



# MineSafe

Western Australia



**Registering  
classified plant**



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Department of Consumer  
and Employment Protection  
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Resources Safety 



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## In this issue

This issue of *MineSafe* starts with the regular feature from Martin Knee, giving his perspective on the importance of learning from mistakes. One of the events that had a profound impact on the State Mining Engineer is the Aberfan disaster, which occurred 40 years ago. We have included an article on the tragedy for those unfamiliar with it, and as a reminder for others.

Some of the articles in this issue address queries regularly received by the Mines Safety Branch, including questions about classified plant and its registration, the standards that apply for personal protective equipment and if there are minimum age requirements for mine employees.

We continue the series on other divisions in the Department of Consumer and Employment Protection with an overview of Consumer Protection.

A new Resources Safety guide to the health surveillance system was released recently, and a welding safety code of practice has been adopted. Readers are encouraged to check out the Resources Safety website regularly to find out what's new — updates and new information are posted there first.

There is an article and a double-page pictorial spread on the 2006 Australian Student Mineral Venture. Resources Safety was pleased to support this program through the involvement of inspectorate and other staff. It provided an opportunity to highlight to students — as prospective employees and employers — the importance of occupational safety and health and the role of the mines safety regulator.

We report on some safety innovations and awards, as well as passing on safety alerts released by other organisations but relevant to the Western Australian scene. Specific safety advice is also included in significant incident reports on an oxygen cylinder that fell on emergency response team members, a paste fill wall failure and loss of control of service vehicles.

In the safety and health representatives section, we introduce you to John Farrow, who is based in Collie, and cover some of the activities happening in Community Safety Month.

Look out for a road safety feature in the next issue of *MineSafe*, as well as a report on October's Mines Safety Roadshow.

### Alan Gooch

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Harry Hills of EnergySafety was omitted from the list of contributors for the previous issue of *MineSafe*. We apologise for this oversight.

*Welding image on cover* © Allan Francis





# Learning from what goes wrong – a personal view

During my undergraduate studies at Leeds University in the United Kingdom during the late 1960s, I, along with all the other engineering undergraduates of various disciplines, had to undertake a short course of study regarding the great mistakes of engineers in the past, which included well-known errors ranging from the Tay Bridge disaster in 1879, progressing through the Tacoma Narrows Bridge collapse in 1940 to more recent problems like the collapse of the cooling towers at the Ferrybridge Power Station in 1965 and the collapse of the Ronan Point apartment block in the east end of London in 1968.

In my own field of mining, there was the Aberfan disaster in 1966, where 144 people in a small South Wales mining village lost their lives when a waste dump slid down the hillside above the settlement. This tragedy was magnified by the fact that the village primary school was in the path of the material and 116 of the dead were children between the ages of 7 and 10. There is an article on this tragedy in this issue of *MineSafe* and it is hard to believe that it happened 40 years ago. I recall driving through the village a few years after the event and being struck by the eerie silence of the place; although most of the physical scars had been removed by that time, it was obvious that for the people of the place, the memory and the horror would never go away.

Thus, I had a fairly good grounding (which I thoroughly recommend to all engineering educators) in the scale of the 'cock-ups' that can be perpetrated by the engineering profession, though I never expected to be personally involved in anything like what I had learned as an undergraduate.

My first job as a new graduate mining engineer was at the Mufulira mine on the Zambian Copperbelt, where a cataclysmic failure in September 1970 allowed a huge quantity of tailings from



*Aerial view of Mufulira showing headframes and entry point of tailings from surface dam*



*Underground at Mufulira showing debris carried by tailings*

one of the major surface dams to enter the underground workings of the mine.

The entire working area in the eastern end of the mine was inundated, with the loss of 89 men and what had been a highly productive operation became, overnight, a mass grave.

The visible signs of the tremendous uncontrolled forces generated as the fluid mass of tailings swept through the mine made a great and powerful impression on a new engineer, which has remained with me all of my life, as has the personal memory of recovering

bodies (or what was left of them) and the duration of the remedial efforts and the heartbreaking labour involved.

This experience has, to a great extent, shaped my attitudes as both an engineer working in the mining industry and a regulator of that industry. We should bear in mind the scale and scope of the potential for major disasters in the practice of the mining profession and remember events like these — otherwise we may be condemned to repeat them.

# The Aberfan disaster – 40 years ago

It was almost forty years ago when, on Friday, 21 October 1966 at 9.15 am, a large section of a colliery waste tip slid down a mountainside into the mining village of Aberfan, in South Wales.

In the most tragic of mining disasters, 144 people died, 116 of whom were school children and mostly between the ages of seven and ten. About half of the children at Pantglas Junior School and five of their teachers were killed — Aberfan had become the village that lost its children.

This is a harrowing story, but an important one. It tells of how ignorance of the potential consequences of failing to act on a problem can have a devastating and long-term effect on a whole community. It is also interesting to speculate on the effect that this disaster had on the thinking of Lord Robens, then chairman of the UK National Coal Board, which was held accountable for the carnage. Robens went on to head the government committee that produced the report *Safety and Health at Work*, which led to the revision of the principles of occupational and public safety law in many countries, including Australia.

The story is told largely by those who experienced it.



Aberfan, South Wales

*It was impossible to know that there was a spring in the heart of this tip which was turning the centre of the mountain into sludge.*

**Rt. Hon. Lord Robens of Woldingham, Chairman of the National Coal Board, to a TV reporter**

*I have been asked to inform that there has been a landslide at Pantglas. The tip has come down on the school.*

**Emergency call received by Merthyr Tydfil police, 9.25 a.m., 21 October 1966**

The men working on the tip up the mountain had seen the slide start, but could not raise the alarm because they had no telephone. (The Tribunal of Inquiry later established that the disaster happened so quickly that a telephone warning would not have saved lives.)

It first destroyed a farm cottage in its path, killing all the occupants. At Pantglas Junior School, just below, the children had just returned to their classes after morning assembly. There was sun on the mountain but in the village in the valley it was foggy, with visibility about 50 yards. In the village, hardly anybody saw anything, but everybody heard the noise. An eight-year-old girl at the school remembered four years later:

*It was a tremendous rumbling sound and all the school went dead. You could hear a pin drop. Everyone just froze in their seats. I just managed to get up and I reached the end of my desk when the sound got louder and nearer, until I could see the black out of the window. I can't remember any more but I woke up to find that a horrible nightmare had just begun in front of my eyes.*

The material from the dump — rock, slurry and water — roared down and inundated the school and about 20 houses in the village before coming to rest. Then there was total silence.

*I heard a noise, a big rumbling noise. ... I saw a tree and a telegraph pole coming towards me first, then I saw a big black mass of stuff. ... A black wave of muck.*

**Schoolboy, age 13**

*As I was walking up the hill where it turns left, I saw a big wave of muck coming over the railway embankment. It was coming straight towards me and I ran. ... I saw trams, trees, trucks, bricks and boulders in it.*

**Schoolboy, age 14**

The heaps of excavated waste from the Merthyr Vale coal mine were piled on the hillside above the coal seam. The tips had been there for more than 20 years, on top of the Brithdir Sandstone, a highly porous rock layer. The sandstone has many springs coming out of it, and several of the tips were placed above springs, which had led to destabilisation of the spoil heaps in 1944 and 1963, with non-damaging failures. The large landslide in 1966 took place in almost the same area as the minor slip in 1963. The callous disregard for the geological conditions and previous small slides were major factors in the loss of life.

*[It sounded] like a jet plane. ... and two or three seconds later I could hear stones and rubble, so I ran back down the hill. I thought it was the tip. ... I said "I don't think it is a jet, it is the tip", and I shouted at them [two*

boys] to run, and they ran down behind me. ... I remember in Moy Road I could see the front windows crashing in, and the front doors; it was like a pile of dominoes coming down. ... I went into that lane for shelter; ... It stopped as it hit the last house down No.1 Moy Road and there was a terrible silence.

**Aberfan resident**

*In that silence you couldn't hear a bird or a child.*

**Aberfan resident**

*My abiding memory of that day is blackness and dark. I was buried by this horrible slurry and I am afraid of the dark to this day.*

**Pupil, Pantglas Junior School**

*We had to break the front windows and then climb in. ... We had no tools — we used our bare hands and anything we could find. But there was nothing anyone could do, between the slurry and the water coming down. That was the worst, not being able to do anything. There's nothing as bad as that.*

**Bereaved parent**

*The women were already there, like stone they were, clawing at the filth — it was like a black river — some had no skin left on their hands. Miners are a tough breed, we don't show our feelings, but some of the lads broke down.*

**Miner**

*I could hear men's voices but I didn't know what they were doing or where they were. I heard someone crying and then this voice was asking me if I could see daylight and I could put my finger through it and then I was dug out.*

*I was passed through a chain of men, out through a window and into the yard and handed to the policeman, who carried me to the side of a wall where he placed me on the ground. ... I looked back at the school and I just couldn't believe what had happened. It was completely flat.*

**Pupil, Pantglas Junior School**

*I was taken straight to hospital and my parents did not come to see me until evening. They must have spent the whole day not knowing where I was, not knowing if I was alive or dead. But we never talked about it.*

**Pupil, Pantglas Junior School**

*In the night we had to go to see if we could identify her in this chapel. I've never forgotten that. It comes back to me everyday. There's some part of the day that that picture comes back to me and I can never forget that. ... All these little bodies wrapped in blankets.*

**Bereaved father**

*The brave front of the people of Aberfan cracked on Monday at an inquest on 30 of the children. There were shouts of "murderers" as the Coroner of Merthyr, Mr. Ben Hamilton, began reading out the names of the dead children.*

*As one name was read out and the cause of death given as asphyxia and multiple injuries, the father of the child said, "No, sir, buried alive by the National Coal Board". ... The father repeated: "I want it recorded — 'Buried alive by the National Coal Board.' That is what I want to see on the record. That is the feeling of those present. Those are the words we want to go on the certificate."*

**Merthyr Express**

In the aftermath of the disaster, the British Government set up a Tribunal of Inquiry to establish the facts of the incident. The Tribunal's report was scathing in its condemnation of the National Coal Board, its management and some of its employees.

*... the Aberfan Disaster is a terrifying tale of bungling ineptitude by many men charged with tasks for which they were totally unfitted, of failure to heed clear warnings, and of total lack of direction from above. Not villains but decent men, led astray by foolishness or by ignorance or by both in combination, are responsible for what happened at Aberfan.*

*... Blame for the disaster rests upon the National Coal Board. This is shared, though in varying degrees, among the NCB headquarters, the South Western Divisional Board, and certain individuals. ... The legal liability of the NCB to pay compensation of the personal injuries, fatal or otherwise, and damage to property, is incontestable and uncontested.*

**Edmund Davies (chairman), Report of the Tribunal appointed to inquire into the Disaster at Aberfan on October 21st 1966, HL 316, HC 553 (London: HMSO, 1967)**

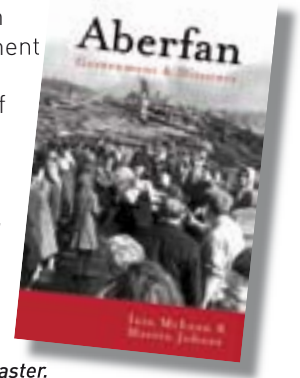
The Tribunal concluded that there was a total absence of tipping policy in the National Coal Board and this was the basic cause of the disaster. At the time, there was no legislation dealing with the safety of dumps in force in Britain or any other country, except in part of West Germany and in South Africa.

Among the lessons was the fact that all dumps should be regarded as potentially dangerous and should be treated as civil engineering structures. The Tribunal recommended that those engaged in the daily management and control of tips should be trained for their responsibilities and managers and surveyors should, as soon as possible, be made aware of the rudiments of soil mechanics and groundwater conditions. The statutory qualifications for managers and surveyors should be amended to include awareness of the rudiments of soil mechanics and hydrogeology, in addition to the geology already included in the syllabus.

The Tribunal also concluded that action needed to be taken to safeguard the future condition of the tips at Aberfan, and the survivors and bereaved families of those who died pressed the government for the remains of the material to be removed from the mountain above the village, citing their fear of a repeat of the slide and the devastating psychological effect of having to view the scar in the landscape on a daily basis and relive the tragedy.

In a final and outrageously insensitive irony, the National Coal Board refused to remove its tips unless somebody else contributed to the cost. Finally, the Aberfan Disaster Fund (which had been set up by public subscription to aid the bereaved families) was forced to pay £150,000 towards the work — until the last minute, the Board was demanding £235,000. A subsequent British government acknowledged that the demand for a contribution had been wrong and, in July 1997, the government paid back £150,000 to the Fund after years of campaigning for the wrong to be set right.

**Source material from [www.nuff.ox.ac.uk/politics/aberfan/home.htm](http://www.nuff.ox.ac.uk/politics/aberfan/home.htm), a website set up as part of a research project to catalogue and conserve material relating to the disaster.**





# FAQs on registration of classified plant

The principal employer and any other employer at a mine site must ensure that all plant is operated and maintained in a safe manner. There are many types of plant at a mine site but there is a particular group, related to a higher operational hazard, referred to as 'classified plant', that has specific regulatory requirements.

## What is classified plant?

The Mines Safety and Inspection Regulations 1995 require all classified plant at a mine site to be registered before being used. This requirement applies to plant listed in regulation 6.34(5). The design and functional descriptions of these classified plant are given in regulation 6.1 — it is these definitions that are ultimately used to determine the name of a particular plant and, consequently, whether or not it must be registered.

## Who can apply to register classified plant?

As the regulatory authority for Western Australian mining operations, Resources Safety concentrates on the main proponents of new projects or existing mines, rather than dealing with every contractor and subcontractor of each mine in the State. In fact, the mines safety legislation is predicated on such a regime, with the prime responsibility for the safety of a mine site and all its classified plant registration being assigned to:

- the corporate entity 'principal employer', which is the proprietor



Air-oil separator tank

- or lessee of a mine;
- the mine manager; or
- a person authorised by either of these two.

When the applicant to register classified plant is an authorised person, an authorisation letter must be provided.

## What documents are required to register classified plant?

An application for registration cannot be accepted unless it includes:

- an authorisation letter if the applicant is an authorised person;
- drawings of the plant design and its serial or equipment number;
- design calculations (including hazard level calculations for pressure vessels and boilers); and
- design compliance.

However, subject to certain conditions, there is a general exemption if classified plant has already been registered with another statutory authority within Australia — see below.

## Is there a special application form?

Although there is no requirement for a specific application form, a pro-forma application for registration of classified plant can be downloaded from the Resources Safety website at [www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety). This form is designed to ensure that the application process is completed satisfactorily without unnecessary delay, and is a particularly useful guide for those applying for the first time.

## What is design compliance?

The regulations require that classified plant is designed to the appropriate Australian Standard:

- boiler — AS 1228
- pressure vessel — AS 1210
- crane or hoist — AS 1418; and
- lift — AS 1735.

There is no provision for construction to any other standard. In order to register plant under the Western Australian system, all Resources

Safety requires is a compliance statement from a professional engineer within the State simply affirming that the plant complies with the relevant standard after checking the design.

However, given that other international standards may be safely used, Resources Safety may grant an exemption from the requirements to design, construct and test according to the Australian Standard. Such an exemption would normally involve the designer, fabricator, supplier or importer satisfactorily demonstrating that an appropriate standard of safety has been achieved. An exemption allowing use of the plant would then be issued to the manager of the mine (not the individual designer, fabricator, supplier or importer).

## Does Resources Safety register designs?

The regulations only stipulate (classified) plant registration. Unlike some authorities with responsibility for plant safety in Australia, Resources Safety does not register plant designs. This means that each application to register classified plant is assessed separately, even in a case of identical plant at the same mine site.

## What about pre-existing registration by other authorities?

There are two general exemptions related to classified plant registered with any Commonwealth, State or Territory authority with responsibility for plant safety. The ownership of classified plant, under these circumstances, is the main factor upon which the decision for exemption is based.

- Registration is required when the plant is owned by an employer at the mine site, including the principal employer. However, instead of drawings, calculations and the compliance statement as normally required by the regulations to register the plant, it is sufficient to submit a copy of registration with the other authority (*General Exemption, R S Hopkins 03/99*).

- Registration is not required when the plant is not owned by an employer at the mine site, including the principal employer. These types of plant are categorised as itinerant plant (*General Exemption, M J Knee, 03/06*).

Note that these exemptions are subject to conditions that must be adhered to.

These and other General Exemptions are available on the Resources Safety website in the mining section under 'Legislation and policy'.

### Do we need to re-register plant that has been repaired or modified?

Once classified plant has been allocated a registration number, the number must be marked on the unit or nameplate as appropriate. This registration number cannot be changed or altered until the end of the plant's operation at a particular mine site. Hence, modifications or repairs of any registered classified plant at a mine site do not require re-registration but, before the plant is used again, it must conform with the Australian Standard unless prior written approval by the State Mining Engineer is obtained.

### What are the registration requirements if plant is permanently removed from an operation or sold to another mine?

Resources Safety should be notified when classified plant has been permanently removed from a mining operation or has left a mine site. If plant is sold to another mine site, the new owner is required to apply for registration. However, rather than submit drawings, calculations and a compliance statement as specified in the regulations, the applicant should submit a copy of the previous registration with Resources Safety (*General Exemption, RS Hopkins 03/99*).

### Apart from registration, are there any other requirements related to classified plant?

Besides operational and maintenance requirements applicable to all plant at a mine site, there are two requirements in the regulations that are specific for classified plant:

- incidents involving registered plant must be reported immediately in writing to Resources Safety; and

- registered plant is not to be used at a mine site unless it has undergone statutory inspection — the time limits for statutory inspections for different classified plant are set in the regulations.

### Where can I get the regulations?

More information on the regulatory requirements regarding classified plant is available from the State Law Publisher's website at [www.slp.wa.gov.au](http://www.slp.wa.gov.au) or telephone 9321 7688.



Registration name plate on a workcage

## Regulation 6.34 Registration of plant

- Each responsible person at a mine must ensure that before any classified plant of a type set out in subregulation (5) is used at a mine, the plant has been registered with the State mining engineer.  
Penalty: See regulation 17.1.
- The principal employer at, or the manager of, a mine or a person authorised by either of those persons may apply to the State mining engineer to have classified plant registered.
- An application for registration cannot be accepted by the State mining engineer unless it includes the following —
  - detailed drawings of the plant design;
  - design calculations; and
  - verification by a person other than the person who prepared the design that the design complies with the Australian Standard applicable under regulation 6.33.
- Where a person applies in accordance with this regulation to have any classified plant registered, the State mining engineer may either register, or refuse to register, the plant.
- Subregulations (1), (2), (3), and (4) apply to the following plant —
  - pressure equipment, other than pressure piping and equipment categorized as hazard level A, B, C or D according to the criteria identified in AS 3920: Part 1;
  - gas cylinders covered by AS 2030;
  - powered tower cranes;
  - lifts;
  - building maintenance units;
  - powered hoists, with a platform movement in excess of 2.4 metres and designed to lift people;
  - work boxes suspended from cranes;
  - prefabricated scaffolding;
  - boom-type elevating work platforms;
  - gantry cranes with a safe working load greater than 5 tonnes, or bridge cranes with a safe working load greater than 10 tonnes, and any gantry crane or bridge crane which is designed to handle molten metal or dangerous goods;
  - powered vehicle hoists;
  - powered mast climbing work platforms;
  - mobile cranes with a safe working load greater than 10 tonnes.

# About Consumer Protection



Consumer Protection is a division within the Department of Consumer and Employment Protection.

Consumer Protection promotes fair trading and the rights of consumers by:

- providing information and advice to consumers and traders about their rights and responsibilities;
- helping consumers resolve disputes with traders;
- investigating complaints about unfair trading practices;
- prosecuting unscrupulous traders;
- regulating and licensing some business activities; and
- developing legislation that protects consumers.

Consumer Protection has a presence across Western Australia with offices in Perth, Albany, Bunbury, Geraldton, Kalgoorlie, Karratha and Kununnura.

Information and advice on retail shopping and trading, credit, product safety, trading standards (weights and measures), service industries, motor vehicles and loans, home rentals, retirement village, home building, incorporated associations and charitable collections, business names, licensing and registration services are available from Consumer Protection.

Consumer Protection administers 60 parliamentary acts, including the *Fair Trading Act 1987*.

The Register of Encumbent Vehicles (REVs) falls under the banner of Consumer Protection, allowing people to check a national register that shows if money is owed on a secondhand car, motorcycle, recreational boat or self-propelled farm implement.

A REVs check can help buyers avoid having significant purchases repossessed from buying stolen vehicles.

In recent years, Consumer Protection has taken extra steps to inform and educate consumers on issues as they evolve.

The fuel monitoring service, FuelWatch, was created in 2001 in response to a Parliamentary Select Committee that investigated intra-daily price changes and the city-country price differential in 2000.

FuelWatch monitors petrol, diesel and LPG autogas prices daily within metropolitan and regional areas from Albany to Geraldton. A website and phone service enables Western Australian motorists to access fuel price information and make informed purchasing decisions. It is the only service in Australia to give motorists the opportunity to access tomorrow's



fuel prices today, providing a price transparency or knowledge of fuel prices in the wholesale and retail sector of the industry.

Consumer Protection has also developed WA ScamNet, a website that gathers information from consumers and businesses, profiling scams targeting Western Australians.

WA ScamNet identifies the most prevalent scams and provides information to law enforcement agencies in Australia and overseas.

Launched in April 2002 as Australia's inaugural online intelligence gathering, profiling and information sharing system for scams, WA ScamNet has proved a popular destination for web users.

More than 220 individual scams are now listed on the site, with contributors sending in 500 mail items and forwarding 4,500 email scams a month.

There are now nearly 16,000 visitors to the WA ScamNet website every month.

Consumer Protection operates a call centre (ph. 1300 30 40 54) where officers can help with queries or transfer calls to the relevant section for further information.

## Australian Standard on risk management

Risk is the chance of something happening that will have an impact on objectives.

Risk is an inevitable part of every business and, consequently, risk management is becoming an intrinsic process for every organisation.

The Australian Standard AS/NZS 4360:2004 *Risk management* and its companion *Risk management guidelines*

outline an integrated and proactive approach to managing risk, allowing an organisation to control negative consequences.

Thousands of Australian companies have already introduced the standard to assist them on the way to effective risk management and corporate governance.

The process helps users to look closely at their organisation and identify areas of risk. By evaluating consequences,

users can better understand their business and its risks.

This standard provides a simple generic guide outlining a proven seven-step process of establishing the context, identifying, analysing, evaluating, treating, monitoring and communicating risks associated with any activity or function.

Although the concept of risk is commonly interpreted in terms of hazards or negative impacts, this



# New guide to health surveillance system

A guide to the health surveillance system for Western Australian mines was released recently to assist employers, employees, medical practitioners and approved persons in understanding the health assessment requirements under the health surveillance system provisions of the Mines Safety and Inspection Regulations 1995.

The objectives of the health surveillance system for mining employees are to:

- assess the health status of all mining industry employees on a regular basis;
- analyse collected data to detect adverse health effects at the earliest opportunity;
- enable appropriate and timely corrective action to be taken in order to safeguard the health and wellbeing of mining industry employees; and
- provide data for future epidemiological studies.

The health surveillance system for mining employees in Western Australia is administered by Resources Safety. Confidential information is recorded on an approved health assessment form and transferred to Resources

Safety's MINEHEALTH database. Following the new guide will help to ensure the uniformity and reliability of the data collected. The information includes:

- a work history;
- a respiratory questionnaire;
- a lung function test;
- an audiometric (hearing) test; and
- in some cases, a chest x-ray.

When they initially join the mining industry, employees must have a health assessment within three months of starting employment at a mine and, thereafter, within five years of the previous assessment. They should keep their health surveillance number for ready reference during their employment.

Employees who are not usually exposed to significant levels of hazardous substances or agents are exempted from the health surveillance system, including:

- employees who normally work in an office, administration building, residential or recreational facilities;
- employees of contractors and self-employed persons who are only engaged to work on mine sites occasionally for periods of less than one month at any one time; and

- employees who work at a mine or mines for a cumulative period of less than three months in a 12-month period.

Employers are responsible for arranging for health assessments and paying the expenses associated with these tests. They may ask their employees to attend a health assessment at a specified place. They may also request a copy of the health assessment from the employee, but there is no legal requirement for the employee to release any of his or her private and confidential medical records to the employer.

Note that the guide applies *only* to initial and periodic health assessments undertaken for the purpose of the health surveillance system that is stored in the MINEHEALTH database. It does *not* apply to:

- pre-employment health checks initiated by employers to assess the medical fitness of prospective employees; or
- additional health assessments that may be required in respect of specified occupational exposure work.

standard is concerned with risk as exposure to the consequences of uncertainty or deviations from what is planned or expected.

Some of the objectives of risk management are to better identify opportunities and threats, gaining value from uncertainty and variability and improved compliance with relevant legislation.

The techniques provide employees, at all levels, with a systematic

approach to manage the risks they are responsible for.

It considers that a consultative team approach is best to define the context and ensure risks are identified effectively, bringing together different areas of expertise to analyse risk, and considering differing views.

Through risk identification, teams can look at what can happen and where and when, then look at possible causes and scenarios. There are

many ways an event can occur, so it is important that no significant causes are omitted.

The standard and its companion guidelines also break down the components of a risk, information for identifying risks, as well as risk analysis to evaluate existing controls and consequence and likelihood, and the recording of the risk management process.

Visit [www.riskmanagement.com.au](http://www.riskmanagement.com.au) for further information.

# Welding safety code of practice

As recommended by the Mining Industry Advisory Committee (MIAC) on 6 June 2006, the Minister for Employment Protection has approved the publication *Welding Technology Institute of Australia – Technical Note No. 7-04 (Health and safety in welding)* (TN7-04) as a code of practice under section 93(1) of the *Mines Safety and Inspection Act 1994*.

A notice in the *WA Government Gazette* on 7 July 2006 gave effect to the code of practice, which now applies to all workplaces covered by either the *Mines Safety and Inspection Act 1994* or the *Occupational Safety and Health Act 1984*.

From a regulatory perspective, employers conforming or complying

with the new code of practice will be deemed to have met their duty of care obligations under legislation, whereas others will need to demonstrate 'equivalent or better' safety outcomes.

The technical note is one in a series of Welding Technology Institute of Australia guidelines, and comprehensively deals with the wide range of electrical, mechanical and occupational health hazards associated with electric welding, gas welding and similar allied processes. It gathers in one place valuable safety guidance information that would otherwise require exhaustive researching from many other documents.

TN7-04 references other guidance material including TN22-03 (*Welding*

*electrical safety*), which specifically addresses electrical safety issues, and both publications are currently aligned with recommendations in Australian Standard AS 1674.2:2003 *Safety in welding and allied processes – Electrical*.

Of particular interest to many will be the specific provisions relating to the use of hazard-reducing devices (known as voltage reduction devices or VRDs, and trigger switches, which are intended to safeguard people from electric welding shocks) and the workplaces where they are to be used.

Copies of TN7-04 and TN22-03 are available from the Welding Technology Institute of Australia website at [www.wtia.com.au/tgn.html](http://www.wtia.com.au/tgn.html)

## Drawn to danger

A global project management and services company has issued a warning following a potentially fatal incident in which a grinder was drawn towards a worker's head and neck.

AMEC ([www.amec.com](http://www.amec.com)), which designs and delivers infrastructure assets, reported in *AMEC SHE Alert No. 082* that a worker received a deep cut injury to his neck and side of the head while using a 7-inch grinder to dress a steel plate.

As he positioned himself to carry out his task, the draw strings from



his jacket hood became entangled in the rotating spindle of the grinder, resulting in the grinder being drawn towards his head and neck.

It happened so quickly that he did not have time to think or react to protect himself and, potentially, this incident could have been catastrophic.

Key points to remember:

- Always ensure a risk assessment has been conducted for all work, identifying all possible hazards including potential entanglement.
- Clothing can present entanglement hazards when working with rotating equipment such as drills and grinders.
- Keep all potential entanglement sources secure at all times or remove from the danger zone. This includes draw strings for hoods, cuffs, high visibility vests, loose clothing, lanyards and belts.



Photographs reproduced from *AMEC SHE Alert No. 082*

**Remember the guiding principle that everyone has the right to challenge any unsafe working practices, conditions or behaviours.**

# Safety and health

## at the workplace is *your* responsibility

Both employers and employees share responsibility to ensure that a workplace is safe and healthy.

Lately, employees in two Australian jurisdictions have been successfully prosecuted for breaches of occupational health and safety legislation.

Legislation governing occupational safety and health in the mining industry in Western Australia imposes a general duty of care on each person who works on a mine. Each person has a responsibility for his or her own safety and the safety of others affected by their actions or inactions.

Prosecution action can be taken against anyone who breaches the occupational health and safety legislation, including employees.

It is apparent from recent decisions in Queensland and Victoria that the courts recognise the shared responsibility for safety and health at the workplace and have imposed high penalties. These decisions also demonstrate the court's willingness to impose prison sentences.

There is a growing trend to prosecute individuals for workplace safety breaches in Australia.

There has also been a trend nationally towards increased provision for fines and imprisonment for managers and directors, and significant fines for companies for breaches of workplace safety. However, the recent court decisions have indicated a trend towards tougher sentences for employees for breaches of occupational safety and health legislation.

It is important that every person who works on a mine must not only be aware of the need to follow and apply safety procedures at work, but also to know their obligations in maintaining a safe workplace.

## Innovation in safety and health

### A new way to stop

A new oil-filled 'Sealed Integrated Braking System' (SIBS) is making its way onto Western Australian mines. SIBS is essentially an enclosed single-rotor high speed disc brake, and is applicable to any rotating equipment, large or small, industrial or automotive, on and off road.

An innovative Perth-based company Safe Effect Technologies is currently fitting the technology onto Toyota Land Cruisers and HiLux models.

The SIBS website ([www.safeeffect.com](http://www.safeeffect.com)) promotes SIBS as the latest in fail-safe braking technology engineered to survive the world's harshest conditions. And that's what makes the brakes ideal for off-road mining work where dust, dirt, water and corrosive elements all have an impact.

The braking system promises unparalleled safety and is fully enclosed to protect against external contaminants — important in mining conditions. It is innovative in that it is also oil immersed, with only a single rotor.

Driver safety and confidence are also improved because there is consistent braking performance. Another feature is the park and fail-safe emergency brake incorporated into the rear brakes, which is also a positive for safety in the mining environment.

SIBS, which boasts improved productivity and lower operating costs, is also being used in mines in New Guinea and South Africa.

The technology has been featured on *Beyond 2000*.

*Right: Exploded view of Land Cruiser front brake*



Illustration courtesy of Safe Effect Technologies



# Unique shaft-sinking method

A local company has developed a revolutionary way to sink steel-lined circular shafts, which it says is safer, cheaper and quicker than traditional methods.

The unique shaft-sinking method from Mandurah-based Craigs Mining Services ([www.craigsmine.com](http://www.craigsmine.com)) has been successfully used in the Northern Territory and New South Wales.

A continuous steel-lined shaft is sunk using telescopic liners each of slightly smaller diameter, with successive liners being lowered in the shaft as excavation proceeds.

Safety is greatly improved, particularly in poor ground conditions, as exposure

to unstable openings can be minimised by lowering liners in the shaft during excavation.

The finished lining is also water proof, a significant benefit compared to conventional concrete-lined shafts.

The company says enhanced sinking rates of up to three metres a shift can be achieved with a crew of three, resulting in substantial cost savings.

Proprietor Kevin Craig has been involved in underground development totalling 5,500 metres of winzes, shafts, declines and crosscuts since 1984, while the company has been sinking shafts and winzes for over 15 years.



Photos courtesy of Craigs Mining Services



*Purpose-built telescoping steel cylinders are welded together to provide a continuous smooth shaft lining*

*Headframe in position over shaft at Giants Reef Mining Ltd's Chariot gold project, with vacuum ore lift in place*

## Keeping track of things

Technology is changing the way that leading resources companies are keeping track of things — anything from explosives to managing the movement of trucks in and out of underground decline mines, or even miners.

The technology, reported in a recent *The Australian* IT Today section, uses radio frequency identification (RFID) microchips that can even track tools.

In a move with implications for mine safety, the tags are also being given to employees and linked to mine incident

management systems.

The intention is to be able to find miners in the event of a collapse, with the technology no doubt being of great benefit in saving time during rescue operations.

The tags, which are computer chip based, can also be used for security and regulating personnel traffic. They can even differentiate between contractors and full-time staff, restricting access where necessary.

The tags were developed by technology company CSC Australia Pty Ltd ([www.csc.com](http://www.csc.com)).

## CME OSH Innovations Awards 2007

Entry is now open to all innovative Western Australian minerals and resource companies, including contractors associated with the minerals and energy industry, to make a submission to the Occupational Safety and Health Innovations Awards 2007 presented by The Chamber of Minerals and Energy Western Australia.

The awards program is open to companies that have developed innovative processes or solutions to a specific occupational safety and health problem.

Multiple submissions from a company or site are permitted — if you have a range of innovations you can make a submission for each.

Receiving a CME Innovation Award is considered to be the peak industry safety awards accolade, and recognises creativity and ingenuity in the workplace.

So, if you have been innovative or created a new way to do things to improve safety or health then nominate.

Entries must be in by 8 December 2006. Preliminary judging takes place on 19 January 2007, with final judging on 9 February. The Awards Presentation and Innovations Fair will be held on 12 March 2007.

For more information on the awards and how to enter your submission, please visit [www.cmewa.com](http://www.cmewa.com) or contact Kae Choo at the Chamber on 9220 8511 or [k.choo@cmewa.com](mailto:k.choo@cmewa.com)

## Safety and health representatives section

### Ask an inspector



John Farrow, a Collie-based Employee's Inspector of Mines with Resources Safety, has a wealth of mining experience throughout the country.

As a young man, he moved to the West Coast of Tasmania in 1968 and started work in an underground mine as a chainman for the surveyors, before entering the mining industry proper.

As was typical in those days, John worked himself up from a level cleaner, before trucking dirt, and basically doing the hard yards to progress to a miner.

'Once you became an experienced miner you could travel the country, so I moved to Western Australia with my young family in 1981, and settled in Kalgoorlie,' he said.

John worked underground in local mines until 1992 when he was elected Employee's Inspector of Mines for the Kalgoorlie inspectorate. During his 25 years in the Goldfields he spent 11 years as a miner and 14 years with Resources Safety and its predecessors.

He was recently elected as Employee's Inspector of Mines for the South-West region, which he moved into earlier this year.

These days his main role is to inspect mines, preferably in the company of elected safety and health representatives.

'During these types of inspections I like to have an informal chat with the safety and health reps and bring them up to speed on any recent information that may be relevant to their position or about the industry generally,' John said.

He also makes a point of attending combined safety and health representatives meetings, and usually a couple of toolbox meetings a month.

'While the toolbox meetings are basically run by the safety reps and I have more of an observer role, I can answer questions and sometimes the reps want to hear my views, or I give a bit of advice when requested or generally guide them in the right direction,' John said.

John's inspections take in underground and open pit mines and processing plants, and he often assists the district inspectors on fatalities and serious accidents.

As an Employee's Inspector of Mines he has the same powers as a district inspector except he cannot initiate prosecutions, although he does assist in investigations and he can issue prohibition and improvement notices.

John said his main focus was to 'educate' safety and health representatives and the general workforce 'if they need to be', with a focus on the new starters.

### Six of the best - John's safety tips

After almost 30 years in the mining industry, John has put together some of his best safety tips.

- 1 Attend work in a fit condition — physically and mentally.
- 2 Whenever possible, receive written instructions in preference to verbal.
- 3 Never be afraid to ask a silly question.
- 4 Whenever operating machinery, be satisfied it is functioning as it should be.
- 5 Think things out before you begin a task.
- 6 KNOW YOUR CAPABILITIES as to whatever job, task, machinery operation or hours of work you may be asked to perform.

## Join in Safe Work Australia Week

Safe Work Australia Week, which runs from 22 to 28 October 2006, is a national week developed to focus attention on workplace safety issues around the country.

During the week, government occupational safety and health authorities across Australia will be organising events and encouraging

workplaces to focus on workplace safety and health.

Safe Work Australia Week aims to spur all working Australians, particularly employers, to get involved and concentrate on safety in their workplace to reduce death, injury and disease.

By participating in a safety event in

Western Australia or conducting a safety activity in your own workplace, you could not only help to drastically reduce the number of deaths, injuries and disease but also boost morale and increase productivity in your business.

To get some ideas and find out what's happening around Australia, visit [ascc.gov.au/NewsEvents/SafeWorkAusWeek](http://ascc.gov.au/NewsEvents/SafeWorkAusWeek)

# Community urged to be part of RAC Community Safety Month

More than 100,000 people are expected to be involved with a wide variety of community safety events and activities across the State during RAC Community Safety Month in October.

Events to be held during the month-long event will showcase community, government and other organisation programs and activities, designed to prevent crime and improve safety in the home, at work or school, on the road, in the water and in public places.

'Our Western Australian lifestyle is envied by many around the world. However, the government's vision is to make WA a better place to live in. That is why we have made community safety a priority and by promoting safety and safe practices within the community, everyone can help increase confidence about safety,' Community Safety Minister John Kobelke said.

Activities planned for October so far include an emergency services

vehicle parade, a property-marking day and Safe Work Week.

The Office of Crime Prevention has developed a website for the month — [www.communitysafetymonth.wa.gov.au](http://www.communitysafetymonth.wa.gov.au) — where participating groups and organisations can access information and register their own activity to be included in the RAC Community Safety Month calendar of events. They can also order safety promotional material for their events.

# Work Safe Forum sets sights on workplace safety

The Perth Work Safe 2006 Forum is expected to be the biggest yet, exceeding last year's event, which attracted around 650 participants.

The Perth Forum will cover a range of issues and give participants the opportunity to network with others interested in workplace safety.

The forum will run from 8 am to 5 pm on Wednesday, 25 October, at the Perth Convention and Exhibition Centre.

WorkSafe WA Commissioner Nina Lyhne said forum participants would be able to discuss in detail a new code of practice on violence, aggression and bullying at work, released in August.

'A code of practice on working hours was also released, and

forum participants will also get to discuss the important issues of work-life balance and long working hours.'

The Work Safe 2006 Forum is presented by WorkSafe, the Commission for Occupational Safety and Health, and WorkCover Western Australia

Speakers will include the WorkSafe WA Commissioner, WorkSafe inspectors, Commission Chair Tony Cooke, DOCEP Principal Labour Relations Advisor Kristin Berger, and speakers from RiskCover and WorkCover.

It will also include an entertaining session in which a panel chaired by Perth motivational speaker and comedian Andrew Horabin will consider some innovative work safety inventions.

'The key objective of the day is to exchange information and ideas on occupational safety and health issues,' Ms Lyhne said. 'We really want to inspire people to put safety first in the workplace.'

'I strongly encourage anyone who has an interest in workplace safety to register for the Forum, as it is a rare opportunity to discuss issues with others who share an interest in safety and to be updated on the latest ideas, strategies and developments.'

**Further information on the Forum can be obtained by telephoning WorkSafe on 9327 8781, or from the website at [www.worksafe.wa.gov.au/forums](http://www.worksafe.wa.gov.au/forums)**



# Students explore mining options

The Australian Student Mineral Venture (ASMV) scheme is a major initiative of The Australasian Institute of Mining and Metallurgy (The AusIMM) Education Endowment Fund. The long-term aim is to attract more of Australia's brightest students to enrol in minerals industry courses at university. The inaugural programs were presented in Western Australia, Tasmania and Queensland in 1996.

Thirty Western Australian students were selected for the 11th ASMV held in Perth, the South West and Goldfields from 8 to 19 July 2006. There was a large, strong field of applicants and the selection process was difficult. The final group comprised nine female and 21 male students, with 13 Year 10s, 11 Year 11s and six Year 12s, including seven country students.

As part of the informal 'MINWEST Consortium', the Department of Consumer and Employment Protection, through Resources Safety, was involved in presenting the Western Region's program with the following universities:

- Curtin University of Technology – Exploration Geophysics; WA School of Mines (Applied Geology, Mining Engineering, Mine Surveying, Mining Geology, Minerals Engineering);
- Murdoch University – Mineral Science and Extractive Metallurgy; and
- The University of Western Australia – Earth and Geographical Sciences; Civil and Resource Engineering.

Resources Safety's involvement in the ASMV provided an opportunity to highlight to students, as prospective employees and employers, the importance of occupational safety and health and the role of the mines safety regulator.

The timetable was designed to showcase the minerals-related tertiary courses offered by MINWEST Consortium members and provide a

basic knowledge of the industry and processes before site visits.

**Day 1** Students arrived; official opening hosted by AusIMM Perth Branch

**Day 2** Hands-on geology and engineering at The University of Western Australia; icebreaker activities

**Day 3** Hands-on geology and environmental geochemistry at Curtin University (Bentley and Technology Park); Resources Safety presentations by State Mining Engineer and Director Health Management; teamwork activities

**Day 4** Hands-on exploration geophysics at Curtin University (Australian Resources Research Centre); WorkSafe Smart Move certification; sports challenge

**Day 5** Hands-on mineral processing and extractive metallurgy at Murdoch University; earth sciences careers evening hosted by Australian Institute of Geoscientists WA Branch

**Day 6** Started South West tour with visits to Iluka Resources' mineral sands operations at Capel and Worsley Alumina Refinery

**Day 7** Visits to Wesfarmers Premier Coal mine and rehabilitation site near Collie, and Sons of Gwalia's operations at Greenbushes; project night at Collie CWA Hall

**Day 8** Travelled to Kalgoorlie; project night

**Day 9** Hands-on mining engineering, mine surveying and mining geology at the WA School of Mines; Ultimate Mining Machine (UMM) project presentations

**Day 10** Underground mine visit to one of Kanowna Belle gold mine (Barrick), Mt Marion gold mine (Harmony – South Kal Mines), Long nickel mine (Lightning Nickel) or Mittel nickel mine (Mincor Resources); hands-on minerals engineering at the WA School of Mines; AusIMM Student Chapter

barbecue; careers presentations by ASMV staff

**Day 11** Geological 'mystery tour', including Museum of the Goldfields; visited KCGM Super Pit and Fimiston processing plant; ASMV Dinner; bowling night

**Day 12** Returned to Perth; most students collected

**Day 13** Remaining country students returned home

Many companies and organisations provided financial support, which was essential for the program to proceed and subsidise the cost to students.

The duty-of-care obligations involved in running a 12-day fully residential program for a busload of teenagers are significant, and even more so as the program involved laboratory work and visits to processing plants and mine sites, including an underground tour. However, students assisted by willingly committing to safe behaviour, following instructions promptly and showing excellent risk awareness.

Dr Susan Ho, Publications and Promotions Manager with Resources Safety, has run the Western Region's annual program since its inception.

'Many students who attended past programs are now employed in the minerals industry or enrolled in relevant tertiary courses, and it is particularly pleasing, from Resources Safety's perspective, that at least one ex-ASMVer is on our database as a safety and health representative with a major iron ore company', Dr Ho said.

'The 2006 program was very successful, thanks to a group of students who were keen and willing, university and industry contributors who were committed to the long-term aim of the ASMV scheme, and a great staff team which included ex ASMVer's', she added.

Further information is available from [www.asmv.org](http://www.asmv.org)

# Australian Student Mineral Venture





# Australian Student Mineral Venture





# What to wear and use

Resources Safety occasionally receives queries about what is required in terms of safety clothing and equipment at mine sites.

According to section 9d of the *Mines Safety and Inspection Act 1994*, employers must, so far as is practicable, provide and maintain a working environment so that employees are not exposed to hazards. Where it is not practicable to avoid the presence of hazards, employers must provide — at no cost to employees — adequate personal protective clothing and equipment as is practicable to protect them against those hazards.

In addition, regulation 4.1 of the *Mines Safety and Inspection Regulations 1995* requires the manager of, and each employer at, a mine to ensure that any personal protective clothing and equipment supplied for use at the mine:

- conforms to any applicable Australian Standard;
- is properly maintained; and
- is replaced if it becomes defective.

Protective clothing and equipment should be considered only after all other control measures have been assessed and implemented where practicable.

The type of protective clothing depends on the job being performed, and it is difficult to advise on any one type of protective clothing and other equipment that would be suitable for all jobs. Many factors need to be considered, including the comfort of employees. A task-specific risk assessment will indicate which Australian Standards (available from [www.saiglobal.com.au](http://www.saiglobal.com.au)) should be considered.

Some of the standards that may apply are listed below. These lists do not cover all aspects of protective clothing and equipment but are a good starting point.

General Australian Standards publications that are relevant include:

- **AS 1470:1986**  
*Health and safety at work – Principles and practices* (Section 14 Personal protective equipment); and
- **SAA HB 9-1994**  
*Occupational personal protection handbook* (2nd edition).

The relevant Australian Standards for high visibility clothing are:

- **AS/NZS 4602:1999**  
*High visibility safety garments*; and
- **AS/NZS 1906.4:1997**  
*Retroreflective materials and devices for road traffic control purposes – High visibility materials for safety garments*.

For protection against chemicals, applicable Australian Standards include:

- **AS/NZS 4501.2:2006**  
*Occupational protective clothing – General requirements*;
- **AS/NZS ISO 6529:2006**  
*Protective clothing – Protection against chemicals – Determination of resistance of protective clothing materials to permeation by liquids and gases*;
- **AS/NZS ISO 6530:2006**  
*Protective clothing – Protection against liquid chemicals – Test method for resistance of materials to penetration by liquids*;
- **AS/NZS 4503.1:1997**  
*Protective clothing – Protection against liquid chemicals – Test method: resistance of materials to permeation by liquids*;
- **AS/NZS 4503.2:1997**  
*Protective clothing – Protection against liquid chemicals – Test method: determination of resistance to penetration by a jet of liquid (jet test)*; and
- **AS/NZS 4503.3:1997**  
*Protective clothing – Protection against liquid chemicals – Test method: determination of resistance to penetration by spray (spray test)*.

Australian Standards for specific items of clothing and equipment include, but are not limited to:

- **AS/NZS 1715:1994**  
*Selection, use and maintenance of respiratory protective devices*;
- **AS/NZS 1716:2003**  
*Respiratory protective devices*;
- **AS/NZS 1800:1998**  
*Occupational protective helmets – Selection, care and use*;
- **AS/NZS 1801:1997**  
*Occupational protective helmets*;
- **AS/NZS 1336:1997**  
*Recommended practices for occupational eye protection*;
- **AS/NZS 1337:1992**  
*Eye protectors for industrial applications*;
- **AS/NZS 1891.1:1995**  
*Industrial fall-arrest systems and devices – Safety belts and harnesses*
- **AS/NZS 1891.2:2001**  
*Industrial fall-arrest systems and devices – Horizontal lifeline and rail systems*
- **AS/NZS 1891.2 Supp 1:2001**  
*Industrial fall-arrest systems and devices – Horizontal lifeline and rail systems – Prescribed configurations for horizontal lifelines* (Supplement to AS/NZS 1891.2:2001)
- **AS/NZS 1891.3:1997**  
*Industrial fall-arrest systems and devices – Fall-arrest devices*
- **AS/NZS 1891.4:2000**  
*Industrial fall-arrest systems and devices – Selection, use and maintenance*; and
- **AS/NZS 4399:1996**  
*Sun protective clothing – Evaluation and classification*.

# Operating grades

## for mobile equipment

The New South Wales Department of Primary Industries has expressed concern that information supplied by manufacturers of mobile equipment on transmission and retarder performance is being misinterpreted as safe grades for use. This may result in mobile equipment being used on steeper grades than those on which the mobile equipment can safely stop in the event of a transmission failure.

The department has released *Safety Alert SA06-14* pointing out that service, secondary and park brakes may not be able to stop and hold mobile equipment on all grades and loads, as identified in the retardation charts, following a failure of the engine or transmission.

While equipment manufacturers supply gradeability and retardation charts, and confirm the braking systems comply with Australian Standard AS 2958.1:1995 *Earth-moving machinery – Safety – Wheeled machines – Brakes* or International Standard ISO 3450:1996 *Earth-moving machinery – Braking systems of rubber-tyred machines – Systems and performance requirements and test procedures*, mines may be misinterpreting these charts as safe grades for use.

Investigations have found in some cases that manufacturers' maintenance documentation indicates that a fault in the engine or transmission will cause the retarder to automatically disengage and the transmission to shift to a neutral position.

Other outcomes of the investigation are:

- a retarder failure or neutral transmission requires the application of the service brake (foot pedal) to stop the vehicle;
- the service, secondary and park brake may not be able to stop and hold the mobile equipment on all grades and loads as identified in the retardation charts following a failure of the engine or transmission; and

- this particularly applies to articulated six-wheel drive equipment that appears, from performance charts, to be able to operate on very steep grades greater than 25 per cent.

For some equipment:

- there is no fail safe brake (spring applied) for emergency applications;
- both service and secondary braking systems utilise the same components and rely on stored air pressure alone for their operation;
- the failure of a single component, leaks or both significantly reduce braking performance; and
- a risk assessment of the failure modes of the braking system is commonly not available.

The alert recommends that mines should identify all grades on their site where mobile equipment is used, and confirm with the manufacturer whether the particular mobile equipment is safe to use on these grades following failure of the retarder or transmission.

Where written confirmation cannot be obtained from the manufacturer, mines should also review the integrity of braking systems to ensure they are 'fit for purpose' for the grades being traversed.

Maintenance practices on braking systems should be consistent with the level of risk for the site haul roads.

It is also recommended that mobile equipment designers, manufacturers and suppliers should provide information to end users describing the performance of the service, secondary and park brake systems. They should also provide the maximum grade on which the mobile equipment can safely stop and hold following failure of the retarder or transmission, and give practical maintenance instructions that will, if followed, ensure all braking systems remain functional over the life of the mobile equipment.

## Minor miners

The safety and health of employees in Western Australian mines are regulated by the *Mines Safety and Inspection Act 1994* and associated regulations.

Inspectors are sometimes asked about the minimum age for employees and others at a mine site. Although no minimum age is specified in the duty of care provisions of the Act, the duty of care is owed to each employee as an individual and there may be a higher duty owed to someone who is young and inexperienced.

However, a minimum age is prescribed in the regulations for some categories of employees.

For example:

- an underground employee should be above 18 years of age unless he or she is an apprentice or a cadet who is working underground in order to gain required experience in the course of training for a profession or trade;
- a person handling, charging or firing explosives should be older than 18 years; and
- a person should be at least 21 years old to obtain a winding engine driver's certificate.

There may also be minimum age requirements under any applicable industrial award or other legislation, such as that governing education or industrial relations.

In general, young people (below 18 years of age) should not be placed in a relatively hazardous environment and should be provided with adequate supervision.

# Fieldies injured at NSW drill site

A New South Wales Department of Primary Industries safety alert reports that two field technicians were injured when struck on the head by a drill rod that was 3 m long, 89 mm in diameter and weighed almost 35 kg.

The technicians, who sustained moderate injuries, were assisting a contract driller to break a frozen thread on the air swivel of an exploration drilling rig.

The driller and his assistant had attempted to crack the thread on the air swivel and decided to use a drill rod as a lever on the frozen thread.

The technicians working nearby were asked to hold the drill rod in position and the lever was positioned over a set of large Stilson wrenches below the frozen thread.

Another set of large Stilson wrenches was positioned above the frozen thread and the drill rig was started with forward rotation applied to hold the top set of wrenches in place.

The forward rotation force was released, resulting in the drill rod immediately moving in the reverse direction. The two field technicians were struck on the head by the drill

rod, knocking them to the ground.

They both sustained head injuries and, although he was also knocked to the ground by the drill rod, the driller's assistant was uninjured.

Investigations are continuing but contributing factors listed in *Safety Alert SA06-11* include, but were not limited to, the following:

- lever used without first applying risk management principles and the hierarchy of controls;
- drill rig started while people were at risk; and
- the drilling contractor's safety management plan included isolation and job safety analysis (JSA) or risk assessment programs, but they were not effectively implemented.

*Safety Alert SA06-11* recommends that all mines, exploration drill rig owners and operators review their exploration drilling activities and practices with regard to:

- developing and implementing effective isolation procedures to control exposure to hazardous energies;

- providing information and training to ensure people are competent to carry out their work activities;
- ensuring contractors' safety management plans are approved, regularly reviewed and effectively implemented;
- ensuring equipment is fit-for-purpose;
- conducting job safety analysis (JSA) or risk assessment for all non-routine high-risk work activities — and apply the hierarchy of controls; and
- refer to and review section 4.2.7 (exploration drilling) of the *Minerals Industry Safety Handbook*.

In addition, Resources Safety recommends reference to the *Exploration safety high impact function audit* available online from [www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety) in the mining section under 'Guidance material and publications'.

The *Minerals Industry Safety Handbook* is available online from the same section of the Resources Safety website.

## What's new on the web

To find out what's new on the Resources Safety website, add [www.docep.wa.gov.au/ResourcesSafety](http://www.docep.wa.gov.au/ResourcesSafety) to your list of favourites and keep an eye on the billboards at the right-hand side of the homepage. The billboards

link directly to significant new material and are a quick guide to what's been added recently.

If you experience problems using the site or have any ideas to improve its navigability or content,

please contact 9222 3229 or [ResourcesSafety@docep.wa.gov.au](mailto:ResourcesSafety@docep.wa.gov.au) — your input is welcome.



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





# Significant incident reports

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

Significant Incident Report No. 137  
Released 4 July 2006

## Emergency response team members struck by falling oxygen cylinder

### Incident

Recently, two emergency response team members were struck by an oxygen cylinder while participating in a closed-circuit breathing apparatus course. The accident occurred during a search and rescue exercise involving descending an emergency escape ladderway.

Two team members were climbing down from the surface to an underground fresh air base. The team members above started to lower the stretcher loaded with standard search and rescue equipment down the emergency escape ladderway before the two team members were clear of the ladder. A spare breathing apparatus oxygen cylinder dislodged from the stretcher and fell down the escapeway, striking one team member on the arm and the other on the shoulder, resulting in bruising. The outcome of this incident could have been more serious.

### Causes

- Lowering a poorly secured load.
- Emergency response team members descended below a suspended load.
- Team trainer not following standard protocols for descending ladderways.

### Recommendations

- Emergency response captains and trainers (and others) must ensure all items being lowered or raised in a ladderway are adequately restrained and controlled.
- Similarly, employees must not travel or be located in an exposed position below a suspended load.
- Managers should ensure mine rescue teams have standard operating procedures developed for regular activities.
- Managers should ensure emergency response team members are trained in those operating procedures.
- Prior to all practical emergency response training sessions, a job safety analysis (JSA) or job hazard analysis (JHA) should be completed and appropriately signed off.
- Emergency response training sessions should be conducted under the supervision of a competent person who has significant experience and expertise in the discipline in which the emergency response team is being trained.

Significant Incident Report No. 138  
Released 7 August 2006

## Paste fill wall failure

### Incidents

Two mines in the Goldfields have recently had paste fill barricade failures.

The first case was a paste fill barricade that failed during the flushing stage of tight filling a drive underground. An employee parked in a vehicle close by observed the wall bulging and took steps to evacuate the area. A substantial quantity of fill material mobilised out onto the level over a bund wall and down into a sump. Had the employee not taken evasive action, the incident may have resulted in a more serious event. It would appear that the wall was poorly located and not designed for the dynamic loading during flushing to achieve tight filling.

In the second case, a stope was to be filled in two stages — firstly, to fill the stope to a height slightly above the initial drive and the barricade wall and secondly, once the fill had set, to continue filling to the full stope height. During the second stage of filling, the fill wall failed and a substantial flow of paste fill surged down the drive, past the exclusion zone, to where two electricians were working. One of the employees was in a ute. The other took evasive action by scrambling onto the back of the ute. Paste fill travelled past the vehicle at a height of about one metre. The employees were lucky to escape without injury. The paste fill flowed for about 250 m from the wall failure. It

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would appear that the stage one filling had only partly covered the barricade wall, leaving it vulnerable to hydraulic loading during stage two.

### Discussion

- These incidents highlight the potential hazards associated with mining systems that use paste fill. Managers are reminded of their responsibility to provide a safe system of work for employees under section 9 of the *Mines Safety and Inspection Act 1994*.
- The design of mining systems requires consideration of the worst case scenario, using appropriate risk management techniques. The amount of stored energy behind paste barricades is commonly disguised and/or not well understood, with the general perception of paste fill being that it is like thick, coagulated concrete or plasticine and incidents such as those above will never happen.

### Recommendations

When incorporating paste fill into mining systems, the following should be considered:

- The design of fill barricades or bulkheads must be capable of withstanding the hydraulic head that may be placed on them, taking into account general groundwater and other seepage into the stope or drive and anomalies in the water content of the fill. Appropriate structural design must be undertaken and the wall must be constructed in accordance with the design requirements, using appropriate construction materials.
- Quality control systems must be put in place to ensure consistent delivery of the desired paste quality and appropriate placement of fill.
- If necessary, adequate drainage

time (dependent on fill quality and water content) must be allowed between fill runs.

- Fill barricades must be appropriately positioned within the access drive (i.e. constructed against rock faces free of geological defects and built at right angles to the direction of the access drive).
- For tight filling, adequate dimension breather outlet pipes need to be located sufficiently far away from the wall, and only a short distance from paste inlet lines to minimise the potential for pressure build-up on the wall.
- Appropriately designed and located containment bunds should be incorporated downstream of the stope or access drive to minimise the effects of an unforeseen failure on other work areas. Design should take into account escape ways and ore passes. Safe personnel exclusion zones should be established outside the containment area.
- The use of cameras and other remote monitoring devices should be considered to monitor the integrity of fill barricades, breather pipes and the paste fill inlet pipe.
- When placing fill in a void that extends above the vertical height of a barricade and may require more than one fill-run, an appropriate monitoring system must be in place to ensure that the vertical height of the fill is above the top elevation of the barricade at the end of the initial fill run to:
  - ensure a solid base for the subsequent filling and
  - reduce the potential for barricade failure.
- It is also essential to ensure that the fill is adequately consolidated and is of suitable and even quality, without encapsulated water, to avoid unwanted hydraulic loading of the barricade.

Significant Incident Report No. 139  
Released 11 September 2006

## Loss of control of service vehicles

### Incident

Two incidents occurred recently on underground mines where there was a loss of control of a service vehicle while travelling down the decline. In the first case, a loaded concrete agitator truck struck the sidewall a number of times after its brakes failed. It then tipped onto its side in an access drive. The second case involved a flat-bed service truck transporting explosives underground. The operator steered the vehicle into the sidewall to stop it after the brakes failed.

Fortunately, the operators of these vehicles were not seriously injured. However, both vehicles sustained serious damage.

### Causes

- In both incidents, the brakes of the vehicles had been poorly maintained.
- The operators had not completed the required training for the respective vehicles.
- The vehicles were being driven in the wrong gear.
- The agitator truck, which had an automatic transmission, appeared to have been operated in the drive mode and not locked into first gear. As the vehicle picked up speed, it may have automatically upshifted into second gear thereby requiring numerous brake applications to slow it down. The service truck was being driven in high range with a load in excess of its allowable payload. Again, brake applications were required to slow it down.
- The increased braking may have caused the brakes to overheat and become ineffective.



The exhaust brake or retarder systems of the vehicles did not appear to have been working effectively.

**Recommendations**

- Vehicles need to be appropriately maintained, with particular emphasis given to their braking systems. Maintenance schedules should be consistent with manufacturer's guidelines and schedules. Pre-start checks must include brake testing.
- Vehicles operating on mine sites must be able to safely ascend, descend, stop and be held stationary on all grades they are required to traverse. This

should take into consideration the operating environment, loads being transported and braking systems in place.

- The service brake must be able to stop and hold mobile equipment travelling with its rated loads on the decline grades used, should a failure of the engine transmission or exhaust brake or retarder occur.
- Operators must receive proper training and be tested and passed as competent to operate a particular type of vehicle. This should include instruction in the gear to be used when driving down the decline.

- High range gears should be locked out or selection disabled to allow only low range gears to be used underground or on steep surface slopes. Signage for the proper selection of gears should be clearly displayed in the vehicle.
- Managers of mines should confirm with the manufacturers of mobile equipment, particularly types not purpose-designed for the mining environment, that it is safe to use the vehicles with their nominated loads on the decline grades. Appropriate risk assessment for the use of the vehicles should also be completed and recorded.



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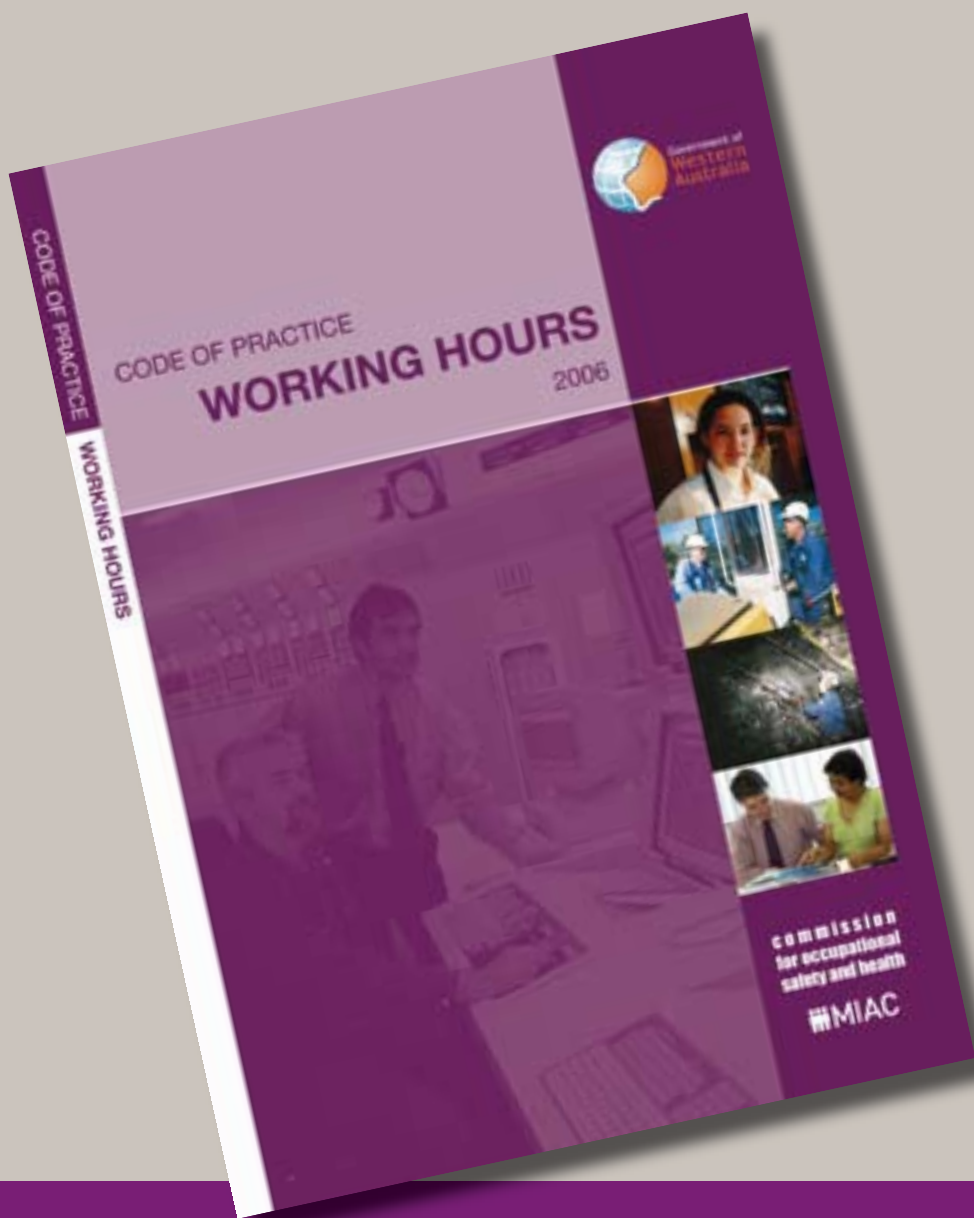
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# Code of Practice

## WORKING HOURS 2006 (including working hours risk management guidelines)



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