bullying at work, and a guideline on dealing with bullying at work.

There is also information about bullying and

violence in the mining FAQs section of the Resources Safety website.

### What should I do if I find a dangerous situation or occurrence?

After taking action to prevent further exposure to yourself or someone else, you must report the matter to your immediate supervisor or manager. Further information on this topic is available in the Resources Safety guideline on general duty of care in Western Australian mines. [also see section 11 of MSIA]

### Is there a policy or procedure for resolving safety and health issues at the mine?

There should be a site procedure available to assist in resolving occupational safety or health issues where they arise. For example, this could involve consulting with the safety and health representative, the safety and health committee and the employer. [see section 70 of MSIA]

Where attempts to resolve an issue in accordance with the resolution of issues procedure are unsuccessful and there is a risk of imminent and serious injury or harm to the health of any person:

- the manager of the mine;
- any employer or employee involved; or
- a safety and health representative

may notify the district inspector for the region in which the mine is situated of the unresolved issue. [see section 71 of MSIA]

### Do I have to continue to work where I believe there is a risk to my safety or health or someone else's?

If an employee believes that to continue to work would expose them or any other person to a risk of imminent and serious injury or harm to their health, they may refuse to continue work. [see section 72 of MSIA]

### What are some tips for making a complaint?

You can complain over the telephone or in writing. If you write, your letter or e-mail should briefly set out the details of your complaint, such as:

- exactly what you think the issue is;
- times and dates;
- locations of issues (i.e. site, area, plant);
- what has been done to date to resolve the matter;
- the names of people you have dealt with; and

include the outcome that would be acceptable to you.

You never know when mine emergency response training will be useful, as shown in this article submitted by Russell Austin, Operations Manager for Tiwest Chandala.

## Emergency response team to the rescue

Earlier this year, several members of the Tiwest Chandala emergency response team (ERT) were involved in a real life emergency close to the Tiwest processing plant on Brand Highway. Vicki Humphreys, Colin Black, Allan Sinclair and Glenn Phillips are part of the normal dry mill operating team and were in the middle of an extended planned shutdown when a call came from the volunteer fire service for assistance. Given their operating plant was shutdown, the ERT members were quickly given permission to attend a bush fire that had started on the side of the road just north of Muchea. Together with the Tiwest light tanker and pump truck, they attended the fire control centre at the Muchea fire shed and met with the control officer.

The team was directed straight to the front line of the blaze and commenced work. Shortly after, the team noticed a man from another tanker had collapsed on

the fire break, flanked on both sides by the fire. They immediately attended the injured person and carried him to the relative safety of a nearby embankment. Oxygen was administered from a breathing apparatus (BA) set and they monitored the man's vital signs. The men then transported him to a safer area and administered more oxygen, after which the patient recovered sufficiently well to communicate. An ambulance then arrived and transported him to hospital.

The Tiwest team immediately went back to fighting the fire, assisting other teams and in time brought the fire under control. After about four hours, the team returned to the processing plant satisfied they had completed a 'job well done'. Clearly, this incident shows that training pays off and the commitment of Tiwest employees extends beyond the boundaries of the plant and sometimes into the community.



Tiwest Chandala ERT members. From left to right: Glenn Phillips, Allan Sinclair, Vicki Humphreys and Colin Black.



Photos courtesy of Tiwest Chandala

The following information on certificates of competency has been provided by Martin Knee, State Mining Engineer and Chair of the Board of Examiners.

There are some simple rules for the way in which the experience requirements, under the Mines Safety and Inspection Regulations 1995, may be vouched for, so the Board may be assured that applicants for certificates of competency as First Class Mine Managers, Quarry Managers, Underground Supervisors and Restricted Quarry Managers meet the requirements.

### Duration of experience

Some candidates seem to be under the mistaken impression that the Board will accept that hours worked during long shifts may be aggregated into additional shifts and counted as additional experience — for example, that 10 x 12 hour shifts will be considered to be equivalent to 15 x 8 hour shifts. This is *not* the case.

Where the regulations require that the Board satisfies itself that, for example, an applicant has three months' experience in drilling or blasting, this means three months, irrespective of the length of the shift. Where experience is gained piecemeal over a longer period, the Board has determined that three months is equivalent to five shifts per week over thirteen weeks (65 shifts of whatever length). The intent of the regulations is quite clear and applicants who cannot clearly demonstrate that they meet the relevant practical experience requirements can expect to have their applications rejected or, at best, queried by the Board. This will result in delays or failure to gain certification.

Clearly, it is up to an applicant to ensure that the Board has adequate information on which to base a decision. It is not up to the Board to 'interpret' or re-calculate experience that may be stated in some other fashion. It is also apparent that some applicants may not



# Experience requirements for certificates of competency

fully meet the requirements stated in the regulations for personal, 'hands-on', practical experience. The Board is familiar with the type of application that says that individuals have worked 'in close association with' blasting operations or have 'assisted' with drilling operations, and similar terminology that can indicate that the applicant has not actually undertaken the relevant personal experience but is prepared to pretend that they have in the hope that the Board will grant a certificate anyway.

## Statutory declaration

What the applicant has to demonstrate to the satisfaction of the Board is that he or she meets the precise requirements set out in the regulations, and anything less is likely to result in rejection of an application. Applications are made under a statutory declaration under the *Evidence Act 1906* that asserts the truth of the information provided. Anything less than the truth may lay an applicant open to the serious charge of perjury!

## Documentary evidence

The Board prefers documentary evidence in support of practical experience to be in the form of clear and unequivocal statements indicating precisely what kind of experience is vouched for and its duration. These should be on company letterhead and signed by a person who is (or was) in a position to verify the experience at first hand (this would include an official company-generated record of service). Where such evidence is not reasonably available (for example, as a result of the lapse of considerable time or of company or

staff changes), the Board may accept a statutory declaration in default but, again, it is the responsibility of the applicant to provide information acceptable to the Board.

Many successful applications consist of only a few pages of support documents attached to the completed application form. It is not necessary to send large numbers of irrelevant documents such as certificates showing training that has been undertaken (except that a current First Aid certificate is required with every application). All that is required is sufficient material for the Board to reach a decision as to whether the requirements of the regulations have been met – a large volume of extraneous material may detract from the Board's ability to do this and will certainly extend the process.

## Timing of Board of Examiners meetings

The Board has also discussed the growing trend of requests that certificate of competency applications be assessed as a matter of urgency outside of the bi-annual Board Meetings. While the Board acknowledges that in certain circumstances urgent applications are warranted, there has been a significant increase in the number of such applications, some of which appear to be due simply to a lack of organisation on the part of applicants or employers.

Applicants are reminded that it is their own responsibility to make all efforts to provide the required information within the time specified in Board of Examiners correspondence as provided to them. It is not the Board's responsibility to make up for shortcomings in this

regard by extensive out-of-session correspondence and consultation.

## Preparation courses for examinations

Given the increase in queries regarding preparation courses for the certificate of competency examinations, the Mine Managers/Underground Supervisors Board also agreed that it would be useful to publish the contact details of the organisations running these courses, although this does not imply any endorsement of either the providers or the courses.

Currently, preparation courses are being run by the organisations listed below. For more information on the exam preparation courses, contact the organisations directly.

## Productivity Training and Consulting Services

**Contact:** Kim Sweet  
**Phone/fax/answering machine:** 08 9359 2606  
**Mobile:** 0408 955 163  
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## Examination content extended

Recent changes to the Mines Safety and Inspection Regulations 1995 enable the Board to examine candidates not only in the mining law of Western Australia as it is set out in the *Mines Safety and Inspection Act 1994* and regulations, but also the new *Dangerous Goods Safety Act 2004* and associated regulations made under it insofar as they apply to explosives.

# Safety performance of WA mines 2006-07



The recently released *Safety performance in the Western Australian mineral industry - accident and injury statistics 06-07* reveals an eight per cent increase in the average workforce on mines in Western Australia from the previous year.

There was an average workforce of 60,861 employees in 2006-07 who worked a total of 125.37 million hours. In 2001-02, there were 40,969 employees who worked a total of 84.80 million hours, so both the number of employees and hours worked have increased by 48 per cent over the past five years.

Statistics from Resources Safety's AXTAT database for 2006-07 show a slight but continuing improvement in the overall safety performance in the industry. The statistics cover injuries to all company and contractor employees who worked at mining operations — they exclude exploration activities apart from a fatality.

Four mining industry employees lost their lives during the year, one less than the previous year.

Fatal incidence rates by mineral mined over the five-year period from 2002-03 to 2006-07 show that

the underground fatal incidence rate is more than five times higher than surface operations. This is reflected in the gold, nickel and base metal sectors where most the State's underground mining occurs. In this five-year period, there were 19 fatalities (excluding exploration), with seven underground and 12 at surface operations. The most common type of underground fatal accident was rockfall, which resulted in two fatalities, while on the surface, vehicle or mobile equipment collision resulted in three fatalities, followed by rockfall with two fatalities.

The number of lost time injuries (LTIs) reported in recent years has become so small that the value of the lost time injury frequency rate (LTIFR) as an indicator of safety performance is questionable and recorded improvements in rate are more marginal. In 2006-07, the LTIFR for serious injuries fell to 2.8, but it has essentially plateaued.

Days lost through occupational injuries totalled 20,762 in 2006-07, comprising

- 9,405 days lost due to injuries occurring in that period;
- 1,077 days lost due to injuries recurring in that period that originally resulted from accidents in 2006-07 or earlier; and
- 10,280 days lost due to injuries from accidents that occurred before July 2006 and the person was still off work.

There were 460 initial LTIs over that period. In addition to the initial injuries, there were 44 recurrences of previous injuries, and 136 persons were still off work from injuries received before July 2006.

During 2006-07 there were 348 serious injuries reported in the mineral industry, one less than for

the previous reporting period. Of these, ten were in coal mines with the remainder in metalliferous mines.

From 2005-06 to 2006-07, the serious injury frequency rate decreased for both underground and surface metalliferous operations, and remained the same for the coal sector, resulting in a ten per cent improvement overall during 2006-07.

Injuries to legs accounted for 23% of serious injuries in underground mines, followed by back injuries (16%) and hand injuries (14%). Of the serious leg injuries, 77% were to knees and ankles.

The majority of serious injuries underground were in production and development areas (75%), followed by access and haulage ways at (18%) and areas not otherwise classified (4%). The most common accident type was over-exertion or strenuous movements (30%), followed by rockfall (14%) and struck by object (12%).

On the surface, the largest proportion of serious injuries was to legs (23%), then backs (22%), followed by hands (19%). Of the serious leg injuries, 76% were to knees and ankles.

The majority of serious injuries on the surface occurred in treatment plants (40%), followed by open pits (17%) and workshops (15%). The most common accident type was over-exertion or strenuous movements (33%), followed by slip or trip (11%) and stepping (10%).

Statistics for disabling injuries have been collected since 2002-02, with a view to establishing a more effective safety performance indicator. Allegations that LTIs are 'managed' to provide favourable accident reporting data have been

## Safety performances in mining

made by various parties over several years. However, disabling injuries are generally not amenable to this type of manipulation and are also more numerous than LTIs.

There were 705 disabling injuries recorded for 2006–07, a increase of 199 on the previous year, with the disabling injury incidence and frequency rates both deteriorating at 11.6 and 5.6, respectively.

Readers can access the full safety performance publication, as well as the accompanying poster and toolbox presentation, from the Resources Safety website at [www.docep.wa.gov](http://www.docep.wa.gov).

[au/resourcessafety](http://www.docep.wa.gov/au/resourcessafety) — go to the industry performance section under mining.

*The information presented in this statistical analysis is prepared by Resources Safety from data submitted by mining operations throughout Western Australia as required by section 76 of the Mines Safety and Inspection Act 1994.*

*Note that exploration injury data are not included. During the 12-month period covered, an average of 234 mines or groups of mines reported to the AXTAT system.*

## Fatal accidents

There were four fatal accidents in the WA mineral industry during 2006–07.

- An air-leg miner died in an underground nickel mine when he was caught in a rockfall while stripping the sidewall of a stope. A firing crew, preparing to fire the mid-shift blast, had noticed that his tag was still on the tag-board and when they investigated they found him lying near the stope sidewall stripping face between two rocks, weighing about 0.75 tonnes and 1.3 tonnes, that had fallen from an unsupported area of the roof overhead. The ground support in the stope, point-anchor rock-bolts, had not been extended to the area immediately above the point where he had been working.
- A transport truck driver died in a tyre unloading accident at an iron ore mine. He was helping to unload the third group of three haul-truck tyres from his truck, after two groups of three tyres had been successfully unloaded. It appears that he had already released the tie-down holding the tyres and had climbed onto the tray to retrieve the tie-down chains when the load moved, knocking him from the truck. One of the tyres then fell or slipped from the truck and crushed him, a second tyre fell and landed on the first, while the third tyre toppled onto the other two but was prevented from falling from the truck tray by the other tyres.
- A concrete truck driver suffered fatal injuries in an underground gold mine when he lost control of the concrete agitator truck he was driving down the main decline and the truck struck the decline sidewall.
- An exploration driller's assistant received fatal head injuries when he was struck by a sample hose and dust deflector box that had detached from the cyclone of a dust collection trailer under pressure while an attempt was being made to clear a blockage in the sample hose.

## Definitions used in the annual report

**Lost time injury** — work injury that results in an absence from work of at least one full day or shift any time after the day or shift on which the injury occurred.

**Serious injury** — lost time injury that results in the injured person being disabled for a period of two weeks or more.

**Days lost** — rostered days absent from work due to work injury.

**Incidence rate** — number of injuries per 1,000 employees for a 12-month period.

**Frequency rate** — number of injuries per million hours worked.

**Duration rate** — average number of work days lost per injury.

**Injury index** — number of work days lost per million hours worked (frequency rate x duration rate).

**Fatal incidence rate** — number of fatalities per 1,000 employees for a 12-month period.

**Fatal frequency rate** — number of fatalities per million hours worked.

**Serious incidence rate** — number of serious injuries per 1,000 employees for a 12-month period.

**Serious frequency rate** — number of serious injuries per million hours worked.

**Disabling injury** — work injury (not LTI) that results in injured person being unable to fully perform his or her ordinary occupation (regular job) any time after the day or shift on which the injury occurred, and where either alternative or light duties are performed.

**Days off** — total calendar days, whether rostered or not, absent from work or on alternative duties, restricted duties or restricted hours due to work injury.

# Review assesses Queensland safety statistics

In October 2007, an independent review of safety statistics in Queensland mines was released by the Queensland Minister for Mines and Energy Geoff Wilson. It contains some statistics, observations and recommendations that will no doubt interest *MineSafe* readers.

The review was commissioned following concerns raised with the Minister that the safety performances of some mines were not accurately reflected in a number of the statistics in the annual *Queensland Mines and Quarries Safety Performance and Health Report*.

*A Review of the Queensland Mines and Quarries Safety Performance and Health Report* was produced by Dr David Cliff, of the Minerals Industry Safety and Health Centre, and Professor Tony Parker, of the Institute for Health and Biomedical Innovation at Queensland University of Technology. The authors are occupational health and safety experts with many years' experience in the mining industry.

As outlined in the review's executive summary, the project specifically considered the:

- validity and accuracy of the accident and incident data currently included in the annual safety performance and health report;
- effectiveness of the report in communicating health and safety data across the Queensland mining industry;
- possible inclusion of other key performance indicators in relation to international best practice in this area; and
- need to provide a more proactive and preventative measures associated with health and safety performance.

A plan for consultation with industry was implemented to include a broad range of stakeholders including unions, management, regulatory authorities and others. This involved structured focus group discussions, individual

discussion and on-line submissions. The response from the mining companies was extremely limited, with only nine participants in the regional meetings. The project team then sought further input from industry through direct contact and industry association meetings.

The review is available from the Queensland Department of Mines and Energy website at [www.dme.qld.gov.au](http://www.dme.qld.gov.au)

Some of the conclusions are reproduced below.

### General

- Very few industries as a whole do any reporting of safety and health performance.
- Mining company safety and health reports are generally mainly narratives of initiatives and programs implemented to improve performance with some statistics.
- The effort put into compiling the annual report is not reflected in the attention industry currently pays to the document.
- There was strong support for the DME annual report and other reports to be used to assist in improving OHS performance rather than merely reporting statistics.

### Validity and accuracy of accident and incident data currently included in annual report

The current data reported in the annual report are inadequate because:

- Over 50 % of injuries that result in the worker not being able to carry out their normal work on their next shift are not collected in any detail. This is due to detailed reporting being limited to LTI [lost time injuries] and not including DI [disabling injuries] or RWI [restricted work injuries].
- A number of cases of permanent disability were reported to the review that had been identified at the mine

site as not LTI but either DI or MTI [medical treatment injuries] and as such not reported as LTI.

- Some industry personnel who fill out the DME forms are inadequately trained in understanding the definitions of the terms.
- A number of comments were made that some contractors and subcontractors were not reporting all the accidents and incidents that they were involved in. This was apparently sometimes due to safety targets being a condition of contract.

### Effectiveness of annual report in communicating health and safety data across Queensland mining industry

- The low number of respondents to the review may indicate that the Queensland mining industry does not place great reliance on the DME annual report to assist them in managing health and safety. The major companies particularly focus on internal incident reporting and analysis processes.

### Possible inclusion of other key performance indicators in relation to international best practice

- The report could include data on occupational hygiene exposure of workers to the various common hazards:
  - respirable dust
  - respirable silica
  - noise
  - diesel particulate matter
  - heat stress
  - chemicals such as cyanide or lead
  - ionising radiation.

### Need to provide more proactive and preventative measures associated with health and safety performance

- Many of the respondents asked for case studies and examples of best practice to assist them in managing health and safety.

# National statistics for industry fatalities

Have you ever wondered how the mining industry compares nationally in terms of safety to other hazardous industries such as construction and transportation?

The following information and statistics are provided in the *Statistical Report Notified Fatalities – July 2006 to June 2007* recently published by the Australian Safety and Compensation Council (ASCC, formerly NOHSC).

### Background information

Occupational health and safety (OHS) legislation in each Australian state and territory requires work-related deaths to be notified to the state or territory OHS authority.

The ASCC began compiling details of these notifications from each OHS authority on 1 July 2003. Notifications cover workers (both employees and self-employed) and bystanders who suffered a fatal injury at work or as the result of work activity. Fatalities that occurred while commuting to or from work and those resulting from suicide or natural causes (i.e. stroke or heart attack) are not included in this report.

The compilation of notifications at the national level is complicated by differences across jurisdictions in the definition of a work-related death and the coverage of some incidents. In particular, several jurisdictions do not include work-related deaths caused by vehicle accidents on public roads in their notification systems and, as is the case in Western Australia, these fatalities are instead notified to and investigated by the police.

Also, aircraft crash fatalities are not notified to all OHS jurisdictions and these fatalities are instead notified to the relevant transport authority.

### Statistics for 2006–07

Nationally, there were 162 notified work-related fatalities in 2006–07 – 146 were workers and 16 were bystanders.

For workers, the number of fatalities was 16% higher than in 2003–04 (126 fatalities), the first year of data collection. This was despite a 42% decrease over that period in fatalities at *Agriculture, forestry and fishing* workplaces.

Most fatalities were of men – 146 in total. There were 14 fatalities of women (including 3 bystanders) and gender was unknown for two other fatalities.

It is notable that nearly one-quarter (24%) of all notified fatalities of known age were of workers aged 55 years or older, although workers in this age group comprised 15% of employed Australians.

The occupation group 'Intermediate production and transport workers' contributed 31% of all notified work-related fatalities (50 fatalities). This group includes road transport drivers, operators of moving and stationary plant, and machine operators.

The report also shows the number of notified work-related fatalities during 2006–07 according to the industry of the workplace and the industry of the worker's employer. The industry of workplace identifies the primary work activity conducted at the site where the incident leading to the fatality occurred.

Five industries accounted for seven out of every ten notified work-related fatalities – 17% of fatalities occurred at a workplace primarily engaged in Construction (28 fatalities); 17% in *Agriculture, forestry and fishing* (27); 17% in *Transport and storage* (27); 11% in *Manufacturing* (18) and 9% in *Mining* (14).

The fatality incidence rate for workers (number of worker notified fatalities per 100,000 workers) by the industry of employment shows the highest rate occurred among workers employed in the *Mining* industry – 8.8 notified work-related fatalities per 100,000 workers.

Other high rates occurred among workers in *Transport and storage* (5.3 fatalities per 100,000 workers) and *Construction* (3.5 fatalities per 100,000 workers). All of these incidence rates were well above the national incidence rate of 1.4 notified work-related fatalities per 100,000 workers.

The most common causes of fatalities were *Vehicle accidents* (30 fatalities), *Being hit by moving objects* (29), *Being hit by falling objects* (29), *Falls from a height* (28), *Electrocution* (13), and *Being trapped by moving machinery* (11).

Among *Vehicle accidents*, 14 fatalities occurred on public roads and 16 occurred elsewhere, including four fatalities during air travel. Since work-related road traffic fatalities are not notified to some OHS jurisdictions, the counts presented in the report are likely to under-report their occurrence.

The full report is available from the ASCC's website at [www.ascc.gov.au](http://www.ascc.gov.au)

## Diary dates for 2008 Mines Safety Roadshow

14 October - Kalgoorlie

21 October - Karratha

Further details in next

16 October - Bunbury

24 October - Perth

issue of MineSafe

## Safety and health awards

The following article is based on media releases from the Chamber of Minerals & Energy Western Australia (CME). Further information on the awards, including other finalists, is available from the CME's website at [www.cmewa.com](http://www.cmewa.com)

# Innovations improve safety

A modification to drilling equipment, a new method for removing oil filter housings and a lifting jig for bearings have taken top honours in the 2008 Chamber of Minerals & Energy (CME) Safety and Health Innovation Awards.

Now in its fourth year, the CME Safety and Health Innovation Awards recognise creativity and ingenuity in the workplace, aiming to promote their application across the Western Australian minerals and resources industry.

Thirty-two submissions were received from across the State in the 2008 Innovation Awards, ranging from engineering enhancements to behavioural safety programs and safety tools.

The overall award winner was HWE Mining for its Burn Out Saver Sub (BOSS), a modification providing a positive coupling and a safe, low energy decoupling of drill string components.

Prompted by a near fatality, HWE Mining developed a safer way of removing a worn down saver sub from the spindle when drill rods are attached or removed. The insertion of a compression ring takes on the load from the tightening of the threads, and can be burned out

instantly to relieve the connection. The new approach avoids heavy lifting, working in a congested area and contending with excessive potential energy, hydraulic power and impact forces.

Alcoa World Alumina Australia received both the Highly Commended and Commended Awards for its modified Hydraulic Steering Filter Housing and the Bearing Lifting Jig.

According to CME Chief Executive, Mr Reg Howard-Smith, everyone who made award submissions should be congratulated.

'Through their participation in the CME Safety and Health Innovation Awards, individuals and work teams are demonstrating a proactive approach to making tasks safer,' he said.

'They are recognising potentially hazardous situations, and adopting strategies to minimise or eliminate the hazards.'

Mr Howard-Smith also said that the awards facilitated the sharing of good safety ideas throughout the resources sector.



BOSS — Burn Out Saver Sub



Kim Horne, CME Interim President, with Russell Dagnall, HWE Mining

Photos courtesy of CME

# CALL FOR ENTRIES

Entries for the Work Safety Awards WA 2008 are now being sought. The awards provide the opportunity for innovative Western Australians to gain state and national recognition for workplace safety achievements that reduce the risk of work-related injury and disease.

The award criteria have been agreed by all states in Australia. WorkSafe will automatically enter Western Australian winners into the National Safe Work Australia Awards administered by the National Department of Employment and Workplace Relations.

Entries close 5 pm, 11 July 2008. Go to [www.worksafe.wa.gov.au/wsawards](http://www.worksafe.wa.gov.au/wsawards) to download the criteria and conditions of entry or call (08) 9327 8657 for more information.

## Road safety on mine sites Part 5

As part of our *MineSafe* series on road safety within the mining industry, traffic engineering expert Damir Vagaja expands here on speed management, an important aspect of traffic safety that was touched on briefly in the road signage article in the previous issue.

Damir holds a BSc (Civil) degree, and is Mining and Resources Manager at ARRB Group ([www.arrb.com](http://www.arrb.com)).

au; formerly ARRB Transport Research), a public company whose members are federal, state and local government authorities in Australia and New Zealand. He is a member of Engineers Australia and the Australian Institute of Traffic Planning and Management, and worked in the Western Australian mining industry before moving into traffic engineering and safety.

# Speed management on mine sites

### Speed management in a broader context

Speed management should form part of the overall risk management approach that mining operations should have in place and actively promote. The aim of speed management is to minimise risks associated with driving at speeds that are inappropriate for the prevailing conditions.

This can be achieved by establishing appropriate and safe speed zones together with developing measures for ensuring compliance with speed limits on mining operations. It is important to create a traffic environment as similar as possible to conditions that drivers encounter on the public road network — it should be recognised that drivers have been trained and conditioned to follow the rules and regulations that apply on public roads. Consequently, drivers will best know how to behave and respond to traffic inputs if they are familiar.

Australian Standard AS 1742.4:1999 *Manual of uniform traffic control devices — speed controls* (the Standard) should be referenced when determining appropriate speed limits on mine sites. According to the Standard, some principles to consider are:

- speed limits shall be capable of being practically and equitably enforced by use of speed zones of adequate length, by limiting speed limit changes and by clarity and frequency of sign posting — in other words, not too many changes in speed limit over a short distance;
- the speed limit shall not be so low

that a significant number of drivers will ignore it;

- speed limits shall not be applied specifically for the purpose of compensating for isolated geometric deficiencies — in other words, build well-designed roads so that low speed limits do not have to be used to compensate for design faults (e.g. corners that are too tight); and
- all signposted speed limits shall be in multiples of 10 km/h.

Some other factors to consider when determining posted speed limits are listed below.

**Road function** — The function and purpose of a road will provide some guidance as to the likely speed limit that drivers would expect to see.

**Advisory speed signs** — In addition to set speed zones, advisory speed signs can also be used at specific locations on sealed roads to indicate to motorists that a reduced operating speed is more appropriate. Examples include curves, steep crests or where the road conditions ahead dictate the need to drive at a lower speed. Advisory speed signs are not mandatory and only provide advice to the motorist at that particular location. They cannot be used on unsealed roads because of the variation of the road surface, hence the speed environment cannot be guaranteed.

**Speed environment** — The speed environment is determined by the elements of the road and traffic environment that influence a driver's

perception of an appropriate operating speed.

**Road crash history** — The road crash history should be taken into account when assessing the appropriate speed limit.

### Speed management on unsealed roads

The Standard governs the determination and setting of posted speed limits on public roads. The road environment on mining operations is somewhat different. The main distinction is that a mine site is a controlled environment where the asset owner — in this case the mining principal — may assert its own controls, procedures and limitations over the traffic.

A good example is the issue of posting speed limits on unsealed roads. The Standard recommends that speed limits or advisory speed signs are not applied to unsealed roads because the characteristics of unsealed road surfaces change significantly with variations in weather conditions, through watering or due to effects of traffic. It cannot be guaranteed that a safe speed at certain conditions will be a safe speed if conditions change.

In practice, however, unsealed roads on mine sites are commonly provided with speed limits. This is deemed to be appropriate as mine management has the legislative responsibility to ensure that work areas, such as roads, are safe and this is achieved by:

- determining and controlling vehicular speeds; and

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## Road safety on mine sites Part 5

...from page 23

- maintaining the driving conditions as safe as possible (or, otherwise, preventing drivers from using unsafe roads)

on all roads, including unsealed roads.

It is, however, paramount that road users are continually advised that posted speed limits are the maximum speed for safe driving on sections of road in ideal circumstances (e.g. environmental, road surface, driver's physical conditions). Drivers should adjust their speed for the prevailing environment and *always drive to conditions*.

### Establishing speed zones

Set speed limits to provide a reasonable balance between an acceptable level of service and the driver's perception of the road environment. Speed limits should be logical, safe, practical, achievable and reflect the condition of the road infrastructure to which they apply.

By imposing a speed limit lower than what the road configuration allows, some drivers will disregard the posted speed limit and drive at a speed that they perceive as appropriate. This behaviour could then lead to a subconscious disregard for other safety messages or signs across the site.

Classic examples of unrealistic requirements are the 3, 5, 7, 8 km/h or similar speed limits established in some areas. Although the intention of lowering the speed in hazardous areas is commendable, from a practical perspective such measures do not always result in the intended outcomes. Speed limits below 10 km/h are:

- hard to comply with; and
- not measurable by vehicle speedometers.

Such impractical limits convey the wrong message to road users.

The number of different speed limits has the potential of confusing

drivers. It is important to minimise the number of speed limits within an area to three or four (e.g. 10, 20, 40, 60 km/h).

### Stopping distances

An important aspect of speed management is to consider stopping distances.

The stopping distance is the distance that a vehicle travels from the moment the external stimulus is within a drivers' field of vision to its complete stop — in a safe manner. It comprises the reaction distance (related to reaction time) and braking distance.

The reaction time depends on factors such as physical or psychological state of the drivers, available lighting and distractions. Research studies recommend 2.5 seconds as the typical reaction time, with 2 seconds being the absolute minimum.

The braking distance is determined by the vehicle type, operating speed, longitudinal friction factor and longitudinal grade of the road.

It is commonly understood that reducing speed has a positive effect on traffic safety. Sometimes, however, it is hard to estimate just how much influence it has in practical terms. To illustrate this, the accompanying table presents a series of stopping distances for cars and trucks at various operating speeds. The data show that by reducing the speed, the stopping distance is reduced significantly.

Even at what are perceived as low speeds, such as 60 km/h, the reduction in stopping distance between 60 km/h and 40 km/h for cars is 32 m, which can make a huge difference between a vehicle

being able to stop safely and being involved in a crash.

On the other hand, it is recognised that vehicle speeds play an important role in productivity and production results, especially for operations that depend on tight trucking cycles such as direct ore feed. For such situations, it is suggested that the safety aspects of various operating speeds be carefully considered together with implications for production.

Separating light vehicle movements from heavy vehicles will significantly reduce the risk of vehicles being involved in incidents and the speeds on the roads can be set accordingly.

The optimal speed limits should be developed by undertaking a robust risk assessment aimed at defining a balance between safety and operational requirements.

Outside areas directly involved in productivity cycles, such as light vehicle roads (both on site and on public roads), traffic safety should be given a much higher priority considering there should be no operational requirements for light vehicles to operate at unsafe speeds.

### Signing speed zones

Speed zones should be appropriately signed as described in the Standard.

Speed limit signs should be erected on the left side of the carriageway. Ideally, speed signs should be installed in pairs on both sides of the road when a change of speed zone is required and, normally, no other sign should be erected on any post carrying a speed limit sign. It is also suggested that speed signs used on mine sites should be Size A, which is the largest legal sign size in Western Australia (i.e. used on freeways).

Table showing stopping distances for cars and trucks at various operating speeds

	100 km/h	80 km/h	60 km/h	40 km/h
Cars	170 m	114 m [-33%]	71 m [-38%]	39 m [-45%]
Trucks	210 m	143 m [-32%]	91 m [-36%]	49 m [-46%]

**Note:** Data are from AP-G1/03: Rural road design – a guide to the geometric design of rural roads, published by Austroads in 2003, and are provided for illustrative purposes only. They do not account for variables such as different reaction times, road conditions, road gradient and vehicle types.



## Road safety on mine sites Part 5

On long stretches of road, repeater speed signs should be erected at regular intervals of 500 m or less if necessitated by prevailing conditions.

Speed zones maps are a useful tool to familiarise drivers with an operation's speed environment. They should be used for:

- driver training;
- advising drivers of any speed limit changes, such as temporary speed limits during road works; and
- re-installing signs that have been damaged and removed.

The maps should be updated whenever speed limits are changed.

### High pedestrian activity areas

Special consideration should be given to areas with high levels of interaction between pedestrians and various vehicle types, such as car parks, administration areas, workshops and processing plants. Implement a low speed limit environment to ensure the traffic risk at such locations is minimised.

The speed of 10 km/h is generally accepted as a safe speed for areas of high levels of interaction between vehicles and pedestrians. This speed limit is usually used in public 'shared zones' such as malls. Pedestrians hit by a vehicle travelling at this speed are less likely to suffer significant injury. The low speed also reduces the possibility of contact between the vehicle and pedestrians.

This speed can also promote walking as the preferred transportation mode and reduces reliance on vehicles for transportation needs — see September 2007 issue of *MineSafe* (volume 16, number 2).

### Compliance

A comprehensive speed management strategy is only partly achieved if there are no effective measures in place to ensure compliance with the requirements.

Site management can implement a number of measures to work

towards lowering the risks associated with speeding and unsafe driving behaviour, and encourage compliance with the applicable road rules. Such measures include procedures, engineering modifications and behavioural modification. The following list of possible measures is by no means exhaustive.

**Procedures** — establish realistic and simple speed zones that are easy to comply with.

**Enforcement and disciplinary actions** — should be used as a last resort measure to show management considers speeding to be an unnecessary risk-taking behaviour that will not be tolerated.

**Education** — regular activities undertaken to promote the importance of compliance with speed limits and the serious consequences associated with speeding.

**Engineering measures** — used to physically slow traffic (e.g. narrowing sections of roads,

installing speed humps, using in-vehicle speed monitoring systems).

**Compliance audits** — speed checks can be used to modify road users behaviour, either as random hand-held radar checks or by using portable speed radars with variable message signs to give feedback to drivers about their speed.

For its part, mine management should to ensure that:

- vehicles provided are fit for purpose;
- roads and road infrastructure are constructed and maintained in a safe condition;
- there are no unsafe or impractical speed limits in place;
- there are no work pressures that would require drivers to speed; and
- the road environment is forgiving to those who make genuine mistakes and lose control of their vehicles.



## Road safety on mine sites Part 5

# Monitoring driving on unsealed roads

Dampier Bunbury Pipeline (DBP) and WestNet Energy have developed a vehicle safety and speed monitoring system (VSSMS) to help improve driving behaviour on unsealed roads that had been identified as a key risk to safety performance.

A vehicle's VSSMS sends messages by satellite to a central unit where the location, date, time and speed data can be viewed on a computer in both table format and graphically superimposed on a Google Earth Pro map and satellite imagery.

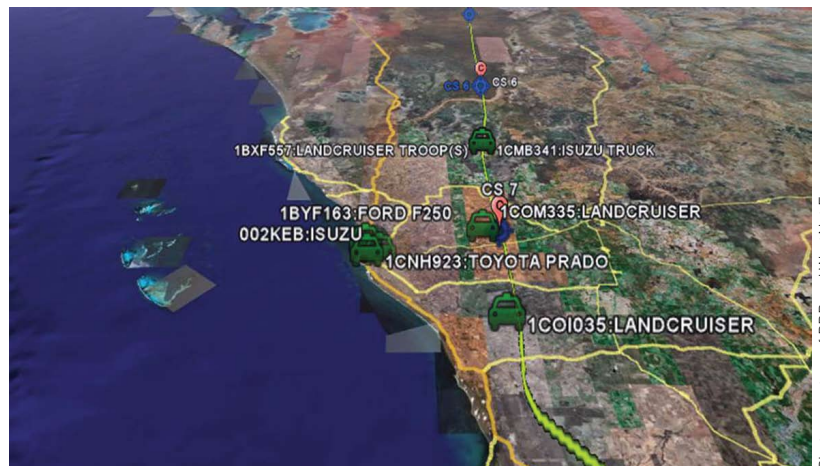
The VSSMS provides the driver with a panic alarm button should an emergency occur and is also used as a tool to modify behaviour, improving compliance with the project speed limits.

The system won the Industry Choice Award at the 2008 Chamber of Minerals & Energy Safety and Health Innovation Awards.



## VSSMS IN OPERATION FOR DAMPIER BUNBURY PIPELINE

<b>Company</b>	DBNGP O&M
<b>Operator</b>	Unknown
<b>Time</b>	4/03/2008 4:11:45 PM
<b>Velocity</b>	123.6 Kph
<b>Direction</b>	E
<b>Location</b>	
<b>Position</b>	-25.04821,115.19052
<b>Speeding Overview</b>	Mainline Easement max = 88 Kph Mainline Easement avg = 51 Kph Stage5 Access max = 99 Kph Stage5 Access avg = 91 Kph UnSealed Roads max = 97 Kph UnSealed Roads avg = 92 Kph



Photos courtesy of DBP and WestNet Energy

# Safety showers and eye washes

Resources Safety is regularly contacted regarding posters and other resource material on emergency safety showers and eye wash stations used to rinse contaminants from a user's eyes, face or body.

Although we do not have such material ourselves, the internet has a wealth of publicly available material that may be helpful for companies to either use directly or modify for their own purposes. Some of these are listed below.

*Note that some of the sites are American and therefore care should be taken with units of measurement. Be aware that some material is copyright and there may be restrictions on how it may be used or distributed. Also, inclusion of a company's website here does not constitute endorsement by Resources Safety.*

*A Western Australian perspective and advice are added for some topics.*

## Australian standards

In Australia, the following standards apply to the installation and operation of emergency eye wash and shower equipment:

- Australian Standard AS/NZS 2243.1:2005 *Safety in laboratories — Planning and operational aspects*
- Australian Standard AS/NZS 2982.1:1997 *Laboratory design and construction — General requirements*
- American National Standards Institute ANSI Z358.1:2004 *Emergency eye wash and shower equipment*

## General considerations

Guardian Equipment — ANSI Z358.1 Compliance checklist

[www.gesafety.com/download/images/ANSIGuide.pdf](http://www.gesafety.com/download/images/ANSIGuide.pdf)

A compliance checklist has been developed by Guardian Equipment, an American emergency eye wash and shower equipment manufacturer. Although the checklist is based on ANSI Z358.1:1998 (which doesn't define 'tepid'), it still has merit and covers:

- emergency response;
- location of emergency equipment;
- water temperature;
- disposal of water; and
- types of emergency showers and eye washes.

According to this manufacturer's website, the ANSI standard provides that emergency equipment be installed within 10 seconds walking time from the location of a hazard. The equipment must be installed on the same level as the hazard (i.e. accessing the equipment should not require going up or down stairs or ramps). The path of travel from the hazard to the equipment should be free of obstructions and as straight as possible.

However, there are certain circumstances where these guidelines may not be adequate. For example, where workers are handling particularly strong acids, caustic substances or other materials where the consequences of a spill can be very serious, emergency equipment should be installed immediately adjacent to the hazard.

## Physical requirements

University of Kentucky Occupational Health and Safety Department — Technical Standard and Performance Standard: Emergency Eyewash and Shower Equipment

[ehs.uky.edu/ohs/eyewash.html](http://ehs.uky.edu/ohs/eyewash.html)

This webpage features a technical and performance standard prepared by the Kentucky Occupational Health and Safety Administration. According to this document, '... where the eyes or body of any person may be exposed to injurious corrosive material, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for emergency use.' The webpage outlines the university's technical standards and preferences to provide safety equipment to meet the mandate.

Two of the University's physical requirements for emergency safety showers and eye washes are described below.

- Emergency safety showers are identified with a highly visible sign and a green cross located as an integral part of the floor directly under the shower.
- Safety showers installed in remote locations must be provided with an audible warning buzzer and visual alarm, which are different than those used for fire. The buzzer and visual alarm will be located above the door of the room with the shower. If feasible, an alternative alarm method connecting flow valves electronically to a 24 hours per day, seven days per week monitoring facility is preferred.

*Note: Safety showers and eye washes should be placed outside bunds so the casualty is removed from any chemical spill and not subject to further injury while being treated.*

*An alarm to indicate use of a shower or eye wash is recommended as the casualty may not be in a position to attract attention.*

## Temperature control

Occupational Health & Safety magazine online — Tempering emergency equipment water

[www.ohsonline.com/articles/47861/](http://www.ohsonline.com/articles/47861/)

The article written by Casey Hayes in May 2007 highlights the dangers of hypothermia if running untempered or cold flushing liquid through emergency safety equipment.

It is recommended that the water temperature of the flushing liquid be tepid. Based on ANSI's 2004 revision of the Z358.1 standard, it further clarified the definition of 'tepid' to be in the range of 60 degrees F (15.6°C) to below 100 degrees F (37.8°C). The temperature of the output flushing fluid must be within

Continued on page 28...

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that range immediately at the start-up of the equipment and remain there throughout the full 15-minute use cycle.

**Note:** In Western Australia, water that is too hot (rather than cold) is a more common problem, particularly in summer. In some northern mines, the water temperature in exposed pipes can reach 50°C. This issue is addressed by insulating pipes and storage tanks.

### Maintenance

Occupational Health & Safety magazine online — Keep an eye on the maintenance [www.ohsonline.com/articles/44893/](http://www.ohsonline.com/articles/44893/)

The article written by Heather Koehn in July 2005 features the importance of ongoing maintenance to emergency eye washes and shower equipment.

It is recommended that units are tested on a weekly basis to ensure they are in good working order and the flushing

liquid is readily available.

**Notes:** Regulation 7.12 of the Mines Safety and Inspection Regulations 1995 requires each responsible person at a mine to ensure that suitable sanitation and hygiene facilities are provided at the mine and that those facilities are properly maintained.

Routine testing and maintenance not only identifies any problems with the water pressure, but also flushes out any sediment build-up to ensure sufficient flow of clean water.



**Above:** Green light highlights location of emergency shower and eye wash near acid store

**Above right:** Regular maintenance is critical to ensure that the emergency equipment functions properly when required. The pressure in both these eye washes is insufficient to allow water to reach, let alone flush, a casualty's eyes.



## GOOD SIGNS

According to Australian Standard AS1319:1994 *Safety signs for the occupational environment*, 'emergency information signs shall comprise a white symbol or worded legend, or both, on a green rectangular sign with white enclosure. Where two or more signs are required at the one location, they may be placed on the one signboard, but each sign shall have its own white enclosure.'

The example shows a typical safety sign for an emergency shower.



# Lightning hazard reminder

An article in the last issue of *MineSafe* described a recent occurrence in which lightning caused serious consequences at a coal mine in New South Wales. The incident involved three tyres of a haul truck violently exploding just minutes after the parked-up vehicle was struck by lightning. Among the devastation was a complete wheel base (weighing 1.6 tonnes) that was propelled around 100 metres and other parts (weighing up to 250 kg) that were thrown several hundred metres. Although no injuries were sustained, the potential for more serious consequences was clearly obvious.

The incident above and the approach of winter provide a timely reminder that all mine employees need to fully understand their exposure to the risks posed by lightning and how best to safeguard themselves. Thunder storms can develop overhead or approach very quickly, and for employees to respond equally fast, responsible persons at mine sites must ensure employees have been instructed in accordance with a system of work that has been established for their protection.

Accidents continue to occur — each year about five to ten people are killed by lightning in Australia, and overseas the phenomenon has caused catastrophic loss of life in both the mining and petroleum industries. Here in Western Australia, although thunderstorm activity is certainly more prevalent in the Kimberley and Pilbara regions, it is notable that there have been fatalities in other parts of the State, including Kalgoorlie and the Perth metropolitan area.

While few people expect to survive a lightning strike, too many still believe that the likelihood of this occurring is extremely remote — 'it will not happen to me'. This is an unrealistic perception, and people need to remain aware of the factors that can greatly increase risk. Lightning will generally target the highest protrusion above the ground in the vicinity of the storm cloud — how a person avoids becoming a 'target' can be as rudimentary as avoiding high or otherwise exposed positions. Wherever possible, seek shelter in a substantial building. In built-up areas, the usual presence of objects such as buildings,

trees, overhead power-lines and street lighting poles normally affords a degree of protection that is in stark contrast to places where blast-hole drilling and waste dumping activities are carried out at an open-cut mine. The dumping activities are commonly on the highest terrain for kilometres.

What is most important is that employees know how to properly respond when a thunderstorm approaches, and this is a statutory duty of their employer.

## Further information

There is no shortage of information on the subject. Australian Standard AS/NZS 1768:2007 *Lightning protection* provides comprehensive technical information, and a quick search of the internet will find a host of useful websites, a few of which are listed below.

[www.lightningman.com.au](http://www.lightningman.com.au) — website has detailed section on lightning safety procedures with occupational health and safety focus applicable to mining operations, Western Australian company

[www.erico.com](http://www.erico.com) — website illustrates

some of the lightning protection products available

[www.gpats.com.au](http://www.gpats.com.au) — Australian supplier of real-time lightning data to the Commonwealth Bureau of Meteorology

[www.weather.com/ready/lightning](http://www.weather.com/ready/lightning) — a guide to lightning before and after the storm, US content

[www.lightningsafety.com](http://www.lightningsafety.com) — website of the National Lightning Safety Institute, based in Colorado

Mines safety bulletins on lightning hazards (No. 46) and managing the risks associated with lightning strikes (No. 60) are available from the Resources Safety's website in the mining guidance materials and publications section.

Details of the haul truck incident in New South Wales can be found in a safety alert (*Lightning Strikes Stationary Truck*) at [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

**REMEMBER** – if you can hear thunder, you are close enough to be struck by lightning!



Lightning strikes a Perth tower block

Photo courtesy of Erico Lightning Technologies

The Australian Centre for Geomechanics is a not-for-profit mining research centre based at The University of Western Australia. As outlined on its website, the Centre undertakes research, education and training activities in the geomechanics disciplines to provide industry with the necessary tools and knowledge to ensure that safety is not simply a top priority on par with productivity, but rather an ethic that guides everything.

The Centre recently released a training DVD covering best practice for tailings disposal, aimed at owners and operators of tailings storage facilities. The DVD is reviewed here by John Phillips, Senior Manager, GHD Pty Ltd, Perth.



## Tailings — from concept to closure

It is frustrating that, despite modern engineering, tailings storages continue to wreak havoc through failures or spillages. Very few of these incidents are due to poor design or highly complex technical difficulties. The majority had simple causes and were preventable — they should never have happened.

In a study of 221 such incidents, the International Congress on Large Dams (ICOLD) found that the majority were due to slope or foundation stability (33%) or poor water management (14%). Many stability problems were, in turn, influenced by lack of seepage control, which together with other seepage issues would make seepage one of the main issues in tailings storages. Earthquake damage occurred in 14% of cases but the statistics are influenced by multiple failures from a single earthquake in one country (ICOLD Bulletin 121, 2001).

What is being done to correct the mistakes and poor management?

Commonly, mine management regard tailings as an unwanted nuisance. Tailings operations are relegated to available staff that may not have been trained in the skills necessary to deal with the many engineering facets of tailings disposal. They confuse risk with consequence. They feel the risk is low, which generally it is, but the consequences are enormous. Failures or spillages in recent years have led to stopping of production, multimillion dollar clean-ups, some loss of life and major impact on company credibility and share value.

The Australian Centre for Geomechanics (ACG) has made a very significant contribution by preparing a DVD entitled *Tailings — From Concept to Closure*. This is a most timely tool for lifting the standards and training associated with tailings disposal. Scripted by Dr Andy Fourie of

ACG, the DVD was reviewed by seven leading exponents of tailings systems representing the major international and Australian mining companies.

This DVD represents not only the latest safe practices but is also pragmatic in its approach, showing real life situations. While the majority of examples are Australian and many are in dry climates, there are a number of examples of tailings disposal in wet climates. The principles and variety of situations described make this DVD suitable for many countries.

The DVD is an essential training tool for all mines or processing plants that have tailings storage facilities (TSF). Before describing the features of the DVD, it is worthwhile to define what it is not. It is not a substitute for a design manual, nor is it an operations manual. It is not a training tool for the designer, but it is very useful for new design staff or those staff working on one aspect of a design so that they can appreciate the interaction between the different aspects of tailings disposal.

The DVD is easily operated and is based on five 'titles' or sections as follows:

- TSF overview;
- TSF operations;
- water management;
- monitoring and response; and
- closure and rehabilitation.

Each title is broken into a series of chapters covering different topics. Although the DVD can be operated to play continuously — not recommended as it is one hour long and the comprehensive information would cause mental overload — each title or even individual chapters can be selected when wanting to focus on a particular aspect.

The TSF overview section is regarded as essential viewing for all staff involved in mine or plant operations. It should follow soon after the initial site and safety inductions. It is imperative that everyone on site has a feeling for the major damage that can be caused by tailings incidents, and as many eyes as possible are alert to early warning signs that action is required. This 11-minute section shows the consequence of some failures and emphasises that there were always some tell-tale signs before the failures. The broad concepts of tailings disposal are described and the importance of operations manuals, water management and monitoring are appropriately emphasised. Closure and rehabilitation are described as being an essential part of the original concept and design, rather than an afterthought at a time when funds are in short supply.

The second section on TSF operations is 12 minutes long and comprehensively outlines the nature of tailings, their transport and deposition techniques. Due emphasis is given to potential environmental impacts of the tailings themselves and the water associated with tailings disposal. Potential problems are described and factors influencing choice of deposition method and its impact on the behaviour of tailings after deposition are described. Diagrams illustrate the various points, with footage of a variety of tailings systems giving the viewer a clear understanding of how the principles are put into practice. The factors influencing the behaviour of tailings on the beach and their impact on the strength and other tailings properties are clearly covered with sufficient detail to allow the viewer to see the impact of various decisions. A number of examples of good practice will enable the viewer to see where improvements may be possible at their own facility.

The section on water management is the longest at 20 minutes, but this is appropriate given the significance of this topic and the fact that most tailings incidents have arisen from poor practice in this area. Vivid illustrations are given of relatively recent major failures at Stava, Merriespruit and Baia Mare, with pointers as to why they occurred and what measures might be taken to prevent future incidents. These dramatic pictures are mixed with views of very practical and well operated decant systems. This section is the most detailed and diagrams show the principles involved in water balance, the importance of controlling the decant pond position and the control of freeboard. Seepage behaviour and its potential to cause piping failure, stability failure or liquefaction is well illustrated. It is demonstrated that pond control is one of the factors in determining wall raising methods. The various wall construction methods are described along with schematics that cover the relevant issues. The important topic of monitoring is given

due prominence, an important factor that is not given adequate attention at many mines. This 11-minute long section describes routine inspections, the annual auditing process and provides checklists. Appropriate guidelines are described to help establish the inspection regime. This section highlights the critical relevance of an operations manual that is mentioned several times earlier in the DVD. The value of monitoring is diminished if observers do not know how to identify critical situations and the appropriate response. These topics are well covered, with an exhortation to have clear trigger levels for initiating a response and clear written instructions on what that response should be. Again there is a graphic warning of what can go wrong and why it is important to have clear and rapid responses.

The final section on closure and rehabilitation appears to carry less emphasis, being only 4 minutes long. It is not appropriate to outline all possible end land uses and methods of achieving the

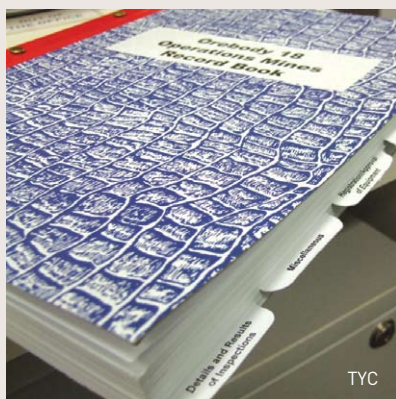
desired outcomes for different climates. The DVD wisely stays with broad principles only, but nevertheless hammers home the key message that closure must be considered at the concept stage for the TSF. It stresses the need to plan ahead and the benefits of progressive closure. Warnings are given about the significant cost implications and their effect on cash flow. It is fitting that the DVD closes with views of how a well managed TSF can be returned to aesthetic and stable land forms.

Overall, the DVD ranks as one of the most useful training tools in this field. Again it is stressed that TSFs have such potential for damage that all staff should at least see the overview section as part of their basic site induction.

For further information or to obtain a copy of *Tailings – From Concept to Closure*, visit [www.acg.uwa.edu.au](http://www.acg.uwa.edu.au) or contact the AGC:

**Phone** 08 6488 1864  
**Email** [acg@acg.uwa.edu.au](mailto:acg@acg.uwa.edu.au)

## Mine record book



Resources Safety is regularly contacted regarding the availability of pre-printed mine record books, and even more so since the publication of the article on this topic in the September 2007 issue of *MineSafe* (volume 16, number 2).

Briefly, the record book at an operating mine is to be kept with the registered manager at the mine site. For exploration operations not at an operating mine, the record book should be maintained at the principal office in Western Australia of the exploration manager. The

manager must ensure that the book is kept safely in good order and condition.

The article outlined the types of information that need to be recorded.

All entries should be made in ink, and dated and signed, with the name of the person making the entry clearly identified.

Although Resources Safety does not produce ready-to-go books, a number of mine sites have developed mine record books for internal use, and an inspector recently brought one to our attention as a good example.

Casey Munyard, Senior HSEC Coordinator at Newman Orebody 18, has developed a mine record book for internal use. The company's record book comprises numbered pages, with tabbed dividers and index pages covering the following sections:

- details of improvement, prohibition and provisional improvement notices;
- statutory appointments;
- occurrences;

- registration/approval of equipment;
- miscellaneous; and
- details and results of inspections.

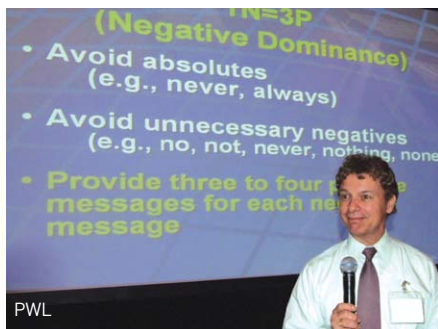
The page numbering follows on from the previous record book so there is continuity of record (e.g. pages in first book are numbered from 00001 to 00300, and in next book are 00301 to 00600 and so on).

Each index lists the page numbers in that section.



Risk communication is an important aspect of modern mining and was the subject of a presentation by New York-based risk specialist Dr Vincent Covello at the recent Chamber of Minerals and Energy of Western Australia (CME) Safety and Health Conference, entitled Driving a Safer Future. MineSafe's Peter W Lewis looks at some of the 'secrets' revealed by Dr Covello.

## Art of risk communication revealed



Dr Covello sharing his knowledge at the CME conference

For risk communication specialist Dr Vincent Covello, Director of the Centre for Risk Communication in New York, the way to respond to any high stress or emotionally charged question is to be brief and concise in your first response.

At the recent CME Safety and Health Conference, Dr Covello outlined his version of risk communication in an entertaining and lively session that provided a number of workable communication templates to

mining companies facing potential public relations tragedies.

In what he calls the '27/9/3 template' or the 'rule of three', any response to stress related questions should involve no more than 27 words, nine seconds and three messages. Apparently anything more than three messages gets lost — people simply cannot effectively take more than that in one go.

He also recommends the 'bookend' approach, where the most important items are provided first and last.

'When people are stressed or concerned, they want to know that you care before they care what you know. Stressed people have difficulty hearing, understanding and remembering information and focus on what they hear first and last,' Dr Covello said.

'In high stress situations, people focus more on the negative rather than the positive. It is a shift the brain does to handle high stress situations.'

He describes risk communication as the exchange of information about risks that aims to build trust and credibility, enhance knowledge and understanding, and encourage appropriate behaviours and levels of concern.

One of the core concepts in risk communication includes the so-called CCO template, where the message is delivered with compassion, conviction and optimism.

According to Covello, risk or strategic communication is a science-based discipline in which the rules of communication change in areas of high concern. His suggestions for communication success are anticipation, preparation and practice with the aim of enhancing knowledge and understanding, encouraging levels of concern and building trust and credibility.

This, he says, can be achieved using the 'triple T model', where three key messages are presented and repeated three times

### Covello's seven cardinal rules for effective risk communication

**1. Accept and involve the receiver of risk information as a legitimate partner.**

People have the right to participate in decisions that affect their lives.

**2. Plan and tailor risk communication strategies.**

Different goals, audiences and communication channels require different risk communication strategies.

**3. Listen to your audience.**

People are usually more concerned about psychological factors such as trust, credibility, control, voluntariness, dread,

familiarity, uncertainty, ethics, responsiveness, fairness, caring and compassion, than about the technical details of a risk.

To identify real concerns, a risk communicator must be willing to listen carefully to and understand the audience.

**4. Be honest, frank and open.** Trust and credibility are among the most valuable assets of a risk communicator.

**5. Coordinate and collaborate with other credible sources.**

Communications about risks are enhanced when accompanied by referrals to credible, neutral sources of information. Few

things hurt credibility more than conflicts and disagreements among information sources.

**6. Plan for media influence.** The media plays a major role in transmitting risk information. It is critical to know what messages the media delivers and how to deliver risk messages through the media.

**7. Speak clearly and with compassion.** Technical language and jargon are major barriers to effective risk communication. Abstract and unfeeling language often offends people. Acknowledging emotions, such as fear, anger and helplessness, are typically far more effective.



with three supporting facts or three credible sources for each key message, using about nine words for each.

Covello says that perception equals reality and that which is perceived as real is real in its consequences.

'Facts about threats (risks) typically play little role in determining perceptions of threats. In high concern situations, the gap between risk perceptions and reality often becomes wider,' he said.

Another important factor is promoting positives because when people are stressed and upset, they typically focus more on the negative than on the positive. One negative message is equal to three positive messages, so it is important to balance the mix and avoid absolutes such as never and always and unnecessary negatives like no, not, never, nothing or none.

'When something you value is being threatened by the action of others it causes psychological changes,' he said.

'In a situation like a mining fatality, you cannot guarantee no more deaths so you must focus on what you can guarantee like 'I can guarantee safety is our number

one priority'.

'If you have to share a negative, such as a fatality, it is recommended to balance it with more positives, like fortunately the rescue team arrived immediately, we are fully investigating the incident to avoid repetition, we will offer all the assistance we can to family and colleagues, and other people involved are expected to fully recover.'

He warns never to use humour in high stress situations with stakeholders, especially affected individuals, the injured or family, but apparently a joke between colleagues is acceptable.

'In crisis situations, humour can easily be perceived as not caring.'

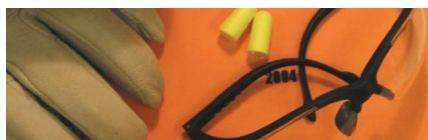
#### Further information

Covello, V.T., 2005, *Risk communication*, in Environmental health: from local to global: Jossey Bass/John Wiley and Sons, New York.

Hyer, R.N., and Covello, V.T., 2007, *Effective media communication during public health emergencies – a WHO field guide*: World Health Organization, Geneva, 55 pp

## More communication tips from Dr Covello

- Never say never.
- Never say always.
- Avoid unnecessary negatives, e.g. no, not, never, nothing, none.
- When asked a question with high emotion, use compassion, conviction and optimism.
- When answering negative questions, repeat or paraphrase the question without repeating the negative; repeat instead the opposite, the underlying value or concern, or use more neutral language.
- Provide information at four or more grade levels below the average grade level of the audience.



# Significant incident reports and safety bulletins

## Mines Safety

### Significant Incident Report No. 146

The following significant incident report was originally published in the December 2007 issue of MineSafe (volume 16, number 3) but an extraneous line of text was included. The amended report (corrected 5 February 2008) is reproduced here.

## Hazard posed by cyclone draw in RC drilling

### Incident

A reverse circulation (RC) drill rig was drilling a grid of 40 to 50 metre deep holes at an exploration site in Western Australia. The holes penetrated the groundwater table.

In dry ground, the sample splitter beneath the cyclone was used to collect a representative sample fraction. During this process, the large plastic sample bag had been sucked up inside the base of the splitter by the dust suppression fans on a number of occasions. When this occurred, the offsider instinctively reached up inside the splitter and pulled the sample bag out.

When wet ground was encountered, or when water was injected into the drill string, the sample cuttings tended to block the splitter. This led to the splitter being removed from the base of the cyclone and the large plastic sample bag being held over the mouth of a short adaptor cone beneath the cyclone draw.

The cyclone draw is a sliding steel plate

that controls the discharge of the sample cuttings from the cyclone.

While drilling was in progress, with the splitter off, the plastic sample bag was again sucked up, this time inside the cone and into the draw. The offsider did what he had done before — reached up, this time inside the cone, to pull the sample bag out.

At the same moment, the driller, while looking at the controls, closed the draw. The sliding steel plate of the draw trapped three fingers of the offsider's right hand. On opening the draw, it was found that the three fingers had been amputated.

Continued on page 34...



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### Cause

The sliding draw, beneath the cyclone, is a potential pinch point. With the sample splitter in place, this potential pinch point cannot be accessed.

With the splitter off, the length of the cone beneath the cyclone was such that it was possible for a person to reach up inside the cone and place their hand in a potential pinch point — the path traversed by the sliding steel plate of the draw.

Thus, when the splitter was not in use it was possible to access this potential pinch point.

### Comments and preventative action

Exploration companies and drilling companies must review their RC drilling procedures to ensure that employees engaged in RC drilling operations are not exposed to the particular hazard posed by a sliding draw beneath the sample cyclone.

The two main reasons for error are that as creatures of habit we do what worked last time and we skip steps when we are in a hurry (Flight Safety Australia, Nov-Dec 2003, p. 38-41).

This needs to be recognised by employers and employees alike. Where there are slight changes in work procedures — in this situation, with and without the splitter installed — the exposure of employees to hazards can change dramatically. What may have been a safe system of work with the splitter installed was not when the splitter was removed.

With the splitter removed, the offsider did what worked last time, when the sample bag got sucked up, the offsider instinctively reached up this time inside the cone to retrieve the bag, with disastrous results.

The control measure adopted was to engineer out the hazard by:

- making it much more difficult to access the potential pinch point; and

- adding hydraulic interlocks to prevent operation of the draw under certain conditions

The original adaptor cone is shown in photograph 1.

A new cone was fabricated that is much longer than the original cone, as shown in photograph 2.

In addition, two hydraulic interlocks were installed to prevent inadvertent operation of the draw.



Photo 1: Sample bag attached to original cone



Photo 2: New cone, which is much longer than the original cone

**Mines Safety  
Significant Incident Report No. 147  
Released 3 January 2008**

## Fire and entrapment hazard on mobile plant (salt harvester)

### Incident

During salt harvesting operations, unknown to the operator, a fire occurred within the machinery of the salt harvester. The fire was brought to the attention of the operator by a grader driver working in the vicinity.

While attempting to escape from the harvester, the operator was unable to exit by the cabin door due to the heat from the flames. In the absence of a second egress, the operator was forced to break the front windscreen of the cabin, exit the machine via the front access platform and use the cross travel conveyor to jump across onto a full salt trailer, which was moved into position to allow this.

The operator received a laceration to the right lower leg from the broken windscreen and was extremely lucky not to be trapped.

The harvester was a modified, experimental machine being developed by the company. There was no fire suppression equipment installed on the harvester at the time of the incident.



### Contributing factors

The following were identified as likely contributors to the incident:

- Hydraulic components located in close proximity to ignition sources without shielding or design separation.
- The harvester was an experimental



machine, modified with elements designed on site by the operating company.

- The original fire suppression system was not redesigned and refitted to the machine after modification.
- The cabin of the harvester was situated directly above the engine. The location of the cabin above the engine prevented the operator from identifying the presence of the fire before it became well established.
- The harvester was equipped with two means of egress that were both rendered inaccessible during the fire, due to the location of the stairs proximal to the engine compartment.
- A lack of emergency training for operators of the harvester was identified.

### Recommendations

Section 14 of the Mines Safety and Inspection Act 1994 places a duty on persons who design and manufacture plant for use at a mine to ensure that persons who use or maintain the plant are not exposed to hazards. Under the Part 6 regulations, the principal employer and every other employer at the mine must ensure that all risks and hazards associated with plant are identified and controlled.

- Mobile plant hydraulic components should be shielded from ignition sources.
- Consideration should be given to the use of double braided or sleeved hydraulic hoses to reduce the likelihood of hose failures and, consequently, oil sprays coming into contact with hot parts.
- Fuel and oil tanks should be appropriately located with respect to the operator's cabin.
- All large mobile plant with high temperature duty cycles should be fitted with a suitable fixed fire suppression system — such as aqueous film-forming foam (AFFF) or film-forming fluoro-protein (FFFP) systems — with adequate spray coverage to reach all potential fire sources. Where fires within the machinery are not easily identified

by the operator, an automatic self-activating system should be considered.

- Appropriate gauges and/or audible or visual alarms should be fitted to notify the operator of fire in the engine compartment.
- All fixed and mobile plant must be equipped with a safe means of access and egress for both normal and emergency conditions. The means of egress provided for an emergency should be located in and routed through areas a safe distance away from potential fire hazards.
- Mobile plant cabins need to be provided with an adequate means of exit maintained in an operable condition at all times. This may require more than one means of egress for emergency use.
- Cabin windows that might be used as a means of egress in case of emergency should preferably be of the removable type or, if it is contemplated that the window would be broken to provide egress, be glazed with glass that breaks into small pieces and can be removed without any danger of jagged edges.
- An adequate emergency response plan with the appropriate backup capability including fire and rescue equipment and trained personnel must be provided at all mines.
- Operators need to be trained in the safe emergency egress procedures for mobile plant prior to operating the equipment.

**Mines Safety**  
**Significant Incident Report No. 148**  
**Released 3 January 2008**

## Tropical Cyclone George

On 2 April 2007 a joint Safety Bulletin on cyclones was issued by Resources Safety and WorkSafe. Following the WorkSafe investigation of fatalities at a construction rail camp, further information has been made public in

relation to Cyclone George.

### Incident

Severe Tropical Cyclone (TC) George crossed the Western Australian coast near Port Hedland at about 10 pm on Thursday 8 March 2007, causing extensive damage to areas in the north of the State. It was the most destructive cyclone to affect Port Hedland since TC Joan in 1975.

The eye passed over a rail construction accommodation camp, situated about 90 kilometres from the coast, while the cyclone was at Category 3 intensity.

Forecasts issued by the Bureau of Meteorology two days prior to impact indicated the cyclone was likely to pass to the west. However, in the 24 hours prior to the cyclone's passage over the camp, the forecasts indicated that the site was at risk of a direct impact from a severe tropical cyclone (Category 3, 4 or 5).

Evacuation of the camp was not considered based on the belief that the cyclone would not pass through the camp. The camp was prepared for the expected weather and all workers returned to the camp to be housed in their normal accommodation.

The rail camp/village was a temporary camp of transportable units (dongas) built to accommodate a 280 strong construction workforce for the duration of the construction phase of the project.

The winds associated with TC George displaced some accommodation units, which impacted with adjacent units when they broke away from their tie-downs. Some units broke into pieces and those pieces caused further damage to other dongas. At the time there were about 230 workers at the camp. The cyclone resulted in two fatalities and 22 notified injuries at the camp.

### Causes

- The cyclone was expected to impact the coast and adjacent inland areas as a Severe Tropical Cyclone

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(Category 3, 4 or 5).

- Forecasts evolved with time to indicate a risk at the camp.
- The cyclone passed through the camp.
- The camp was not evacuated.
- There were no cyclone shelters.
- Workers were directed to stay in their normal accommodation.
- Some dongas broke loose from their tie-downs.
- Extensive damage was caused by loose building material.

### Recommendations

#### Cyclone preparedness

Irrespective of the distance from the coastline, cyclones do penetrate from the coastal areas into the inland regions of the State, as evidenced by the history of cyclones in the North-West of Western Australia on the Bureau of Meteorology website.

Employers under the *Mines Safety and Inspection Act 1994* are advised to err on the side of caution in relation to the design and construction of buildings and other structures, and in the development of emergency plans and procedures in cyclone prone regions. Given the limited predictability of cyclones in terms of track and intensity, forecasts must be continuously monitored until the threat has completely passed. Remember that cyclones can and do 'backtrack'.

#### Building standards

The Australian/New Zealand Standard AS/NZS 1170.2:2002 *Structural design actions – Wind actions* sets out the wind speeds to be used for design purposes. AS/NZ 1170.2:2002 divides Australia into wind regions (three regions for most of Australia and four regions along the Western Australian North West coastline) as follows:

**Region A4** from a distance greater than 150 km from a smoothed coastline;

**Region B** within the distance of 100 to 150 km from a smoothed coastline;

**Region C** within the distance of 50 to 100 km from a smoothed coastline;

**Region D** within the distance of 0 to 50 km from a smoothed coastline.

Employers should seek engineering advice on the construction standards applicable to each wind region to ensure each accommodation unit or donga, transportable building and cyclone shelter on mine sites and camps in cyclone sensitive regions is adequately designed and constructed in accordance with the *Design Guidelines for Australian Public Cyclone Shelters*, published by Queensland Public Works for Emergency Management Australia, and Australian/New Zealand Standard AS/NZS 1170.2:2002.

Companies are reminded to seek advice and the relevant approvals from local Shires prior to constructing buildings on their site.

#### Emergency plans and procedures

In accordance with Regulation 4.30 of the Mines Safety and Inspection Regulations 1995, employers must develop emergency plans and procedures. In the case of emergencies arising from cyclonic weather conditions, this should be done in conjunction with advice from the Fire and Emergency Services Authority of Western Australia (FESA) and other regional emergency planning groups where sites are located.

It is a requirement that all personnel are trained and inducted in these procedures, and practical tests of the plans and procedures are carried out at appropriate intervals.

Employers should consider the evacuation of staff and detailed procedures for making the site safe, including the removal or restraint of loose objects and structures in their emergency plan. In situations where an informed decision to remain on site is taken as part of the procedures, appropriate cyclone shelters should be utilised, emergency

provisions and supplies of food and water should be considered, and backup communications and power should be planned in advance. Evacuation of non-essential personnel from the worksite or camp to a predetermined suitable location should occur in the Blue and Yellow Alert Cyclone Warning phase, before high winds are experienced. Consideration of suitable evacuation locations should involve consultation with the destination Shire authorities and emergency services to ensure that adequate secure accommodation and facilities are available for evacuees. Care must be exercised to avoid over-stretching the facilities in the destination area or merely transferring the risk to another location.

When employees remain on site during a cyclone, they should be moved to designated, appropriately designed and constructed shelter well in advance of the arrival of the cyclone to avoid being injured during the transfer to shelters. The designated cyclone shelter should be equipped with essential items such as food, water, lighting and toilets.

Where employees are required to stay on site, adequate stocks of food and other essential items should be available during the period when the site may be cut off due to high winds or flooding.

During the Red Alert Cyclone Warning phase, when all power has to be isolated, or in the eventuality of damage or interruption to the power supply or telephone and other communication systems, an adequate means of reliable emergency backup communication should be available on site to make contact with external emergency services should assistance be required.

Each site should continuously monitor cyclone warnings issued on radio, television or via the internet connection to the Bureau of Meteorology or FESA websites. In the event of power interruptions on site, battery-powered radios should be available.

All employers in cyclone sensitive regions are requested to review their cyclone plans and procedures as a result of this significant incident report and the recommendations made above. Additional information covered in this significant



incident report on preparing for cyclones can be found on the websites listed below.

### Further information

- Bureau of Meteorology  
[www.bom.gov.au](http://www.bom.gov.au)
- Fire and Emergency Services Authority of Western Australia  
[www.fesa.wa.gov.au](http://www.fesa.wa.gov.au)
- Building Code of Australia  
[www.aib.org.au/buildingcodes/bca.htm](http://www.aib.org.au/buildingcodes/bca.htm)
- Design Guidelines for Australian Public Cyclone Shelters by Emergency Management Australia  
[www.ema.gov.au](http://www.ema.gov.au)  
(search for 'cyclone shelters')
- Australian and New Zealand Standards  
[www.saiglobal.com](http://www.saiglobal.com)  
(search for AS/NZS 1170.2:2002)

Further safety information can be obtained from the Resources Safety website at [www.docep.wa.gov.au/resourcessafety](http://www.docep.wa.gov.au/resourcessafety)

### Mines Safety Significant Incident Report No. 149 Released 10 April 2008

## Loader falling into an open stope

### Incident

While backfilling of an open stope was in progress, a loader fell from the top level of the stope to the bottom level, about 15 metres below. The loader landed upside down and the operator was fatally injured. The operator remained in the cabin during the accident and received head and other injuries.

He had started backfilling this particular stope earlier that shift. No backfilling had been done at the stope previously. At the time of the accident a small amount of backfill had been tipped into the stope void.

It appears that the accident occurred as the operator was tipping the third load into the stope.

### Immediate causes and contributing factors

- Due to the size of the loader and size of the excavations, forward visibility was limited. This is not unusual and is associated with many such loading operations
- There were no warning devices such as paint marks or delineators placed at the edge of the stope on the top level that would have indicated to the operator that the loader was approaching the edge.
- There was no safety bund or stop installed at the edge of the stope on the top level at the time of the accident.
- As the accident was early in the shift, the supervisor had not yet inspected this working area by the time the accident occurred.

### Comments and preventative action

- A complete risk assessment of backfilling operations should be completed before the start of any such operations.
- Following the completion of the risk assessment, a safe working procedure must be developed to include measures to ensure employees or vehicles are not exposed to falling or driving over the edge of a stope.
- Measures such as safety bunds, stops and delineators should be put in place to prevent vehicles and employees from falling into the void.
- Employees must be trained in the safe working procedures, and regular audits and inspections must be carried out to ensure full compliance with the procedures.

### Mines Safety Bulletin No. 81 Released 4 January 2008

## Unattended vehicles rolling away

### Incidents

In recent months there have been a number of incidents involving unattended

vehicles rolling away down slopes at mine sites in Western Australia. These include:

- A supervisor parked in a designated light vehicle parking area and alighted from the vehicle without engaging the hand brake or placing the vehicle in gear. Before alighting from the vehicle, the supervisor had been distracted by calls on the mobile and two-way radio. A short time later the unattended vehicle rolled about 25 metres, from one side of the car park to the other, mounted a half metre high earth bund and crashed into the wall of a transportable office, causing significant damage to one end of the office. There were no injuries.
- An operator was loading the rear trailer of a road train and, while returning with the third bucket, noticed the truck and trailer rolling downhill. The operator placed the bucket of material between the front and rear trailer but this failed to stop the truck. The truck came to rest with the prime mover and front trailer in a creek about 120 metres from the loading area. On inspection after the incident, the truck park brake was disengaged. The slope on which the truck was parked was very slight and barely noticeable.



- While working on an overland conveyor, an operator's vehicle rolled down a steep access road. The operator chased and attempted to halt the vehicle by getting in through the driver's door. The vehicle left the road, climbed an embankment and tilted over, partially trapping the operator in the door area. The vehicle was extensively damaged

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and the operator suffered bruising and lacerations.

- An operator had just finished tipping the lead and dog trailers into a hopper and had pulled the truck and trailer forward to clean the wheels and rear of the dog trailer. The operator thought the maxi-brakes were on and neglected to engage the handbrake. As he walked alongside the truck it started rolling forward off the ramp. The truck went down the ramp and crashed through an Armco barrier at the base of the hill, continued through a garden bed and across a road. The operator had run after the truck and, after it had crossed the road, decided to enter the truck and apply the foot brake. He successfully stopped the truck centimetres from an upright metal beam on the side of a large shed.



Also, at a mine in Queensland, an unattended partly loaded explosives truck was parked with its engine running. The operator had applied the park brake before disembarking and was walking away from the truck when he noticed it moving. While the truck was rolling away he climbed back into the cab and stopped the truck by applying the foot brake. The truck had travelled about 20 metres and ended up with the front wheels suspended over a 2.5 metre drop off.

This issue has previously been highlighted in the December 1999 edition of *MineSafe*, which outlined eleven cases of plant and vehicles rolling away when unattended. In one instance, an operator was injured when struck by the door of the vehicle in an attempt to jump into the vehicle while it was rolling backwards down a ramp.

Of primary concern is the attempt by some operators to pursue and enter the cabs of their runaway vehicles to try and stop the vehicles. This practice may result in serious injury or death.

### Causes

- Failure to apply or correctly apply the park brake, which may be caused by distractions such as phones or by complacency, fatigue, tiredness, inattention, forgetting, hurrying and a lack of knowledge of the potential hazard.
- Poor parking area design with no engineering controls to prevent the vehicles rolling away.
- A faulty park brake, which may cause inadequate braking.
- Incorrectly adjusted park brake due to poor maintenance.
- Failure to use wheel chocks.
- The steepness of the slope on which the vehicle is parked and the weight of the vehicle plus factors such as attachments, tools and equipment.
- Failure to recognise and assess the hazards associated with parking on slopes.
- Failure to comply with parking procedures and rules.
- Failure to identify more effective controls than reliance on procedures and behavioral measures.
- Failure to detect and correct unsafe parking behaviour.

### Recommendations

Section 9 of the *Mines Safety and Inspection Act 1994* prescribes that the employer at a mine must provide and maintain workplaces, plant and systems of work such that employees are not exposed to hazards. The following points indicate what a safe system of work may include to prevent injury from unattended vehicles rolling away:

- Develop suitable and designated parking areas for trucks, vehicles and mobile plant. Ensure these are on flat level ground. Install suitable parking

ditches or parking berms. Operators should then shift the machine to neutral, release all brakes to test if the machine is stable and not moving (suitably located in the ditch or against the berm), lower any implements and then apply the parking brake.

- Fit-for-purpose barriers should be installed to prevent uncontrolled vehicles and plant going over embankments or into buildings, workshops and other areas where people may be located. Small windrows and bunds may not be appropriate for certain types of vehicles as, depending on the angle of approach, they are easily traversed, even on gentle slopes.
- If parking in a non-designated area, select ground as level as possible, park across the slope with the steering wheels positioned to use gravity to prevent the vehicle from rolling away, lower any implements, fully apply the park brake and use appropriate wheel chocks.
- Develop parking procedures and protocols after conducting risk assessments, determining the steepness of the ground, consulting the vehicle manufacturer's instructions and current practice in industry. Monitor compliance with procedures.
- Ensure employees are educated on the parking procedures and the importance of fully applying the hand brake when parking.
- Investigate and implement systems such as warning alarms to alert the operator that the park brake has not been engaged when the vehicle door has been opened, or systems that automatically engage the park brake when sensors in the seat detect no pressure and doors have been opened or the engine is turned off.
- All braking systems should comply with the relevant Vehicle Standards (Australian Design Rules), Australian Standards (AS), and Society of Automotive Engineering (SAE) and International Standards Organization (ISO) standards.
- For earthmoving machinery, the park brake should be capable of



holding the machine stationary on a 15% grade, as prescribed in Australian Standard AS 2958.1:1995 *Earth-moving machinery — Safety — Wheeled machines — Brakes*, with the machine at maximum gross machine mass including all accessories and capacities according to the manufacturer's specifications. When applied, the parking brake should maintain parking performance despite any contractions of the brake parts, exhaustion of energy or leakage of any kind.

- There should be systematic testing of brakes for all trucks, vehicles and mobile plant that takes into account the type and duty of the plant, the loads carried and the slopes likely to be traversed and parked on.
- The maintenance regime at the workplace should allow for inspection, testing and repair of brakes as per the manufacturer's specifications. A brake test should be performed and recorded immediately after any repairs or adjustments to the braking system of all trucks, vehicles and mobile plant.

**Mines Safety Bulletin No. 82**  
Released 14 January 2008

## Emergency Management Act 2005

### Purpose

This safety bulletin is issued to provide general advice regarding the *Emergency Management Act 2005* (the EM Act).

The key objectives of the EM Act are to:

- establish overarching emergency management arrangements for Western Australia's emergency services, including local governments and support organisations — this will establish a framework for managing emergencies of a large scale or catastrophic nature requiring a significant and coordinated response;
- provide necessary legislative powers and protection; and
- improve protection for volunteers.

### Overview of the EM Act

The EM Act establishes a planning infrastructure based upon previously existing arrangements, including:

- The State Emergency Management Committee (SEMC) — responsible for planning and preparing for an efficient emergency management capability for the State. The EM Act requires SEMC to establish policies and plans.
- District Emergency Management Committees — established for each emergency management district to assist in the establishment and maintenance of effective emergency management arrangements for its district.
- Local Emergency Management Committees — established by the respective local government to advise and assist the local government in ensuring that local emergency management arrangements are established for its district.
- Hazard management agencies — responsible for developing and maintaining State emergency management plans for designated hazards.
- Combat agencies and support organisations, and the activity or function for which they are responsible.
- Local governments' responsibilities in relation to local, community-centred emergency management.

The EM Act also establishes an operations infrastructure, including:

- The State Emergency Coordinator (the Commissioner of Police) — responsible for coordinating the response to an emergency during a declared 'state of emergency', for chairing the State Emergency Coordination Group, and for providing advice to the Minister and the State Disaster Council.
- The State Emergency Coordination Group (SECG) — this is automatically established if a 'state of emergency' is declared, or may be formed at other times at the request of a Hazard Management Agency. The SECG is responsible for ensuring the

provision of a coordinated emergency management response across whole of government.

- The State Disaster Council (SDC) — this is automatically formed if a 'state of emergency' is declared. The SDC is chaired by the Premier, and includes relevant Ministers and the State Emergency Coordinator. Establishment of the SDC ensures that Government is involved in the management of a declared 'state of emergency', and has the opportunity (via the State Emergency Coordinator) to provide the Government's input to the State Emergency Coordination Group.

### Overview of key powers available

The EM Act provides for a graduated scale of emergencies, via the declaration of an 'emergency situation' (by the respective hazard management agency) or a 'state of emergency' (by the Minister). Different levels of powers are available during an 'emergency situation' or 'state of emergency'. Common to each are the powers to:

- evacuate persons;
- control or use property (e.g. as an evacuation centre);
- detain and decontaminate persons exposed to hazardous substances; and
- obtain and exchange information (e.g. to provide welfare services).

Local governments have additional powers in designated 'cyclone areas'.

Directions may be given to 'public authorities' in relation to the preparation, review or testing of State emergency management plans, and during a declared 'state of emergency'.

State Emergency Management Committee policies must be complied with.

### Regulations under the EM Act

- Prescribe hazard management agencies for hazards, plus combat agencies and support organisations.

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- Limit the circumstances, and regulate the manner, in which the powers under the EM Act may be exercised.
- Require emergency management agencies to provide insurance cover for volunteers for compensation for injury caused.

### General information about the EM Act

The EM Act came into operation on 24 December 2005. Since then, Western Australia's emergency management arrangements have been reviewed and there is now a wide selection of sources of information regarding the EM Act and emergency management in the State.

The EM Act 2005 can be obtained from the State Law Publisher website at: [www.slp.wa.gov.au/statutes/swans.nsf/PDF?openPage&Count=600&RestrictToCategory=E](http://www.slp.wa.gov.au/statutes/swans.nsf/PDF?openPage&Count=600&RestrictToCategory=E)

and the Emergency Management Regulations 2006 at: [www.slp.wa.gov.au/statutes/regs.nsf/PDF?openPage&Count=600&RestrictToCategory=E](http://www.slp.wa.gov.au/statutes/regs.nsf/PDF?openPage&Count=600&RestrictToCategory=E)

### State emergency management arrangements

Western Australia's emergency management arrangements are based on the provisions of the EM Act and are extended through a number of other documents. Documents forming the State's emergency management arrangements can be found on the Fire and Emergency Services Authority (FESA) website at [www.fesa.wa.gov.au/internet](http://www.fesa.wa.gov.au/internet) and following the menu items through 'State emergency management'.

Alternatively, links to the specific pages are listed below.

- State Emergency Management Policies  
[www.fesa.wa.gov.au/internet/default.aspx?MenuID=296](http://www.fesa.wa.gov.au/internet/default.aspx?MenuID=296)
- State Emergency Management Plans (WESTPLAN)

[www.fesa.wa.gov.au/internet/default.aspx?MenuID=297](http://www.fesa.wa.gov.au/internet/default.aspx?MenuID=297)

- Emergency Management Act tips  
[www.fesa.wa.gov.au/internet/default.aspx?MenuID=362](http://www.fesa.wa.gov.au/internet/default.aspx?MenuID=362)
- State Emergency Management Committee (SEMC), including minutes of meetings, annual report, strategic and annual business plans, and subcommittees  
[www.fesa.wa.gov.au/internet/default.aspx?MenuID=284](http://www.fesa.wa.gov.au/internet/default.aspx?MenuID=284)
- Training and development opportunities and information  
[www.fesa.wa.gov.au/internet/default.aspx?MenuID=285](http://www.fesa.wa.gov.au/internet/default.aspx?MenuID=285)
- Emergency risk mitigation information  
[www.fesa.wa.gov.au/internet/default.aspx?MenuID=288](http://www.fesa.wa.gov.au/internet/default.aspx?MenuID=288)

### Hazard management agencies

Section 4 of the EM Act provides for hazard management agencies (HMAs) to be prescribed by the regulations for emergency management, or an emergency management aspect (prevention, preparedness, response or recovery), of a hazard. The prescription as a HMA may be for the whole of the State, or an area of the State. Two of the most important HMAs are already established by regulations.

### Hazard management agency — Commissioner of Police

Regulation 16 of the Emergency Management Regulations 2006 prescribes the Commissioner of Police as the HMA for the emergency management aspects of preparedness and response, for the whole of the State, for the hazards:

- air crash;
- road crash;
- persons lost or in distress on land, requiring significant coordination of search operations;
- persons lost or in distress on inland waterways within the limits of a port or in a fishing vessel or pleasure craft within the limits of a port or at sea;

- radiation escape from nuclear powered warship;
- space re-entry debris; and
- a terrorist act as defined in The Criminal Code section 100.1 set out in the Schedule to the *Criminal Code Act 1995* of the Commonwealth.

### Hazard management agency – FESA

Regulation 17 of the Emergency Management Regulations 2006 prescribes FESA as the HMA for the emergency management aspects of preparedness and response, for the whole of the State, for the hazards:

- injury or threat to life of a person trapped by the collapse of a structure or landform;
- cyclone;
- earthquake;
- flood;
- storm;
- tsunami; and
- actual or impending spillage, release or escape of a chemical, radiological or other substance that is capable of causing loss of life, injury to a person or damage to health of a person, property or the environment.

### Volunteer employment protection

The EM Act provides for the protection of the employment rights of volunteers when carrying out an emergency management response. Basically, this means that a volunteer who is legitimately absent from work carrying out an emergency management response is entitled to their normal pay and entitlements (long service, sick or recreational leave entitlements or other benefits).

Also, the EM Act provides that an employer must not victimise an employee for the reason that the employee was absent carrying out an emergency management response. An employer victimises an employee if the employer:

- dismisses the employee;





- alters the employee's position to the employee's disadvantage;
- refuses to promote or transfer the employee under competitive and/or reasonable circumstances; or
- does not provide entitlements that the employee is otherwise entitled to.

If an employer does contravene the EM Act, the employee or their representative organisation or association can apply to the Magistrates Court for an order against the employer to correct the contravention.

The EM Act does not, however, provide for employers to be required to release employees to attend emergencies. Therefore it is essential that:

- volunteers ensure that their employer is aware that they are a volunteer and therefore may be called upon in an emergency;
- volunteers recognise that their employer has engaged them to do a job and may not always be able to release them to attend an emergency because of the operational requirements of the company;
- volunteers and volunteer agencies acknowledge and thank employers for the support they provide particularly by releasing their employees in an emergency;
- volunteer agencies acknowledge and respect that volunteers have work commitments and try to work around them — in particular, try to spread call-outs equally among members so as to minimise, where possible, the imposition on employers;
- employers, whenever practicable, release employees when they are

called up for an emergency, recognising that a volunteer will be contributing to a safer community, which may indirectly benefit the employer; and

- employers are made aware of the volunteer employment protection provisions of the EM Act.

### Practical application to the mining industry

The mining industry has the reputation in remote areas of being willing to provide assistance in an emergency. Commonly, mining enterprises have facilities, trained personnel and equipment that may be of immense value to emergency management authorities, such as accommodation, landing strips and other infrastructure, medical or first aid personnel and equipment, mine rescue and fire-fighting personnel and equipment etc.

However, it is now important to realise that such facilities equipment and people may now be requisitioned by emergency management authorities under a penalty prescribed in the law of the State and that it is an offence not to comply. This does not, of course, mean that any such requisition would be made lightly or without consideration for the needs of the provider, but the decision lies with the relevant emergency management authority and not with the provider.

### What are the penalties for not complying with a legal direction given by an Authorised Officer (during a state of emergency) or a Hazard Management Officer (during an emergency situation)?

- If a person refuses to comply of their own accord, they are committing an

offence under the EM Act and may be subject to a \$50,000 fine.

- If a person is instructed by their employer not to comply, then the employer may be subject to a \$500,000 fine and the person may be subject to a \$50,000 fine.
- It may be a defence for a person instructed by an employer not to comply if that instruction alters the 'state of mind' of that person.

### Ensuring the best outcome

Mining companies (and others) should be aware of their new responsibilities under the emergency management legislation. A proactive approach will ensure the best possible outcome in any given emergency situation.

Mining companies operating in the remote areas of the State are strongly enjoined to become familiar with the requirements under the EM Act and to co-operate by ensuring that the relevant State, regional and local emergency management authorities (usually the most senior police officer in the area) are made aware of the type and extent of assistance that they may be able to call upon in any given type of emergency situation. This will enhance the industry's reputation as a 'good neighbour' and may help to save lives in the event of the kind of emergency contemplated by the EM Act.

All significant incident reports and bulletins are available online at [www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety)

Visit the Resources Safety website for more information on the new Dangerous Goods Safety Act and regulations



[www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety)



# Medical Bulletin No. 5

Revised April 2008

## Cyanide poisoning — first aid and medical treatment

### Properties

Cyanide is a rapidly acting and extremely toxic chemical that exists in various forms. Depending on temperature, it can be a colourless gas or liquid (e.g. hydrogen cyanide — HCN, cyanogen) or a solid (e.g. sodium or potassium cyanide). Cyanide is described as having a bitter almond odour at concentrations greater than 1 ppm, but not everyone can detect this.

### Routes of absorption

The primary route of occupational exposure is through inhalation, which results in rapid absorption into the systemic circulation. A less common route in the occupational setting is through ingestion. Cyanide can also be absorbed through the eyes or intact skin.

### Mechanism of action

Cyanide inhibits cytochrome oxidase at the cellular level, preventing cells from using oxygen. This impairs the function of vital organs.

### Cyanide poisoning

The onset of symptoms following cyanide exposure depends on:

- the form of cyanide;
- the mode of entry into the body; and
- the dose.

#### Acute

**Mild poisoning** — This may manifest as anxiety, headache, nausea and vomiting, mucous membrane irritation, metallic taste, shortness of breath and dizziness.

**Progression of poisoning** — Signs of deterioration include increasing shortness of breath, falling blood pressure, cardiac arrhythmia, periods

of cyanosis and a deteriorating level of consciousness.

**Moderate and severe poisoning** — Exposure to cyanide gas produces the most rapid onset of symptoms. High concentrations of inhaled cyanide result in rapid loss of consciousness with seizures, difficulty breathing and cardiac arrest, with death occurring within a few minutes. Survivors may suffer brain injury due to either a direct toxic effect or anoxia (lack of oxygen).

**Eyes** — Direct contact with cyanide in caustic solutions is irritating to the eyes. Cyanide can also be absorbed into the body through the eyes.

**Skin** — Cyanide in caustic solution is corrosive to the skin and can also be fairly rapidly absorbed through the skin.

#### Chronic

Chronic exposure may result in symptoms of headache, eye irritation, fatigue, chest symptoms and nose bleeds. This is uncommon as cyanide is broken down to thiocyanate in the body and excreted.

### Rescue and first aid

**The first priority is to remove the casualty from further exposure — ideally move to a source of fresh air.**

The trained rescuer should have donned appropriate respiratory and dermal personal protective equipment (PPE), especially gloves, goggles and an appropriate respirator if hydrogen cyanide or liquid cyanide is involved.

**Airway** — Clear and insert oral airway if casualty is unconscious and not breathing. If breathing, place in coma position.

**Breathing** — Mouth-to-mouth resuscitation should be avoided due to the risk of contamination to the rescuer.

If not breathing, use a resuscitation bag and mask. Provide 100% oxygen by mask with a non-return valve if available.

**Circulation** — Check for pulse. Commence external cardiac massage if absent.

### Oxygen

**Oxygen (100%) is considered the most useful treatment for early cyanide poisoning and should be administered to anyone exposed to cyanide, whether conscious or unconscious, breathing or not breathing.**

Each site needs to undertake a **risk assessment** to determine the appropriate quantity and location of oxygen that should be available on site, taking into consideration the numbers of potentially exposed personnel and the duration to reach a tertiary care facility.

### Decontamination

Remove any contaminated clothing and ensure these items are placed in a sealed collection bag. Wash down the casualty with copious amounts of fresh water.

**Treatment should not be delayed by decontamination procedures and should be started immediately.**

### Transfer

Arrange urgent transfer to the nearest hospital or, if remote, nearest doctor. The casualty should be accompanied by someone trained in cardiopulmonary resuscitation (CPR) and able to continue resuscitation. The cyanide antidote kit should accompany the person.

## Ingestion

There is little evidence to support the benefit of emesis (vomiting), gastric lavage or charcoal administration, especially when more than 2 hours have lapsed since ingestion. This form of treatment should only be used on the advice of an emergency physician or toxicologist.

## Eye contamination

This should be managed with copious irrigation using water or normal saline for at least 5 minutes.

## Cyanide antidotes and kits

The use of antidotes is **not as immediately critical** as the administration of effective first aid, oxygen and life support measures.

### Mild poisoning

Administration of 100% oxygen may be all that is needed.

If the casualty rapidly improves after removal from cyanide exposure then no further immediate management beyond supplemental oxygen is required.

### Progression of poisoning

If there is evidence of deterioration, despite 100% oxygen administration, and there is a convincing history of exposure, administration of an antidote may be indicated, particularly if there is loss of consciousness or cardiovascular instability.

The preferred antidote is hydroxycobalamin administered intravenously. Oxygen should continue to be administered.

### Moderate and severe poisoning

Continue administration of 100% oxygen.

Advanced life support may be required if the casualty is in shock or having seizures, with due caution to the protection of the care giver.

Preferably insert two intravenous lines.

Monitor heart and blood pressure, and pulse oximetry if available.

Monitor level of consciousness using the Glasgow Coma Scale (GCS).

Take 10 ml blood in a sodium heparin or sodium fluoride tube for analysis of blood cyanide levels to confirm the diagnosis. The sample should be chilled but not frozen and transferred to a laboratory capable of undertaking

cyanide measurements. **Treatment should not be delayed while awaiting test results.** Note that as most cyanide is in the red blood cells, the levels in the blood may not accurately reflect the true level of free cyanide and symptoms should therefore guide treatment.

### Intravenous administration of an antidote

- **Hydroxycobalamin** is available through the Therapeutic Goods Administration (TGA) Special Access Scheme. It reacts with cyanide to form cyanocobalamin, which is excreted by the kidneys.  
*Dose:* Administer 5-15 g hydroxycobalamin intravenously (Cyanokit® contains two 2.5 g bottles) over 30 minutes or faster if the casualty's condition is deteriorating.

- **Sodium thiosulphate** is no longer a preferred antidote as it is a slower acting agent. However, it is considered by some authorities to be useful as an adjunct to hydroxycobalamin.

- **Kelocyanor (dicobalt edetate)** is no longer a preferred antidote as there is the potential for a severe adverse reaction if administered when cyanide poisoning has not occurred. It should only be used where there is unequivocal evidence of cyanide poisoning and hydroxycobalamin is not available. Even then, there may be a toxic reaction such as anaphylaxis, cardiac arrhythmia or convulsions. Co-administration of glucose may ameliorate this to some extent.

### Antidote storage

The selected cyanide antidote should be stored in a sealed tagged container in an accessible area with the cyanide protocol enclosed. The contents of the container and the expiry date should be regularly checked. Intravenous fluids and cannulae and blood sample tubes should be available. The kit should be transported with the casualty to the hospital or doctor.

## Monitoring in hospital

- **Arterial blood gases (ABGs).** Severe metabolic acidosis requires correction.
- **Fluid and electrolyte balance.**
- **Neurological, respiratory and cardiovascular status.** Watch for the development of pulmonary oedema and aspiration pneumonia in

comatose patients. Seizures will require treatment with intravenous or rectal benzodiazepines.

- Further antidote administration may be required, particularly if there is a persisting metabolic acidosis. Oxygen therapy will be determined by the response to the antidote.
- Close monitoring should continue for a minimum 24–48 hour period following exposure if an antidote has been required as delayed effects may occur.
- Following skin exposure, a period of 6 hours of monitoring is required to ensure there are no delayed effects.
- Re-assessment of eye splashes is required within 24 hours, and ophthalmologic assessment is recommended.

## Cyanide management plan

Each site should develop a medical management plan, including location and contact details of the nearest medical facility capable of treating a victim of cyanide poisoning.

## References

Agency for Toxic Substances and Disease Registry (ATSDR), US Department of Health and Human Services, Toxicological profiles for and ToxFQA's Cyanide: viewed 27 July 2007 <[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)>

Braitberg G & Vanderpyl M, 2000, Treatment of cyanide poisoning in Australasia. *Emergency Medicine* 12, 232-240.

Cummings T, 2004, The treatment of cyanide poisoning. *Occupational Medicine* 54, 82-85.

*Micromedex®* Healthcare series — Cyanide.

For further information regarding the health surveillance (MineHealth) and contaminant monitoring (CONTAM) systems managed by Resources Safety, please contact:

**Email:** [contammanager@docep.wa.gov.au](mailto:contammanager@docep.wa.gov.au)  
**Phone:** +61 8 9358 8108  
**Fax:** +61 8 9358 8188  
**www:** [www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety)

# ThinkSafe Small Business Assistance Program

## Introduction

If you are a small business owner (employ less than 20 people) and want to make your workplace safe, the ThinkSafe Small Business Assistance Program can help you.

The good news is that the help you can get:

- is free;
- easy to obtain;
- takes just three hours of your time; and
- is a simple process with clear and immediate outcomes.

The ThinkSafe Small Business Assistance Program is a confidential occupational safety and health assistance program. It has been developed using the best small business workplace safety programs across the world as a guide.

## Small business is important

The small business sector in Western Australia makes a vital contribution to our quality of life and the state's economy.

Small businesses employ almost half the state's workforce, and it is an unfortunate fact that many of these businesses operate in industries that have unacceptably high rates of workplace deaths and injuries. This program will directly assist you to improve occupational safety and health for you and your employees.

The ThinkSafe Small Business Assistance Program is targeted at the following high-risk industry sectors that have significant rates of lost time injury and disease:

- agriculture, forestry and fishing;
- construction;
- health and community services;
- manufacturing;
- retail and wholesale; and
- transport and storage.

Should your business fall outside the above industries, please register your interest because you may still be able to access the program.

## Reasons to be involved

- Good occupational safety and health practices are part of good business management.
- Doing the right thing reflects well on your company's image and you are recognised as an employer who cares about your staff.
- You are more likely to win contracts if your business has a good safety and health record.
- The program will help you to comply with occupational safety and health laws.
- There are significant penalties for businesses found to be at fault for not ensuring a safe place to work.

- There are also economic reasons to take advantage of this simple program.
- Safer and more efficient working practices can save you money.
- You will reduce lost time from workers being sick or off injured.
- And you could also be paying lower workers' compensation premiums.
- The National Occupational Health and Safety Commission estimates that the cost of workplace injury and disease across the Australian small business sector, excluding self-employed and voluntary workers, is a massive \$8.3 billion annually.

## What is involved?

We arrange for an independent occupational safety and health (OSH) consultant to visit on-site at your workplace to conduct a safety assessment and prepare a simple safety action plan. Our consultants will visit workplaces in metropolitan or rural Western Australia. The assessment will take about three hours and is a free service provided by government.

If you are not the manager, you will need to ensure that your manager or person responsible for occupational safety and health in your workplace make themselves available for the three hour session with the consultant.

The consultant won't talk a lot of jargon or blind you with science or statistics. Working together you will be able to develop a simple, easy-to-implement plan that is unique to your business and relevant to your industry.

This is a confidential service and the consultant will not report back to WorkSafe on any aspect of your business.

## Applying for assistance

Visit [www.docep.wa.gov.au/WorkSafe](http://www.docep.wa.gov.au/WorkSafe) and go to the ThinkSafe small business section to download an application form. Alternatively, you may call the Hazard hotline on **1800 429 273**.

The OSH consultant will provide you with up to three hours of free advice and meet all travel costs. However, any costs for consultation beyond the three-hour limit will need to be met by your business.

WorkSafe will ensure that information provided by employers under the ThinkSafe Small Business Assistance Program is not provided to WorkSafe inspectors. However, WorkSafe does have a legal requirement to respond to complaints and incidents. Employers who are part of the ThinkSafe Small Business Assistance Program will not be exempt from this procedure.

A 'small' business is any business that is:

- independently owned and operated; managed personally by the major investor(s);
- maintains relatively small share of the market; and
- does not form part of a larger group.