MineSafe

Western Australia

No compromise on safety

despite mining industry boom

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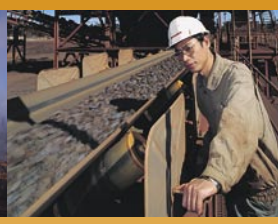

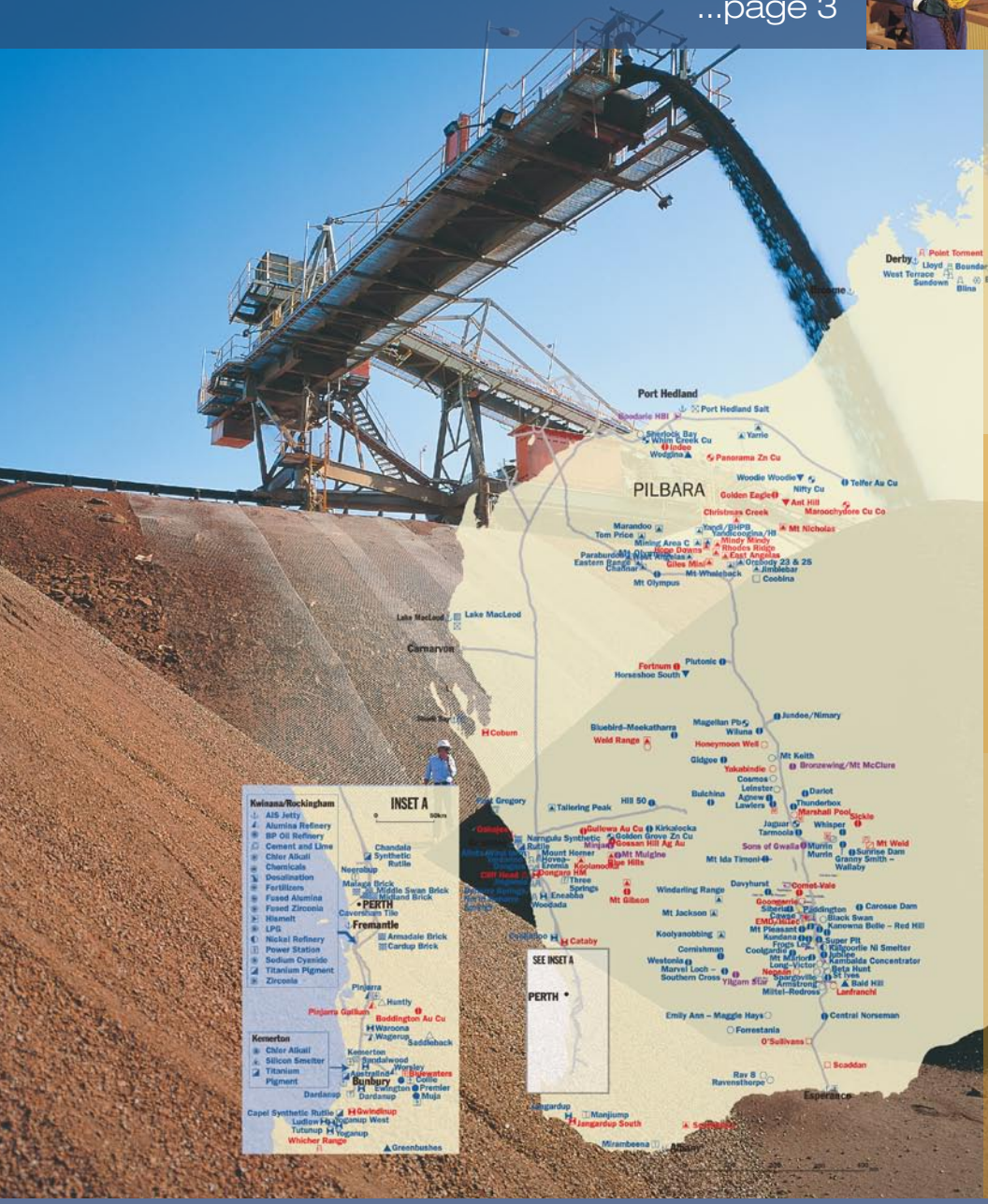

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MINESAFE is published four times a year by the Safety Health and Environment Division of the Department of Industry and Resources. Articles and news items may be used freely, although we would appreciate acknowledgement and a copy of any publication in which they are used.

Editorial

Welcome to MineSafe – the Department of Industry and Resources' flagship publication for communicating mine safety and health issues to mine workers, the minerals industry and the wider community.

MineSafe's aims are to promote safe practices and health and safety awareness at all levels and in all types of locations in the WA mining industry, and provide up-to-the-minute information on safety in mining, and notify of emerging hazards, risks and critical incidents.

In addition, MineSafe will advise you of relevant seminars, conferences and training opportunities, keep you informed about our inspectorate activities, and provide a forum for contributions and viewpoints from the mining industry.

In this issue, we look at the need to ensure hearing protection is worn consistently, the latest dangerous goods community confidence survey, amendments to the Mines Safety and Inspection Act, and we provide an economic snapshot of the mining industry to help show its importance to all Western Australians.

The Department of Industry and Resources is also helping develop the National Mine Safety Framework, an initiative of the national Ministerial Council on Mineral and Petroleum Resources, which will provide common standards across the whole of the Australian mining industry.

The Department's contribution to having an effective and safe mining industry is to provide best-practice regulatory services, using statutory inspections and safety management audits.

We also provide education, training support and information to industry, with safety meetings, presentations to mine site employees, and briefings to industry safety and health representatives complementing our inspection activities.

Your comments on MineSafe are always welcome, and may be emailed, telephoned or posted to the Safety, Health and Environment Division at the Department.

Malcolm Russell
Director, Safety Health and Environment Division
Department of Industry and Resources

What the Department does for WA's mining industry

The Department's Safety, Health and Environment Division oversights safety, occupational health and environmental matters within the mining industry in Western Australia. Advice is given to government and industry on engineering and occupational health and safety matters relating to mining operations, including mineral processing, transportation and storage.

The Safety, Health and Environment Division also regulates and audits the safe storage, handling and transport of explosives and dangerous goods across all industries in Western Australia. While the bulk of these goods relate to the resources sector, they also include fireworks and other hazardous materials used by industry and the public.

Internet database services relating to mining activity can be accessed via the Department's website www.doir.wa.gov.au. These include MINEDEX (information about mine sites, mineral deposits, notices of intent, and site operators) and AXTAT (incident and injury statistics), as well as informational and statistical publications relating to the WA mining industry.

Ministerial inquiry

into OH&S at BHP Billiton's Pilbara iron ore operations

The State Government is conducting an inquiry into occupational health and safety systems and practices at BHP Billiton's Western Australian iron ore operations.

The Ministerial Inquiry is proceeding concurrently with the four statutory investigations already under way under the Mines Safety and Inspection Act into recent fatalities on BHP Billiton sites.

Three fatalities occurred at three different BHPB sites within a three-week period in the Pilbara.

Each fatality is being separately investigated by the Mines Inspectorate of the Department of Industry and Resources.

In addition, the State Mining Engineer has instituted, under Section 45 of the Mines Safety Inspection Act, a formal investigation into the technical processes involved in the fatality that occurred at the Boodarie iron ore pellet plant near Port Hedland.

State Development Minister Clive Brown said the Ministerial Inquiry would investigate whether there were any cultural, behavioural or other factors that might adversely impact on occupational health and safety at BHP iron ore sites.

"In conjunction with the findings of the four statutory inquiries already under way, the outcome of this inquiry will provide a complete picture into occupational health and safety practices on BHP Billiton iron ore sites, to ensure there is the best possible chance of identifying any deficiencies, remedying them and improving safety arrangements."

BHP Billiton and all local union leaders have agreed to the inquiry's terms of reference, which is being conducted by barrister Mark Ritter.

Mr Ritter is expected to deliver his report to the Minister for State Development this year.

Submissions are being treated confidentially and Mr Brown has received strong assurances from BHP Billiton management that there will be no discrimination against anyone making comment.

The government has encouraged all who have worked on BHP Billiton sites and who feel that the inquiry would benefit from their experience to make submissions as a contribution towards building a safer workplace for them and their workmates.

"While the resources sector is important to the State's economy, nothing is more important than ensuring workers return home safely at the end of their working day," said Mr Brown.

"Our resources sector has a strong record of protecting the health and safety of workers, and the number one priority of the industry must be to maintain and improve upon this record."

WA mining industry snapshot

– no compromise on safety despite the boom

Western Australia is the nation's number-one State in terms of resources production.

Covering 2.5 million square kilometres, Western Australia occupies more than one-third of Australia's total land mass – more than three times bigger than Texas and about the size of Western Europe.

At the beginning of 2004, there were 15,877 mining tenements in force, covering 26.3 million hectares.

These tenements host 225 commercial mineral projects, embracing 672 operating sites (open pit and underground mines and quarries) plus 143 processing plants, all together producing about 50 different mineral commodities worth more than $17 billion per year.

WA is one of the world's great mineral provinces, currently producing large percentages of total global minerals including: tantalum – 42%, zircon – 32%, diamonds – 29%, rutile – 28%, alumina - 20%, ilmenite - 19%, nickel - 18%, iron ore - 16%, gold - 8%, and salt - 4%.

Investment in mining in Western Australia has doubled over the past four years.

As a result, the WA resources sector is enjoying a remarkable resurgence and our economy is flourishing, with economic growth of 4.5 per cent predicted for 2004-5, following the growth of 6.7 per cent last year, which was the State's highest growth rate in nearly a decade.

At June 2004, $18 billion worth of resources sector projects were committed or under construction in Western Australia. Another $60 billion of investment is being considered, representing up to 50,000 new jobs, mostly in construction.

This investment comes on the back of record breaking new trade deals with China for natural gas (North West Shelf $25 billion) and iron ore (BHP Billiton $12 billion and Hamersley Iron $15 billion).

If the proposed $11 billion Gorgon LNG project goes ahead, it will generate $2.6 billion a year in LNG sales.

As well, both the alumina and the nickel industry are thriving, with the recent announcement of go-ahead for Ravensthorpe nickel (a $1.4 billion investment with 300 permanent jobs) and Alcoa considering a $1.5 billion expansion of its Wagerup refinery.

Historically, Western Australia has led the nation in terms of resources industry investment, with more than half of all new investment capital for Australia being attracted to WA.

This trend is set to continue as world energy prices reach a 13-year high, and the demand for key commodities continues.

From this will come once-in-a-generation opportunities.

Growth will not be limited to any one area or a single commodity, but will most likely include oil and gas, iron ore, nickel, alumina, heavy mineral sands, salt, gold, natural gas and other petroleum products – of which Western Australia has plenty.

Opportunities will also come from downstream processing industries and varied support industries linked to the resources industry.

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Dangerous goods survey
shows increased community confidence

A recent Department of Industry and Resources survey shows a nine per cent increase in community belief that dangerous goods are being safely stored, handled and transported, compared to the last survey conducted two years ago.

To ensure a statistically accurate result, Perth company Patterson Market Research canvassed opinions from 600 adults (400 metropolitan and 200 country) throughout Western Australia.

According to the 2004 Dangerous Goods Community Confidence Survey, the main reasons respondents felt increasingly confident that dangerous goods were being handled appropriately was that they believed regulations and requirements were adequate, they did not know of too many incidents, they had faith in people handling dangerous goods, and believed the relevant people had a good knowledge of the safety regulations.

While there has been a general increase in the level of anxiety regarding the safe use of all forms of dangerous goods, the survey shows an increased confidence (91 per cent) that dangerous goods will be handled safely, and that the State's emergency services will be able to manage any event satisfactorily.

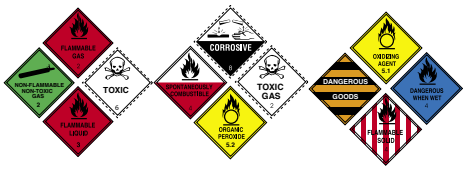
This broader awareness of risk can be attributed to greater media exposure of explosives incidents, either locally or worldwide, and this is borne out by the fact that for the first time in these surveys, terrorism has surfaced as a public safety issue.

Consistent with results from earlier surveys, chemicals and petroleum products retained their position as the most prominent dangerous goods in the public mind.

However, there have been some increases in awareness of other dangerous goods, with one in four respondents referring to pesticides in the latest survey, compared to one in five in 2002.

The survey also found concerns about explosives, which did not rate a mention prior to 2002, had emerged as a community concern, rising from 15 per cent in 2002 to 21 per cent in 2004.

Some survey questions regarding general public safety were also asked in order to establish a context for dangerous goods. Consistent with previous surveys, it was found that Western Australians are increasingly concerned with the public safety issues of road safety and crime.



Importantly, the public regards Western Australia as having a good record in terms of minimising incidents involving the storage, handling and transport of dangerous goods. This is particularly important for the resources industry, which often has large quantities of dangerous goods located on mine sites.

The new Dangerous Goods Safety Act 2004 was passed by Parliament recently, and four suites of regulations are being drafted and expected to be in force before the end of the year.

The Dangerous Goods Community Confidence Surveys began in 1996 and have been conducted each two years since. Western Australia is the only State to have them. In 2000, the Department arranged a comparison survey in Victoria and was able to demonstrate that community confidence is higher in WA.

Most of the time, it's nothing at all

Mrs Murphy had just given birth to her fourth set of twin boys. The doctor said, "Well, Mrs Murphy. It seems that every time your husband makes love to you, it's twins." Mrs Murphy replied, "Oh no, doctor, you're wrong there. Most of the time, it's nothing at all."

Accidents at work are a bit like that. Most of the time, it's nothing at all. For every accident that results in injury, there are a lot of near-miss (or near-hit) incidents or unsafe acts in which no-one is hurt, but which might, if the circumstances had changed just a little, have resulted in someone being injured or killed.

Industrial accidents (not to mention road accidents and accidents in the home) are like an iceberg. By far the biggest proportion is below the waterline and not easily visible. We tend to be concerned only about the bit we can see (the accidents where injury or fatality results) and not worry too much about the invisible menace beneath. But when the Titanic sank, it was the hole in the ship below the water line that did the damage.

Most injuries are not accidents. If all non-injury incidents are monitored over time, patterns may start to emerge that assist us in predicting where, when and how an injury may occur in the future. It follows that if injuries are predictable, they are also preventable, but the only way to ensure that this information comes to light is to report every incident and unsafe act, no matter how minor it may seem at the time.

If as few as four lost time injuries occur per annum in an organisation, then over an employee's working lifetime there is a one in two chance of someone being killed in an accident.

In the past, mining companies have reactively conducted thorough accident investigation. However, tackling the no-injury incidents and unsafe acts more proactively could prevent injuries from occurring in the first place.

For example, look at a company employing 1,000 people, none of whom hold the handrail when using the stairs.

Even if they only use the stairs six times a day this results in more than 1.5 million unsafe acts per year. In this situation, Lost Time Injuries will inevitably happen with resultant pain, suffering and loss of earnings.

In addition, there is a good chance that a fatality will occur, and this will have a long term impact on the person killed, their family, their workmates and the whole organisation.

WA mining industry snapshot

Continued from page 3

Western Australia's iron industry has about $6.5 billion worth of projects either committed or on the drawing board. This includes Rio Tinto and Robe River's mine, rail and port expansions costing $1.25 billion, and the HIsmelt iron making plant under construction at Kwinana, costing $800 million. BHP Billiton also has major expansion plans, and another possibility is the development of the Hope Downs iron ore mine in the Pilbara, worth just over $1 billion.

Fortescue Metal's proposed mine, rail and port development in the East Pilbara, worth A$1.8 billion, and Mineralogy's proposed Cape Preston mine and pellet plant valued at A$1.4 billion, are new entrants to the iron ore industry seeking to capitalise on strong worldwide demand.

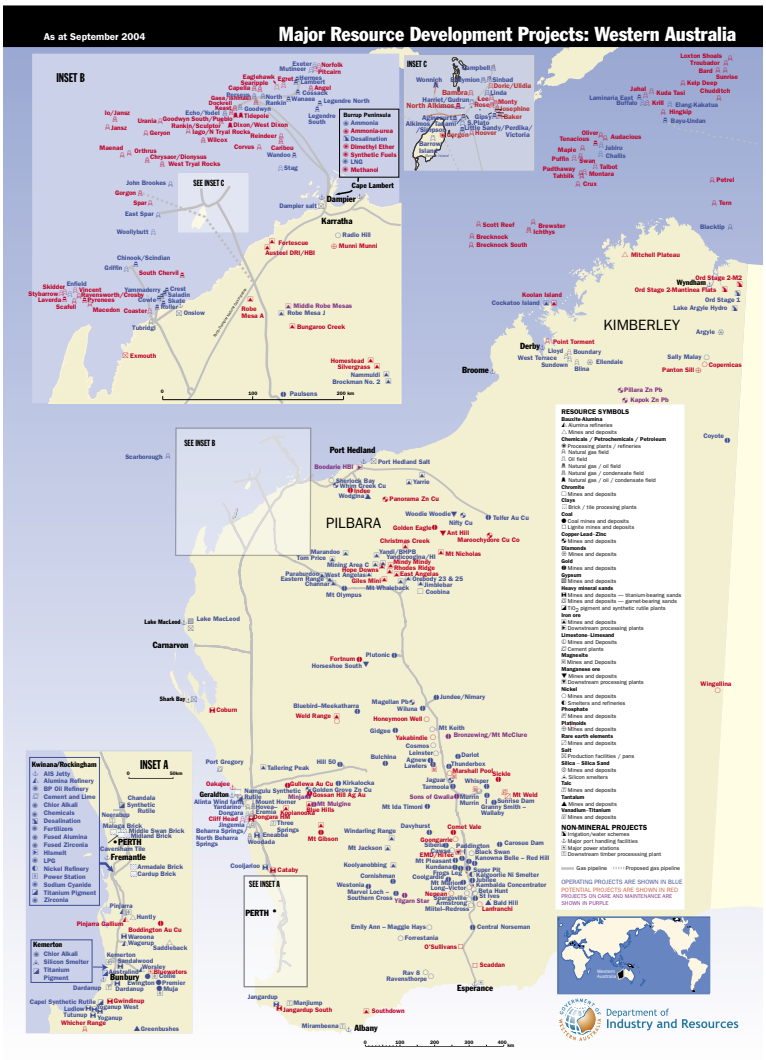
Alumina refinery expansion and optimisation works are under way or planned in the State's South West. They include the Wagerup refinery for which $1.5 billion has been earmarked for expansion work, and the Pinjarra refinery where a significant plant optimisation project is under way. These projects will potentially generate 2,000 construction jobs and 150 permanent jobs.

Expansion of the Telfer gold mine in the State's Pilbara (worth $1.2 billion) is almost complete.

In addition, there are numerous other resource projects totalling more than $10 billion, some of which are subject to final feasibility studies, while others involving desktop studies remain confidential at this stage.

All this development has enormous implications for safety in the workplace.

In particular, we need to ensure that in the enthusiasm and rush to take advantage of the current resources boom, we do not shortcut and downplay the need to make certain the occupational health and safety needs of mining industry employees continue to remain a primary focus.



Safety to be improved by Mines Safety and Inspection Act amendments

The Mines Safety and Inspection Act 1994 (MSI Act) will be amended to further improve workplace safety in Western Australia's most important industry.

The amendments place greater focus on safety by strengthening the workplace administrative and consultative arrangements, ensuring better scrutiny of any workplace hazards or procedures that may need to be improved.

The amendments bill introduced into Parliament at the end of August resulted from a statutory review of the MSI Act conducted by Robert Laing, a former Commissioner of the Australian Industrial Relations Commission. Mr Laing simultaneously conducted a review of the Occupational Safety and Health Act 1984 (OSH Act). It is a statutory requirement that the two Acts be reviewed each five years.

The Laing Review resulted in 61 recommendations aimed at improving workplace safety and will set new standards within the mining industry.

Amendments include:

- Expansion of the general duties of care, largely to close the gaps within the labour hire industry.
- The introduction of more flexible processes for the election of safety and health representatives, and the establishment of safety and health committees.
- Introduction of the right of appropriately trained and accredited safety and health representatives to issue provisional improvement notices (PINs).
- Establishment of a Safety and Health Tribunal, under the auspices of the WA Industrial Relations Commission, to hear matters best dealt with by a tribunal.
- Changes to penalty provisions to reflect the gravity of an offence that ends a person's life or causes injury. The amendments provide for imprisonment in cases involving serious harm or death where the breach constituted gross negligence.

Inaugural Occupational Safety and Health Innovation Awards

Chamber President Kim Horne at the launch

Attracting 25 entries, the Chamber of Minerals and Energy's inaugural Occupational Safety and Health Innovation Award has been won by Alcoa World Alumina Australia for its Powerhouse Ergonomics initiative

AngloGold Ashanti Australia Limited was highly commended for its Hori Board, while Worsley Alumina Pty Ltd received a commendation for its concept, design, construction and commissioning of four-wheel drive vehicles to safely service 51 kilometres of overland conveyors.

Finalists in the Occupational Safety and Health Innovation Awards were:

- Wesfarmers Premier Coal for its new towing device for heavy equipment; and its prevention of carry back, reducing risk using smooth surface wear plate
- Tiwest Joint Venture for safety improvements in its Chandala Laboratory
- Alcoa World Alumina Australia for its eliminating ergonomic and emission risks in confined areas; redesigned horizontal borer work area elimination of fall and ergonomic risks; the Alcoa School Safety Initiative; and scaffold erection - 100 per cent hookup fatality elimination.

The Chamber's Occupational Safety and Health Innovation Awards recognise creative and practical solutions to health and safety problems, and promote their application across the Western Australian resources sector.

The awards were presented by State Development Minister Clive Brown in early October.

"Submissions showcased solutions to specific health and safety problems, design of new equipment and processes, implementation of training programs and modification of procedures," said Chamber Chief Executive, Tim Shanahan.

"It is through these innovative practices that we will continue to promote and assist industry improvements in safety and health performance."

Following the awards ceremony, Professor Jim Joy demonstrated the Minerals Industry Risk Management Gateway (MIRMgate), a website providing access to a useful database of information related to hazard and risk management in mining, minerals processing and quarrying industries. This website can be accessed via a billboard link on the Department's Safety Health and Environment homepage at www.doir.wa.gov.au.

An overview of each innovation is featured on the Chamber of Minerals and Energy's website at www.cmewa.com. For more information, contact Nicole Roocke, Executive Officer, Safety and Health on +618 9220 8513.

Photography courtesy peter.garside@alcoa.com.au

Winners of the Chamber of Minerals and Energy's inaugural Occupational Safety and Health Innovation Awards.

Suggestion Box

From time to time, Departmental inspectors come across a really good idea in the industry – something which is relatively cheap or cost effective, easy to implement and very effective in making a job safer.

Sometimes these ideas are improvements to the way of doing a job, or they may involve a piece of new equipment, or a tool designed for a particular task. The innovation usually comes from individuals or groups of employees who have thought about how they can reduce the risks associated with their jobs.

These ideas can often be applied across the industry and not just on the site where they were originally developed.

Let's share the good ideas that make our industry safer.

So, if you or your workmates have come up with a great idea that helps improve safety, send the details to MineSafe's Editor at richard.langford@doir.wa.gov.au and we will publish your story.

Let us know why the idea was developed, what need it fulfilled, how it was tried and tested, and how successful it was. A photograph or sketch of the idea can be very helpful in getting the message across to others, so include if possible. Also include the names of those involved, ideally with a photograph.

Take care – summer is coming

Working conditions on mine sites and around smelters, kilns, furnaces, roasters and on exploration drill rigs can be potentially hazardous during summer.

This is because the temperature in many regions of the State during this time of the year regularly climbs above the 40 degree mark.

However, the health risks posed by high temperatures can be minimised by following safe work practices.

One of the easiest ways to cool down is to wear clothing that breathes, so that moisture transfer can occur while sweating. Cotton clothing is also safer and more comfortable than nylon or other synthetic materials, as it is more porous.

Taking regular breaks and drinking adequate amounts of water are other ways to help stop yourself from overheating and dehydrating.

It is also appropriate for new employees, or those returning from extended leave or absence, to undertake a formal period of acclimatisation to manage their transition back to a hot working environment.

The brochures *Working in Hot Processes* and *Working in Remote Locations*, produced by the Mines Occupational Safety and Health Advisory Board (MOSHAB), provide more details about reducing the hazards created by hot working environments.

To obtain copies, contact the Department of Industry and Resources' Safety, Health and Environment Division on 9222 3092.

Is mining safety improving?

By Martin Knee
General Manager Mining Safety and State Mining Engineer

It's no accident that Western Australia is one of the safest mining provinces in the world.

Last year, our State's 43,285 mining industry employees worked about 90 million hours.

The good news is that our safety performance is getting better, with the lost time injuries per million hours worked each year during the past decade falling from 13.9 in 1993 to 4.3 in 2004, a more than 300 per cent improvement.

In 1994, the number of incidents reported was 1,033. Ten years on, it has dropped to 394 in 2003-04, a 260 per cent improvement.

However, despite our industry's best efforts, four fatalities and 270 serious injuries were reported to the Department last financial year.

All of the fatalities occurred in iron ore industry operations.

Although there was one less fatality and one more serious injury than in the previous financial year, any incident that hurts or kills is unacceptable to all of us, and we must therefore continue to strive for zero harm and zero fatalities.

Human tragedy on a mine site affects everyone, including co-workers and supervisors, mine management, police officers and the Department's inspectors, all of whom have to confront and intimately deal with the loss of a mate's life in a mine.

But of course, the most affected people are the family of the deceased worker. They have to now live each day with the harsh and painful reality that a partner, a father or mother, a brother or sister, or a son or daughter, is not coming home. Not ever.

The real tragedy is that fatalities and serious injuries do not have to happen.

In every investigation, our inspectors find that the fatality or the serious injury was avoidable.

There is no inevitability about them. We do not have to have an annual quota. And if we do, that quota should be zero.

We must all realise that applying safe work practices every moment of the day does not involve rocket science. But it does involve discipline and the will to avoid taking shortcuts, or doing things differently without an approving full job safety analysis having first taken place.

After you finish reading this publication and return to your workplace, remember continuously that safety starts with you.

None of us are bullet-proof, and so it is also your personal responsibility, not just that of your supervisor and managers, to organise and effectively manage your workplace, and to look out for your mates, so that everyone goes home safely at the end of the shift.

At all times, your mantra has to be – do it safely or not at all.

Earth leakage protection **on mine sites**

With approval from the Mines Occupational Safety and Health Advisory Board (MOSHAB), the Department of Industry and Resources (DoIR) and the Chamber of Minerals and Energy have formed a joint working group to advance a Departmental proposal to widen the mandatory use of electrical earth leakage protection devices on mine sites.

Earth leakage devices (also known as residual current devices or RCDs) automatically switch off the electricity supply when electrical current leaks to earth from faulty electrical equipment or wiring. In the case of an electric shock, where electricity flows through a person to earth, a RCD rated at 30 milliamperes (mA) will trigger and turn off the power well before a serious injury is sustained.

However, it is important to note that RCDs cannot prevent electric shock. They detect a shock as it occurs and then isolate the electricity supply.

RCDs are available in a range of sensitivity ratings. Devices rated at 30mA (or lower) provide an internationally recognised acceptable level of safety called personal protection. Devices rating higher than 30mA afford a diminishing level of protection and cannot be relied upon to safeguard against injury.

In addition, RCDs cannot detect a shock current that returns through the supply system's neutral conductor. However, the incidence of shocks in this category is small and normally arises from contact with live parts inside electrical enclosures.

RCDs are not a substitute for the primary protective measures provided to prevent electric shock from occurring. Instead, they are a back-up for when the primary systems fail, and like other life-saving devices, routine testing is essential to ensure reliable operation when required.

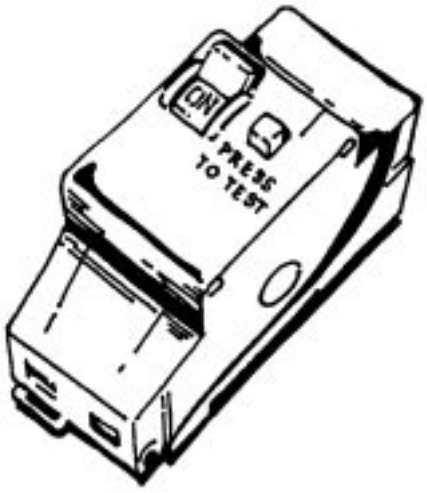
Proposal

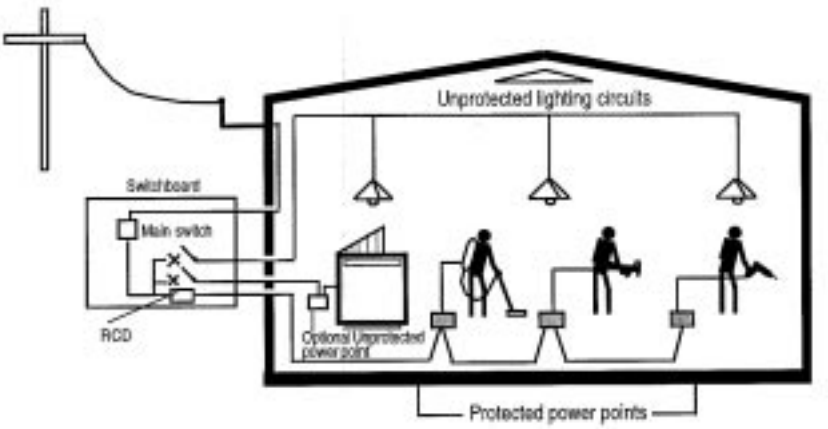
Given that earth leakage devices are readily available and purposely designed to prevent electrocution, DoIR's proposal is that these safety devices be installed wherever it is practical to do so.

Though 30mA personal protection is clearly impractical in certain parts of electrical installations such as high-voltage circuits and distribution systems, there remains a significant proportion of plant items where 30mA RCDs can be employed to provide effective back-up protection; and these circuits happen to be the ones involved in many recurring electric shocks.

Since 1995, MSIR regulation 5.24(2)(c)(i) has required that all circuits supplying portable electrical apparatus be protected by a 30mA RCD. Considering about 18 per cent of mining industry electric shocks consistently fall into this category, there is some comfort in knowing that none of these events could have proved fatal.

Two other electric shock categories that raise much concern, and will be considered by the working group as candidates for RCD protection, are lighting circuits, and control circuits such as stop/start controls, transducers and pump float-switches.





Lighting circuits and control circuits are equally involved in around 32 per cent of electric shocks, and if just these two categories were also required to be 30mA RCD protected (as is proposed), the current 18 per cent RCD safety level would almost triple to 50 per cent.

The target is that 50 per cent of mining electric shocks will not be harmful.

Raising the safety benchmark this high (or further) will undoubtedly challenge the resolve of many – not least the working group responsible for ensuring outcomes are both realistic and achievable.

Issues sure to rouse interesting debate will be defining which control circuits should be protected during the upgrade of existing installations. Extra-low voltage control circuits are an obvious exclusion and this alternative should be pursued as far as possible.

However, problems aside, the Chamber has had little difficulty in providing plenty of horsepower, with more than enough engineers, consultants and supervisors from all industry sectors nominating to participate in the working group, or at least have a background involvement.

The group will be chaired by DoIR's Senior Electrical Inspector, Denis Brown, who says "Let the music begin.

"All together now: I want, I want, I want my RCD."

By Denis Brown
Senior Electrical Inspector

Guidelines launched for

prevention of underground fires

A Hazard Management Guideline for Underground Fire Prevention has been released by the Chamber of Minerals and Energy to help prevent underground fires in the WA mining industry.

The guideline was developed following consultation with industry representatives, and through research into current systems and practices to prevent or minimise the risk of underground mine fires.

The Hazard Management Guideline for Underground Fire Prevention is in two parts, with the first outlining the risk management process and the information that should be considered when determining the underground fire risk. The second part is a reference document detailing the controls that could be considered to prevent underground mine fires, and contingency controls that could be in place to minimise their impact.

The format is based on the risk management model contained within the Australian Standard for Risk Management AS/NZ54360:2004, providing information that establishes the context for underground fire prevention, assists in identifying underground fire hazards and risks, outlines factors used to determine underground fire risk, and introduces potential controls for eliminating or minimising the risks.

The prevention controls are based on controlling the sources of fuel and ignition associated with underground fires through good equipment design, use of proper operating and maintenance procedures, and having personnel competent to perform their tasks.

Employers and mine operators have a duty of care under WA mining safety and health legislation to provide a working environment where employees are not exposed to hazards, or where the risk of exposure to such hazards is effectively managed.

Fires in underground mines pose an extreme risk to the safety and health of underground employees because of the confined nature of the underground excavations, the quantity of smoke and noxious fumes that can be produced and its potential impacts on mine ventilation, and the limited ability to quickly evacuate persons from the mine.

All underground mines should therefore undertake and document an underground fire risk assessment that is specific to its operations.

The information in this guideline has been provided to assist employers and mine operators to undertake this risk assessment and to meet their duty of care obligations to prevent the outbreak of fire in underground mines and minimise the effects, should a fire occur.

Other Guidelines available from the Chamber of Minerals and Energy

- **Guidelines for Mine Emergency Preparedness in WA**

  Practical advice to mine management, emergency response coordinators and emergency response personnel for the establishment and maintenance of a mine emergency team organisation.

- **Guide to Positive Performance Indexing**

  Assists in identifying major factors which if addressed on a systemic basis, would facilitate a positive performance culture on WA mine sites.

- **Back Injury Prevention Guidelines for the WA Mining Industry**

  Better education for both management and workers to reduce the incidence and severity of lower back pain in the WA minerals industry.

- **Guide to Contractor Occupational Health and Safety Management for WA Mines**

  A framework within which mining operations can work with contractors to facilitate quality occupational health and safety management systems and performance.

- **General Duty of Care in Western Australian Mines Guidance Note**

  Detailed discussion on the general duty of care provisions in the Western Australian Mines Safety and Inspection Act 1994.

  Email s.reid@cmewa.com at the Chamber of Minerals and Energy to obtain a copy of these guidelines.

Booster compressor explosions

– reverse circulation drilling

During the past few years, explosions involving booster compressors at reverse circulation (RC) drilling operations have generated a high potential for serious injury or fatality.

Anecdotal evidence indicates a considerable proportion of incidents go unreported, and this impedes awareness across industry and reduces opportunities to improve the management of hazards and risks associated with the use of this type of plant.

Occurrences involving the explosion and/or bursting of pressures vessels such as booster compressor heat exchangers (inter-coolers and after-coolers), condensate tanks (scrubber tanks) and the pipe work and hosing/ fittings directly connected to them must be recorded and reported to the Department of Industry and Resources, pursuant to Section 78 of the Mines Safety and Inspection Act 1994.

Causes and contributing factors

There is little accurate data on the nature of these types of occurrences, but what is known about the occurrences is alarming because in almost all of the reported cases there were common factors such as:

- Booster compressors were older models
- Ingress of hydrocarbon (oil) into the booster compressor compression system and to downstream components, resulting in oil mixing with air to form an air/fuel mixture that under the right conditions, ignites and combusts producing tremendous heat and pressure
- Inadequate maintenance, resulting in worn or defective mechanical components allowing oil to enter the booster compressor system either from other compressors feeding it or from the booster itself
- In at least one case, hammer oil was intentionally introduced into a booster compressor system thereby raising the level of hydrocarbon in the air/fuel mixture and increasing the potential for ignition and combustion
- Deterioration of the scrubber elements' condition, reducing its effectiveness to capture oil, water and other contaminants. (In one situation, the steel gauze and steel wool were found to have melted, indicating several combustion events prior to the explosion)
- Worn and defective mechanical components generating excessive heat and thereby increasing the air/ fuel mixture temperature
- Partially blocked/clogged inter/after-coolers, bringing the temperature of the air/oil mixture within the booster system closer to flash point
- Build up of carbon from previously burnt oil, providing an excellent ignition source in a high temperature environment
- Spikes in booster system pressure, such as from sudden discharge valve closure
- Sparks from various sources, such as static electricity or mechanical parts.

Symptoms

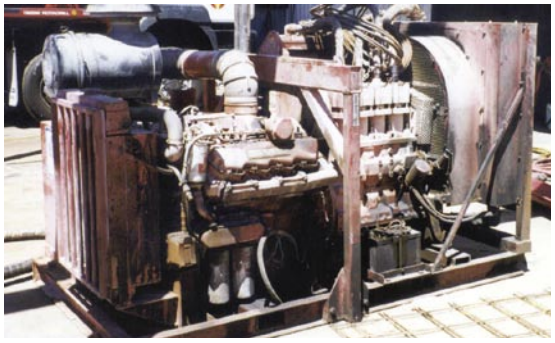
- Excessive oil loss caused by mechanical wear/failures, allowing oil to enter the booster compressor system
- Oil leaking from parts of the booster such as the breather hose, seals or gaskets
- Excessive oil present when draining scrubber tank
- Excessive operating temperatures of booster engine and compressor
- Excessive oil loss from compressor feeding booster compressor.

Duties of employers and precautions to be taken

Given the pressures and volumes of compressed air involved with RC drilling operations, it is imperative the highest standards of design, maintenance and operation of all compressors is established and maintained.

Before continuing any use of high-pressure compressed air at RC drilling operations, all employers should immediately undertake the following actions:

- Establish monitoring procedures to ensure none of the above-mentioned conditions are present at operations under their control, and establish measures to eliminate such conditions.



- Ensure compliance with the following Regulations of the Mines Safety and Inspection Regulations 1995 by completing a formal hazard/risk assessment and reducing identified risk to an acceptable level determined in consultation with employees:
  - o Reg. 4.13 Induction and training of employees
  - o Reg. 6.2 Employer to ensure plant is maintained and operated in a safe manner
  - o Reg. 6.17 Employer to identify hazards associated with plant and to assess risks
  - o Reg. 6.18 Employer to reduce identified risks

Duties of designers, manufacturers, importers, suppliers and hirers

Designers, manufacturers, importers, suppliers and hirers have duties under the Mines Safety and Inspection Act and must ensure any hazards/risks associated with the plant are identified, assessed and reduced so far as is practicable, and that they are in compliance with the respective regulations contained in Part 6 of the Mines Safety and Inspection Regulations.

Opportunities for improvements

The following should be investigated and where appropriate, actioned by employers, designers, manufacturers, importers, suppliers and hirers:

- Improving end users' awareness and management of hazards/risks associated with use of high-pressure compressed air plant
- Providing adequate instruction, training, assessment of competency and supervision to equipment operators and maintainers
- Ensuring operation, maintenance and safety information is readily available
- Developing systems and methods for reducing the reliance on increasing compressed air pressures to achieve desired drilling outcomes
- Reducing booster intake and discharge air temperatures
- Providing sensors that automatically shut down the booster when recommended temperatures are exceeded
- Utilising oils with higher flash point ratings
- Providing additional pressure safety devices in addition to pressure relief valves to safely vent in the event of internal combustion occurrences, as pressure relief valves are not designed for such sudden occurrences.

Reference information for the management of hazards in drilling operations is provided in Safety Bulletins No: 21, 31; Significant Incident Reports No: 003, 020, 036, 047, 051, 061, 077, 079, 087, 092, 095, 109, 113, 119; MOSHAB Reports: Drilling Hazards Sub-committee Report and Drilling Hazards Report. These references are available from the Department's website at www.doir.wa.gov.au

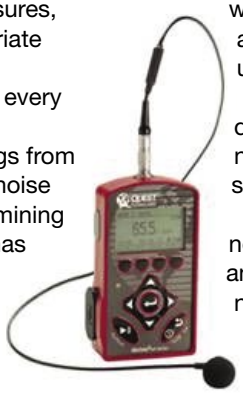
Employee **Noise Exposure**

Mining employee noise exposure is initially assessed during a noise reporting process prescribed in the Mines Safety and Inspection Act 1994.

The levels of employee noise exposure obtained are then used for a series of noise control measures, including selection of appropriate hearing protectors.

This process is carried out every five years.

As a result of recent findings from the MineHealth database on noise induced hearing loss among mining employees, the Department has recommended that individual mining companies introduce personal noise exposure programs to enable quicker responses if corrective action is required.



Personal noise exposure programs use noise dosimeters that are worn by employees during their work to provide accurate measurements of individual noise exposure.

Data from dosimeters with data-logging functions can be downloaded and displayed graphically to clearly show when the employee was exposed to various noise levels, as shown in the chart below:

Showing employees how their individual noise exposure varies across a day is useful in gaining their cooperation with noise control measures such as appropriate procedures or the use of hearing protection.

Recent experience with dosimeters has also identified noise levels in excess of those shown in noise reports.

The Department is collating noise dosimetry data for more analysis that will assist in reducing noise exposure within the mining industry and preserve the hearing of mine workers.

Data provided to date clearly show underground workers experience higher noise exposure than other workers.

The Department currently has more than 1,500 noise dosimetry recordings entered into the MineHealth database. Of this data set, over 75 per cent is above the 85 decibel (dB) action level.

Mining industry seminars and conferences

Quantitative Mineral Resource Assessment and Exploration Risk Analysis for Strategic Planning
Brisbane Qld, 1-2 December 2004
More information at www.ausimm.com/events/upcoming.asp

Australian Institute of Occupational Hygienists Conference (AIOH)
Perth, 4-8 December 2004
More information at www.aioh.org.au

PNG Mining and Petroleum Investment Conference
Sydney, 6-7 December 2004
More information at www.ausimm.com/events/upcoming.asp

Managing Rock Dumps and Stockpiles
Perth, 17-18 February 2005
More information at www.acg.uwa.edu.au

AusIMM's 9th Underground Operators' Conference
Perth, 7-9 March 2005
More information at www.ausimm.com/events/upcoming.asp

RaSiM6 – Sixth International Symposium on Rockburst and Seismicity in Mines
Perth, 9-11 March 2005
More information at www.rasim6.org.au

Ground Support in Open Pit and Underground Mines
Brisbane Qld, 5-8 April 2005
More information at www.acg.uwa.edu.au

Aucta 12th Australian Tunnelling Conference
Brisbane Qld, 17-20 April 2005
More information at www.acg.uwa.edu.au

Second World Conference on Sampling and Blending
Sunshine Coast Qld, 9-12 May 2005
More information at www.ausimm.com/events/upcoming.asp

Centenary of Flotation 2005
Brisbane Qld, 6-9 June 2005
More information at www.ausimm.com/events/upcoming.asp

Tailings Management and Decommissioning
Perth, 23-24 June 2005
More information at www.acg.uwa.edu.au

8th International Mine Ventilation Congress
Brisbane Qld, 6-8 July 2005
More information at www.ausimm.com/events/upcoming.asp

Advanced Geomechanics in Underground Mines
Perth, 3-4 August 2005
More information at www.acg.uwa.edu.au

FLAC-3D Numerical Modelling
Perth, 5 August 2005
More information at www.acg.uwa.edu.au/courses_f.html

Hoist and Haul 2005
Perth, 5-7 September 2005
More information at www.ausimm.com/events/upcoming.asp

Blasting for Stable Slopes
Perth, 15-16 September 2005
More information at www.acg.uwa.edu.au/courses_f.html

Iron Ore 2005
Perth, 19-21 September 2005
More information at www.ausimm.com/events/upcoming.asp

AusIMM Extractive Metallurgy Operators' Conference 2005
Brisbane Qld, 26-30 September 2005
More information at www.ausimm.com/events/upcoming.asp

MineBox Expo
Becoming WA's biggest mining and engineering expo, incorporating the latest technology, products and services for the mining industry
Claremont Showgrounds, Perth, October 2005

Underground Mining Seminar Series
Four one-day workshops - open stope mining, narrow vein mining, caving geomechanics
Perth, 26-28 October 2005
More information at www.acg.uwa.edu.au/courses_f.html

Visit www.doir.wa.gov.au for other information