

minesafe

WESTERN AUSTRALIA

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Government of Western Australia
Department of Mines and Petroleum
Resources Safety

RADARS

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BATON CHANGE
FOR SME
.....

ALL ABOUT HEAT
.....

CONSULTATION CODE
DISCUSSES "HOW TO"
.....



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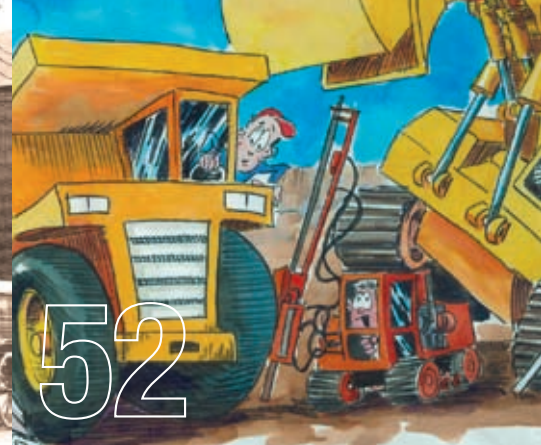
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Welcome to the third and final issue of *MineSafe* for 2009. In this issue marking the 20th anniversary of *MineSafe* and retirement of the State Mining Engineer, not only does Resources Safety look to the future with its RADARS strategy, but we look back at the journey of the mines inspectorate and mine emergency response competitions.

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The mine emergency response competitions are important events on the mines safety calendar and this issue covers both the 2009 Underground Mine Emergency Response Competition and 2009 South West Emergency Response Skills Challenge.

This issue also includes the four significant incident reports and safety bulletins issued by Resources Safety since September 2009, and features the recently released code of practice on consultation in the workplace, which is a "how to" guide initiated by the Mining Industry Advisory Committee (MIAC).

As always, enjoy your reading and have a safe and happy festive season.

Malcolm Russell
Executive Director, Resources Safety



A SAFER FUTURE IS ON THE RADARS

RADARS: REFORM AND DEVELOPMENT AT RESOURCES SAFETY

In response to needs identified in recent independent reviews and inquiries (e.g. 2009 Kenner Review of the *Mines Safety and Inspection Act 1994*), and a spate of mining fatalities, the Western Australian Government has committed to overhauling the way safety and health in the resources industry are regulated.

The RADARS strategy will be coordinated by the Department of Mines and Petroleum's Resources Safety Division — the State's specialist regulator for occupational safety and health in the mining, onshore petroleum and geothermal sectors, and the safe use of dangerous goods.

The design of RADARS not only considered the recent independent reports and safety regulatory activities in similar jurisdictions (e.g. Queensland), but also the unique aspects of the large and diverse resources industry in Western Australia.

There are three main drivers for RADARS — legislation, capacity and competency.

Legislation

Resources Safety Executive Director Malcolm Russell said that the current regulatory trend of more emphasis on risk management and less on detailed prescription would continue, with a focus on reducing the likelihood and consequences of serious incidents.

“The risk-based approach puts the onus on operators to demonstrate that they understand the hazards and risks of their particular workplaces, and have implemented control measures to eliminate or manage these risks,” he said.

“The aim is to create a modern, uniform legislative base to reflect community expectations and adopt agreed national resource safety strategies and Council of Australian Governments reforms for occupational safety and health.”

Changes to the mines safety and inspection legislation may be considered but will entail extensive consultation and detailed regulatory impact assessment, as required by the Department of Treasury and Finance.

There is also a need for dedicated petroleum and geothermal safety legislation — separate from administrative arrangements relating to licensing and royalties.

Capacity

Independent reports on safety regulation released over the years have identified the need for additional technical and support staff in specific areas at Resources Safety. In particular, Commissioner Kenner reported that the current number of mines inspectors per capita of workers is significantly lower than for comparable mining jurisdictions elsewhere in Australia.

“An increase in staff is needed not only to maintain a minimum program of enforcement work, such as inspections and audits, but also to support more proactive and transparent compliance measures aimed at reducing serious incidents,” Mr Russell said.

“Case managers will be established across industry sectors and regulatory teams will need to have diverse skills and expertise.”

“A dedicated team of experts will be formed to investigate serious incidents, even if no-one has been injured — this will lead to targeted safety initiatives aimed at eliminating the root causes of many accidents.”

Under RADARS, enhanced data management and analysis systems will allow decisions about compliance and education work programs to be based on evidence and risk profiles. In addition, staff of the three inspectorates will be able to access compliance and other databases remotely, allowing better use of their time and resources.

Substantial resources will also be directed towards staffing at regional mines inspectorate offices.



Competency

The State's resources industry has seen unprecedented growth, not only in the number of workers but also the size and complexity of operations and the diversity of commodities. The regulator requires a broad mix of staff with the technical, audit and communications skills needed to oversee industry sectors adopting systems-based risk management models for safety.

Resources Safety has developed a recruitment and professional development strategy to ensure that inspectors will have the competencies, intellect, passion and experience necessary for the regulator to:

- systematically recognise and eliminate hazards in the industries for which it is responsible;
- use appropriate persuasion and, where necessary, enforcement to achieve legal compliance as a minimum standard;
- be consistent and proportionate in the application of legislation;
- develop and maintain strategic networks among stakeholders so that constructive relationships can be used to drive safety and health outcomes; and
- facilitate and encourage continuous improvement of safety systems for industry sectors within its responsibility.

Delivery of this regulatory style requires mechanisms for:

- defining the key competencies required for inspectorial positions at different career stages;

- where necessary, providing the training and environment to attain and maintain those key competencies and any specialist skills; and
- recognising the attainment of those key competencies and specialist skills.

The strategy incorporates a competency assessment program for the three inspectorates, with the independently assessed Diploma in Government (Workplace Inspection), based on recognised prior learning (RPL), being the standard qualification.

Inspectorate staff can also have occupational safety and health expertise and experience formally recognised through nationally recognised certification.

Looking to the future

Responsibility for safety performance rests principally with those in industry creating and controlling the risks, and must be managed in consultation with those who are exposed to the risks.

“The Government’s vision for RADARS is a proactive safety regulator working with industry to create an environment in which ‘resilient’ safety cultures are the norm, and companies, workers and the wider community are confident that industry is operating as safely as possible,” Mr Russell said.

“For industry, the ultimate outcome will be a reduction in the number and severity of incidents, and another step towards the goal of ‘zero harm’.”

SAFETY CULTURE SPECTRUM - ALL OPERATIONS SHOULD ASPIRE TO BE RESILIENT

SAFETY CULTURE "TYPE"	VULNERABLE	RULE FOLLOWERS	ROBUST	ENLIGHTENED	RESILIENT
Characteristics	In denial Messengers ‘shot’ Whistleblowers dismissed or discredited Protection of the powerful Information hoarded Responsibility shirked Failure punished or covered up New ideas crushed	Deal ‘by the book’ Conform to rules Target = ‘zero’ Reactive Repair not reform Information neglected Responsibility compartmentalised New ideas = ‘problems’	Develop risk management capacity Enhance systems Improve suite of performance measures Develop action plans Monitor/review progress Clarify/refine objectives	Active leadership Safety management plan widely known Competent people with experience Accountabilities understood Advanced performance measures Regular reviews Range of emergency responses catered for	Strive for resilience of systems Reform rather than repair Responsibility shared Actively seek new ideas Messengers rewarded Proactive as well as reactive Failures prompt far-reaching inquiries Flexibility of operation Consistent mindset = ‘wariness’
Descriptions	In disarray Pathological	Organised Reactive	Credible Calculative	Trusting Proactive	Disciplined Generative
Strategy	Sanction	Direct	Encourage	Partner	Champion

Table compiled by Martin Knee from a variety of sources

NEW LEAD AGENCY ROLE FOR DMP

The Department of Mines and Petroleum (DMP) has been designated the lead agency for the regulation of mining, petroleum, geothermal and carbon capture and storage proposals under the State Government's implementation of a "lead agency framework", announced by Premier Colin Barnett on 16 October 2009.

As defined by the State Government, the goal of the lead agency framework is:

To establish a seamless approvals system that can deliver necessary approvals within an acceptable timeframe and cost to proponents and government, while taking into account the public interest.

Under the new lead agency framework, a specific government department will be designated as the first point of call for a project. The lead agency takes a more proactive role in assisting proponents through the entire approval process, with a custom level of service depending on the size, scale and significance of the project. It is responsible for overseeing the whole application approval process and liaises with other agencies where required.

Lead agency key contacts have been established at DMP to provide the first point of contact for proponents for information and advice on their proposals.

Petroleum, geothermal and carbon capture and storage

Petroleum tenure and land access — *Beverley Bower, 9222 3133*

Petroleum environmental approvals — *Kim Anderson, 9222 3142*

Petroleum resource management — *Reza Malekzadeh, 9222 3759*

Petroleum well approvals — *Steve Walsh, 9222 3267*

Minerals

Mining tenure — *Tony Bullen, 9222 3112*

Mining Native Title and Aboriginal heritage — *Adrian Murphy, 9222 3031*

Minerals environment — *Xuan Nguyen, 9222 3237*

Resources Safety

Dangerous goods licensing — *Andrew Kempton, 9358 8028*

Other lead agencies include the Department of State Development for major resource projects like Gorgon and Oakajee, and the Department of Planning for infrastructure projects such as the sinking of the Northbridge rail line and the Perth waterfront development. The Department of Regional Development and Lands will become the lead agency for developments like Ord River Stage Two.



IS FATIGUE A DYING ISSUE?

Many of the presentations at the recent Mines Safety Roadshow held in regional centres and Perth referred to the issue of fatigue. This hazard is not unique to the resources industry, and it is certainly not the result of recent developments or technologies. Fatigue has been a part of the human condition since time immemorial — but are we any better equipped to handle it in the twenty-first century? There has been substantial research worldwide on this topic. Results are readily available and many of these studies were used in the code of practice on working hours — but how effective are we at applying them to improve occupational safety and health?

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Anyone who has done shift work knows about fatigue. The equation is simple — not enough good quality sleep equals a difficult time at work.

One of Resources Safety’s District Inspectors, Adrian Lang, has completed a study into the effects of fatigue in the mining sector as part of a Masters degree course in risk management (see *MineSafe*, volume 18, number 2, pages 28-29). He recently presented a paper at a Perth forum on contractor safety alignment for energy and resources. Strategies were put forward at the forum to help shift workers and management cope with the fatigue issue.

The coping ability of any worker is related to three basic factors:

- the person’s “body clock”, which is linked to the circadian rhythm, a roughly 24-hour cycle shown by physiological processes (i.e. tells us when to eat, sleep and wake up);

- sleep quality; and
- domestic and social factors.

These factors are said to be like the three legs of a stool (Monk and Folkard, 1992). If any single factor is weak then the stool will fall over when called upon to do its job. And those who influence these factors include the employer, the employee and the employee’s family and friends.

To ensure that the legs of the stool remain strong enough to support the worker, an appropriate set of strategies must be in place. Shift work is difficult for some workers because of the lag time in adjusting to the changing waking hours. Our body clocks simply do not adjust to the eight- to 12-hour time shift in our activity profiles. This problem is in-built (the technical term is endogenous) and can only be managed by obtaining good quality sleep.

When good quality sleep eludes us, fatigue sets in, and the problem is compounded as we accumulate a sleep “debt”. Unfortunately, a sleep debt cannot be eliminated by simply gaining equivalent extra sleep at the next opportunity — to eliminate a sleep debt requires “interest”!

Some of the best fatigue strategies relate to obtaining a good sleep, as listed below.

- Prior to a change in the shift cycle, ensure that good quality sleep is maintained and sleep debt is minimised.
- Darken the bedroom (e.g. ensure curtains are fully drawn, turn the clock radio away from your bed).
- Activate the “silent” setting on items such as telephones and doorbells.

WORKING HOURS GUIDANCE

Jointly published by WorkSafe and Resources Safety, the code of practice on working hours applies to all Western Australian workplaces covered by either the *Occupational Safety and Health Act 1984* or *Mines Safety and Inspection Act 1994*.

The code and accompanying working hours risk management guidelines are available from the Resources Safety website.

Hardcopies may be purchased from the Publications Officer at the Department of Commerce (ph. 08 9327 8721, email publications@commerce.wa.gov.au).

WHAT REST WORKS – TOOLBOX PRESENTATION NOW AVAILABLE

Being sufficiently alert to concentrate on critical tasks is vital for mining industry safety. The code of practice on working hours, released in 2006, provides guidance on the management of safety and health hazards and risks commonly associated with roster arrangements.

The hazards also include those relating to individual and lifestyle factors, such as the amount and quality of sleep. While employers cannot tell workers how to live their private lives, fitness for work is an employer's legal responsibility.

But how can we raise awareness of the importance of sleep and proper rest when not at work? This topic was covered at the 2009 Mines Safety Roadshow and is now available as a toolbox presentation in the mining safety guidance section of the Resources Safety website.

- Let people know that there is a shift worker sleeping (e.g. sign on door, respect your mates on the cross shift).
- Maintain the room temperature between 18 and 24°C.
- Use ear plugs and eye masks.
- Sleep in a room remote from other activities (e.g. family, other workers).
- Use background noise (e.g. air conditioner, fan) to mask outside noise.
- Avoid caffeine, alcohol, smoking and going online (or other activity that over-stimulates the brain) before bedtime.
- Use a routine similar to that of your "normal hours" before retiring to sleep.
- If sleeping becomes too difficult, get up and walk around or read for 20 minutes (don't log on to the computer!) then try again.

Another factor that has an appreciable effect upon the worker's body clock is the shift roster itself. Studies have shown that shorter turnrounds such as *2 days, 2 nights, 4 off* or *4 days, 4 off, 4 night, 4 off* present a lower fatigue risk than longer turnrounds such as the traditional *2 weeks on, 1 week off* fly in-fly out (FIFO) roster with a *7 night, 1 off, 7 day, 6 off* work pattern.

Obviously, rosters and work patterns must be considered carefully and there will be many competing interests in their selection. I remember well the difficulties that the mines inspectorate observed when the legal provisions regulating hours of work were removed and 12-hour shifts became common in the 1990s. I wonder how many workers would want to go back to the 7.5 hour limit for underground miners?

In one of his papers, Adrian presented a five-step plan for managing fatigue issues associated with shift work. This came from the work conducted by Gertler and others, published in 2002.

- Secure and maintain senior management commitment.
- Develop a company fatigue policy and procedures.
- Communicate with the workforce and train them in the fatigue policy and procedures.
- Manage fatigue and alertness in the workplace using the fatigue policy and procedures.
- Use the continuous improvement cycle of monitoring, reviewing and modifying to maintain the effectiveness of the fatigue policy and procedures.

The risk management guidelines that accompany the code of practice on working hours are a very useful tool when assessing the hazard factors and risks to be addressed in the policy and procedures. And applying the five-step plan will go a long way towards effectively managing the hazard presented by fatigue at your work place.

References

T H Monk and S Folkard, 1992, Making shift work tolerable. Taylor and Francis, London, 94 pp.

J Gertler, S Popkin, D Nelson and K O'Neil, 2002, Toolbox for transit operator fatigue. TCRP Report 81, Transportation Research Board, Transit Cooperative Research Program, Washington DC.

Simon Ridge, State Mining Engineer



TYC Martin Knee receiving his commemorative SME plaque from DMP Director General Richard Sellers

BATON CHANGE FOR STATE MINING ENGINEER

After more than 20 years with the Resources Safety Division of the Department of Mines and Petroleum and its predecessors, the State Mining Engineer Martin Knee retired on 2 October 2009 and started the next stage of his life.

After travelling the world and working on mine sites in Zambia, Ireland, the Middle East and around Australia, Martin said it was time to pass the baton to a new team member.

"I have seen a lot of changes and a lot of people come and go in the department, but now it is my turn to go," he said. "One of the things that influenced me in going now is that I am determined to have some fun with the rest of my life."

"I watched my father manage six months of retirement before he died of his first and only heart attack and thought this is not going to happen to me, so time to take your leave while you are still young enough to enjoy the rest of your life."

The third-generation engineer started his career in Zambia after completing a degree in England as a mining engineer. After looking at various types of engineering, Martin said

mining engineering had offered the best opportunity for travel and broadening horizons.

"My father thought I was seriously deranged wanting to go into the mining business and he could not understand why anybody would want to go into dark holes in the ground, but I never regretted it," Martin said.

"My first job in Zambia as a very green, young engineer was on the Mufolira mine. We had an accident there that killed 89 people and that made a powerful impression on me that has stayed with me my entire career.

"There was a major cave-in and inundation by one of the large tails dams at the mine, and the damage caused was devastating. It was, however, a good education in terms of what can go wrong. It was a very large and well run operation, and had been more or less like shelling peas until this problem occurred.

"I spent the first couple of years of my career working on the recovery operations from the accident, which included working as a shift boss and mining directly underneath the site of the major cave-in that had caused all the problems. This clarifies the mind wonderfully."

“

YOU NEVER FORGET THAT THERE ARE ACTUAL PEOPLE BEHIND THE STATISTICS, THAT'S THE BIG LESSON YOU HAVE TO LEARN AS IT IS PEOPLE'S LIVES YOU ARE DEALING WITH

”

After getting married and working seven years with the company to progress from a very junior engineer to an underground manager with 700 staff, Martin decided to take up a job opportunity in Ireland.

“My wife didn't like Zambia as the Rhodesian War was going on and it was very rugged and violent in a lot of cases, so we left and went to live for a couple of years in west Ireland,” Martin said.

“It was quite an eye opener after Africa, and I realised why Ireland was forty shades of green as it used to rain about 300 days a year.

“I took up a position as the mine engineer with Tynagh mine and one of the things I was involved in was handling the closure schedule for the mine, so I knew exactly how long it was going to last and was able to get out in good time.

“Then, in 1979, I landed a job in the Middle East as the mine manager on the Sohar Copper Project in the Sultanate of Oman. You couldn't get a more different environment from the lush green in Ireland we had been living in, to the rocky desert in the Persian Gulf.”

After a couple of years in the Middle East, and with their second child on the way, Martin and his wife moved back to England.

“Oman was a touch primitive in those days and it wasn't a great place to have a new baby, especially with the climate, which was pretty brutal in summer,” he said.

“We went back to England for a few months and I thought I had better get a job. After some calling around, I was offered two opportunities, one in South Africa and the other in Australia. I didn't really want to go back to Africa as I had been there and done that, so I decided to head to Australia.

“After flying to Sydney for an interview, I landed a job as general manager of the Gunpowder copper mine in Queensland, which I found interesting as it was an underground in-situ leaching operation and very different to what I had been used to.

“It was a short-term job as the mine closed down, so we left Queensland and headed to Leinster in Western Australia, where I started as the chief engineer, and later became the mine operations manager.

“After a few years in the job, I decided to try working in an open-cut mine and went to Argyle diamond mine. My job with Argyle was a bit of a revelation, and my first view of the surface mining job was ‘why has a man been beating his brains out down dark holes in the ground all of this time when he could have been doing this?’

“Some of the biggest differences were that you could see everything that was going on, and if you wanted to speak to anyone you could just pick up the microphone and talk to them on the radio. You couldn't do that on underground mines in those days, although all of that has changed quite significantly

now with underground communications being improved.

“Although I loved the job, it was fly-in fly-out and hard on the family, so I looked around for another job where we could all be together. That's how I came to join the then Department of Mines in 1986.”

Martin's first position in the public sector was as the senior inspector of mines in Karratha. After seven years in the role, Martin took up an opportunity to move back to Perth as the senior inspector of mines for the Perth region, which in those days covered the area from south of Carnarvon to Albany.

Following Martin's promotion to the role as general manager of the mines inspectorate, he was appointed the State Mining Engineer in 2001.

“When my predecessor as the State Mining Engineer, Jim Torlach, retired, I took over that role as well, which I found to be much more involved in the policy side of things,” Martin said.

“I saw some very interesting things during my time in the role. I have enjoyed it, although it has been hard from time to time, and you never get used to dealing with the families of people who have been injured or killed on a mine site. You never forget that there are actual people behind the statistics, that's the big lesson you have to learn as it is people's lives you are dealing with.”

Martin said the one thing he will take away with him is the people he has met in both the industry and public sector.

“I have worked with some really good people and I have learnt a lot from them both professionally and personally,” he said. “There are very high quality people working in the inspectorate, and they are technically very competent.

“I guess one of the things that has surfaced in the resources industry is the way the inspectorate will operate going forward into the future. Major changes are on the way. It's something that I have been involved with and it has made me conscious that it's time to pass the baton on to someone a bit younger, more enthusiastic and more open to change.

“In any management role, you have to know your use-by date and, after 23 years in the department, mine is up.”

Martin said he has no real plans until after Christmas, but attending to his wife's list was his first priority.

“My wife has a long list of jobs she wants done around the house, and on my first weekend in retirement I will no longer have any excuse not to do them,” he said.

“Travel is not a high priority as we have done quite a bit of travelling already. However, if we want to go to Rio for the Carnival, we can now just get up and do it.”



TAKING OSH ON THE ROAD

Resources Safety staff recently engaged with industry members on mines safety concerns surrounding radiation, vehicle access, the importance of rest and sleep, and hazardous manual tasks. These topics were up for discussion at the fifth annual Mines Safety Roadshow held in October 2009.

Executive Director of Resources Safety, Malcolm Russell, said that the annual roadshows were a valuable tool in keeping regional areas throughout Western Australia up-to-date on key safety and health issues of concern to the mines inspectorate.

“Through these roadshows, we can ensure that industry has access to highly qualified staff and the latest information,” he said. “The State Government is committed to ensuring that the State’s mining industry operates under the best safety framework possible, and implementing initiatives such as the Mines Safety Roadshows is valuable in helping industry to adopt a risk management approach.”

The roadshow kicked off in Kalgoorlie, before travelling south to Bunbury and north to Tom Price. Perth was the last stop in

the itinerary. There were about 300 participants in total. The number would have been higher but some 20 registrants did not make it into Tom Price as the town was encircled by fires and access roads were closed. However, a later videoconference meant some did not miss out completely.

Each roadshow started with an overview of industry’s recent safety performance, followed by information sessions. The events also provided opportunities for networking with other registrants as well as mines inspectors, senior scientific officers and Resources Safety staff involved in education and training.

The Perth event also addressed the issue of safe design of equipment, with a presentation by Stuart Evans of Sandvik Mining and Construction, who spoke on behalf of the Earth Moving Equipment Round Table (EMESRT).

EMESRT was formally established in 2006 by six global mining companies to start a process of engagement between original equipment manufacturers (OEMs) and mining customers. The aim is to encourage OEMs to incorporate human factors issues early in the equipment design life cycle to help designers reduce health and safety risks to an acceptable level, particularly those associated with operability and maintainability.



TYC Bunbury

“ THROUGH THESE ROADSHOWS, WE CAN ENSURE THAT INDUSTRY HAS ACCESS TO HIGHLY QUALIFIED STAFF AND THE LATEST INFORMATION ”
MALCOLM RUSSELL

Stuart's in-depth machinery expertise and knowledge of the mining industry at local, national and international levels, combined with his occupational health and safety experience and OEM perspective, led to an informative and balanced overview of EMESRT's role and plans for the future.

Resources Safety's Director of Mines Safety and newly appointed State Mining Engineer, Simon Ridge, said that the roadshows were also important in supporting the development of resilient safety cultures in mining workplaces, with communication and consultation being integral to this process. The manual task presentation clearly demonstrated this philosophy, with the application of "participative ergonomics" being fundamental to successfully managing this hazard, which accounts for about half of all injuries.

One of the major issues discussed at all venues was fatigue management. There appears to be an increasing willingness in industry to tackle this issue in a coordinated and consultative manner. This will be a key action item for Resources Safety's education and information program in 2010, and it is hoped to use an approach similar to that adopted for hazardous manual tasks.



SH Fires cut off Tom Price during the roadshow



SH Delegation leader Yang Shaohua (left) with State Mining Engineer Simon Ridge

REGULATORS BRIEF CHINESE VISITORS ON SAFETY IN WA

A delegation from China's Zhejiang Administration of Work Safety recently visited Resources Safety to learn about the division's many roles and activities.

The 20-strong delegation was in Perth as part of a five-day State visit organised by the Department of Commerce's WorkSafe Division. The visitors attended seminars, presentations and site visits to learn how their Western Australian counterparts regulate the various aspects of occupational safety and health.

The delegation heard from the following Resources Safety presenters.

- State Mining Engineer, Simon Ridge, gave the visitors a brief overview of the history of Western Australia's mines safety and health legislation, the current situation for the mining inspectorate, and future directions.
- Principal Dangerous Goods Officer, Lawry Lim, explained the role of the Dangerous Goods Safety Branch and legislative requirements that Western Australian companies working with dangerous goods are expected to adhere to. He also briefly covered onshore petroleum safety.
- Communications Manager, Su Ho, described Resources

Safety's important role in safety education and publications. The group showed particular interest in the roadshows, the role of safety and health representatives, and the participation of staff in industry events such as the mine emergency response competitions.

Resources Safety also arranged visits to MineARC Systems (refuge chamber manufacturer), Alcoa Kwinana and Wesfarmers Premier coal mine in Collie.

Through an interpreter, the Zhejiang Administration of Work Safety's Director, Mr Yang Shaohua, said that the presentations were very informative.

"I have learnt many things so far, and I found the points on education for general workers and promotion of safety conduct in the workplace very interesting," he said.

"I feel that we share many concerns with our colleagues here, and have many fundamental common goals such as reducing incidence and fatality rates in all aspects of the industry."

Mr Yang said he was most interested in hearing about how Western Australia's safety legislation differs in each industry and how industry responded. The group was particularly curious about the move from prescriptive to risk-based legislation.

DMP LEGISLATIVE PROGRAM AS AT 3 DECEMBER 2009

MINES SAFETY AND INSPECTION ACT AND REGULATIONS

On 26 November 2009, the Western Australian Parliament passed the *Mines Safety and Inspection Amendment Bill 2009*. The Bill received Royal Assent on 3 December 2009. It provides for the insertion of a new regulation-making power to enable regulations to be made to impose a levy that will be payable to the State for the costs of administering the Act.

The Bill also provides that the funds will be held in a special purpose account under the *Financial Management Act 2009*, which is administered by the Department of Treasury and Finance. This account will be subject to separate accounting and reporting requirements.

Regulations will be drafted to implement the levy scheme in early 2010. The scheme will enable the Department of Mines and Petroleum to proceed with the mining aspects of the reform and development strategy for Resources Safety to become a "best practice" safety regulator.

The levy scheme will be based on the calculation of the number of industry full time equivalent (FTE) workers on a mining operation. It is proposed that the levy will not apply to small operations with ten or less FTE workers.

The latest version of the legislation is available from the State Law Publisher's website at www.slp.wa.gov.au

DANGEROUS GOODS SAFETY ACT AND REGULATIONS

As reported in the last issue of *MineSafe* (October 2009), Resources Safety is progressing a raft of amendments to reduce the regulatory burden and streamline administrative processes. These are still being drafted by Parliamentary Counsel.

PETROLEUM SAFETY LEGISLATION

Drafting of the safety regulations attached to the *Petroleum Pipelines Act 1969* (PPA) and the *Petroleum and Geothermal Energy Resources Act 1967* (PAGERA) is close to finalisation. A brief period of consultation will follow to allow stakeholder and industry comment.

Once the regulations are completed, the remaining parts of the *Petroleum Legislation Amendment and Repeal Act 2005*

(PLARA), which introduce an occupational safety and health regime into the PPA and the PAGERA, will be proclaimed along with the safety regulations.

NATIONAL ACTIVITY

On 25 September 2009, the Workplace Relations Ministers' Council agreed to release an exposure draft of the model Occupational Health and Safety (OHS) Act for public comment for a six-week period that closed on 9 November. The Department of Mines and Petroleum and Department of Commerce made key submissions for the Western Australian OHS regulators. Publicly available submissions are accessible at:

www.safeworkaustralia.gov.au/swa/ModelLegislationPublic+Comment/ModelLegislationPublicComment.htm

The National Mines Safety Framework (NMSF) Steering Group, which operates under the auspices of the Mineral Council on Mineral and Petroleum Resources, also made a submission, which is available from this website.

On 1 November 2009, Safe Work Australia began operating as an independent body with primary responsibility to improve occupational health and safety and workers' compensation arrangements across Australia. Safe Work Australia will continue to operate under the Commonwealth Government's accountability and governance frameworks.

Under the new arrangements, the former Safe Work Australia Council is now known as Safe Work Australia. There are 15 members, including the independent Chair, Mr Tom Phillips AM, nine members representing the Commonwealth and each State and Territory, two members representing workers (ACTU), two members representing employers (Australian Chamber of Commerce and Industry; Australian Industry Group) and the Chief Executive Officer of Safe Work Australia. Further information is available at www.safeworkaustralia.gov.au

DANGEROUS GOODS SECURITY CARDS

The current exemption from requiring a dangerous goods security card expires at the end of the year, by which stage all individuals required to have a security card under the dangerous goods safety legislation (e.g. shotfirers, explosives transport drivers) must have one.



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CHECKS NEED TO BE DONE ON MOBILE EQUIPMENT, POWER STATIONS, PUMPING STATIONS AND DRILLING RIGS, AND THEY ALL COME UNDER THE SAFETY INSPECTION UMBRELLA

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A LIFE OF
MECHANICS

ROD MCFARLANE

Resources Safety's Special Inspector of Mines (Machinery), Rod McFarlane, has been involved with mechanics all his life.

After completing an apprenticeship as a heavy duty fitter on trucks as a teenager, and fitting in some time to backpack around the world to places including Asia, Pakistan, Afghanistan, Iran and Europe, Rod spent the next 30 years in the mining industry. He particularly enjoyed the fly-in fly-out lifestyle.

In 1990, Rod started his own mining company with a friend. They built an alluvial treatment plant in Perth, transporting the plant from the city to the Pilbara by road.

"We operated a plant in the Pilbara about one and a half hours' drive out of Marble Bar, and had two employees," he said. "We also operated the plant on a mine site near Port Hedland, where we mined tin and tantalite for a number of years until the commodity price dropped. The plant also used a lot of water and that was a major problem for us as there was not much water in these areas — there was not much of anything really."

Rod joined the Resources Safety Division in March 2007 after taking a year off work to finish a diploma in mechanical engineering. He said the core part of his job involves mines inspections and safety audits on the mechanical side of treatment and production plants.

"Checks need to be done on mobile equipment, power stations, pumping stations and drilling rigs, and they all come under the safety inspection umbrella," he said.

"The job does entail long distance travelling to mines sites, mostly by car, and this usually means that I am away from Perth for about five days at a time.

"My time in Perth is usually spent catching up on classified plant applications, which we process for the mining industry, and answering phone queries on plant and machinery matters."

Rod said the biggest challenge he faced in his job was getting the message out about keeping the "safety bar" at a level that ensures a consistent level of safety for employees on mine sites.

He said Resources Safety was driving changes to help keep the mining workplace safe.

"The division emphasises investigations when they are required, and provides direction and information through the Mines Safety and Inspection Regulations for the improvement and enhancement of safe work practices and procedures," he said.

"The division will be going through a major change over the next 12 months that will result in an upgrade and recognition of skills among all inspectors, including those in the mines inspectorate. I have started an external TAFE course on occupational safety and health, which I should complete in about six months' time."

Rod said that when he is not working in mechanics, he enjoys a barbeque with family and friends.

"My wife shares my enthusiasm for travel, and we try and get away whenever we can," he added.



“ MY NEW ROLE IS ALL ENCOMPASSING, IT GRABS EXPERIENCE FROM EVERY LEVEL, WHETHER ACADEMIC, WORK ON SITE OR JUST GENERAL LIFE EXPERIENCE ”

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WELL QUALIFIED
FOR SEISMICITY
CHALLENGE

ALEX ATKINS

Resource Safety has a new Senior Mining Engineer, Alex Atkins, who is both a qualified geologist and mining engineer.

Alex joined the division in July 2009 after some 20 years of industry experience, with more than 15 of those being mainly in underground metalliferous mines throughout Australia and in Papua New Guinea (PNG). She also has postgraduate qualifications in management and holds First Class Mine Manager's Certificates for Western Australia and Queensland.

With her extensive geotechnical expertise, Alex has undertaken to compile Resources Safety's knowledge database and guidelines on mining-induced seismicity. Her research, inspections and audits are focussed on the Kalgoorlie–Leinster region.

Alex started her career as a mining geologist after her interest in the field was sparked in high school.

"I first studied geology because of a social science teacher," she said. "I found it really interesting and thought I'd like to be a geologist or palaeontologist. Then someone from the WA School of Mines spoke to my class and I was sold on the idea of mining as a career."

Alex moved to Kalgoorlie in 1986 to study at the WA School of Mines, and graduated with a Bachelor of Engineering in Mining Geology with Honours.

After two years working in Queensland as an open-cut mine geologist and exploration geologist, Alex returned to university to study a Bachelor of Engineering in Mining, graduating from The University of Queensland in mid-1995.

Having a double-degree in geology and mining engineering opened up many doors for Alex and, by 1996, she was established at Porgera underground gold mine in PNG working as a production engineer. This required clearance from the PNG Mines Minister as it was illegal for women to work underground. Alex worked through roles in production, ore reserve estimation, mine services and ventilation, leaving after two and a half great years to obtain the practical underground mining experience required to attain a First Class Mine Manager's Certificate.

Alex completed six months of mechanised mining at Osborne mine in Queensland then a year of handheld mining at Mt Morgans in Western Australia. She obtained her WA First Class Mine Manager's Certificate of Competency in 1998.

Over the next few years, Alex gained a diverse range of geotechnical and engineering knowledge. As the long-term mine planning engineer at Renison in Tasmania, Alex was tasked with establishing a geotechnical engineering department from scratch, and was first exposed to stress modelling for mine design and sequencing. At Kidston open cut gold mine, in northern Queensland, she worked in a team trying to monitor and control deep-seated structural instability in the pit wall hosting the haul road.

She then moved back to Osborne mine to work as a production and planning engineer and further developed her geotechnical engineering skills. Alex was also responsible for the hydraulic fill system, which had been revamped by a consultant after a barricade failure and the Bronzewing incident — an experience that has left Alex wary of hydraulic fill to this day.

After seven years working as a geotechnical and planning engineer, Alex decided to take a break from mining and have a family, with her first child arriving in October 2003. She moved to Cairns and worked as a civil project engineer for local government. Her second child was born in late 2006, at the same time as her first child was diagnosed with autism. She then took two years off work to focus on the children.

In mid-2008, Alex and the children moved back to Western Australia to be around family and friends, and she obtained a position as a senior mining engineer at a consulting firm. This was a great opportunity to revitalise her mine design software skills and obtain experience in mine valuations. In mid-2009, Alex decided to make the switch to the safety regulator.

Resources Safety provides the perfect opportunity for her to utilise all her qualifications and industry experience, including her First Class Mine Manager's Certificates, in the pursuit of one of her greatest passions — protecting worker safety.

"My new role is all encompassing," she said. "It grabs experience from every level, whether academic, work on site or just general life experience. It pulls it all together for a good cause."

The Department of Mines and Petroleum has flexible working conditions, and Alex balances work and family life by working a three-day week. She also has the support of her parents, who care for the children when she is at work or away on inspections.

Alex says this is a dream job for her as she is surrounded by supportive, family-oriented and very experienced people who have the same core values about worker safety. In the longer term, she hopes to become a District Inspector after a earning her stripes as a Special Inspector of Mines.

AA Alex's children Beccy and David are also well prepared for the mining game



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WE USE ANY
FEEDBACK WE
GET TO MAKE
OUR PROGRAMS,
PUBLICATIONS
AND EVENTS MORE
RELEVANT AND
ACCESSIBLE TO
INDUSTRY

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THE ROAD LESS
TRAVELLED

SU HO

From initially wanting to be a physicist to becoming a geologist, mentoring hordes of teenagers and now firmly entrenched in a role involving education and information, Resources Safety's Su Ho has taken a few different directions in her career. After finishing high school in Albany and with thoughts of being a physicist, Su headed to Perth to study at The University of Western Australia (UWA).

"I loved the sciences such as physics and chemistry. Geology incorporates these and more, so that's what I ended up studying. Also, I grew up in the wheatbelt and love red dirt," Su said.

After completing Honours and PhD degrees at UWA, Su was awarded a National Research Fellowship to undertake postdoctoral studies.

"My research involved analysing the fluids that formed gold deposits more than two and a half billion years ago. The 1980s were an exciting time for UWA researchers as we discovered a lot about how these ancient deposits formed. I was then awarded a Minerals and Energy Research Institute of WA Fellowship, which I did part time as I had started consulting," Su said.

"I also helped set up the Key Centre for Strategic Mineral Deposits at UWA. The Centre's Director for many years was Professor David Groves, a world-renowned economic geologist, who has also been a long-time mentor. He always emphasises using the scientific approach to tackle problems — collect the information, interpret it, work out its significance and then, maybe, start speculating about what it might all mean in a wider context. This has been good advice."

In 1991, Su took a very different road when she had twin boys. She carried on with some of her consulting work then, after five years, took on the Australian Mineral Student Venture (AMSV) for The Australasian Institute of Mining and Metallurgy. She was the West Region's Administrator for 11 years.

"UWA, Curtin, the WA School of Mines and Murdoch University nominated me to coordinate a new annual program, the ASMV, to give high school students an insight into the minerals industry and associated university courses," Su said. "Setting up the ASMV in WA gave me a broad perspective of the mineral industry, from exploration through mining to mineral processing. We covered the breadth of the industry to show students the variety of careers available."

It was in this role that Su's passion for safety in the resources sector flourished.

"Through dealing with the duty of care requirements for the students, I really appreciated the safety and health side of things, which had always been there but became more apparent in this role. It's a huge responsibility taking teenagers on mine sites and trying to instil a safety perception in them before they go underground or into a processing plant," she said.

In 2003, Su joined the then Department of Industry and Resources' Geological Survey Branch as a geoscience editor — she had written and edited numerous research publications and this was an opportunity to apply those skills.

In late 2004, the position of Senior Promotions Officer came up in the Department's Safety, Health and Environment Division, now known as Resources Safety, and Su decided to try her hand at something new. The role has evolved and expanded to Su's current position as Communications Manager.

"A challenging aspect is ensuring our guidance material is user-friendly and accessible. With this role, my scientific background and time interacting with teenagers have been really helpful in working out how to communicate the sometimes highly technical information" Su said. "We are always looking to improve things. We use any feedback we get to make our programs, publications and events more relevant and accessible to industry."

"We also try to feed information back to industry quickly by getting safety alerts out to people so they can learn from other people's mistakes and not re-invent them, but this doesn't always happen. However, we keep working on raising awareness and maybe it can save someone somewhere some heartache."

So what does Su do behind the scenes? As well as her interests in AFL, science fiction and keeping fit, she is a founding member of Geoconferences, a voluntary association of geologists who have organised conferences and field trips in Western Australia for over 20 years, and provide travel grants for students.

Su said that although her career has taken many paths, it has all come together in her current job, where she believes she can make a difference.

"Both my brothers and many of my friends are in the resources industry. I think we can make a difference — much of it is about raising awareness and getting people to stop and think before they act. I have done the research and consulting side of things — my role now is about people in the industry. Every little bit counts and I know I am helping to make a difference. I believe in that saying, from little things big things grow."



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A DANGEROUS GOODS OFFICER ACTS ON BEHALF OF THE PUBLIC TO CHECK THAT THINGS REALLY ARE SAFE. WE ARE THEIR EYES AND EARS IN TERMS OF DANGEROUS GOODS.

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EYES AND EARS OF THE PUBLIC

LAWRY LIM

When it comes to dangerous goods, Resources Safety's Lawry Lim has been the eyes and ears of the public for over 27 years. But how did this former industrial chemist make his way into handling dangerous goods safety?

After completing a degree in Applied Science and Applied Chemistry at Western Australia's Institute of Technology, now known as Curtin University, and working as a laboratory and mineral processing chemist for three years, Lawry joined the department in 1982 as a dangerous goods inspector.

Lawry said his interest in safety, the challenge of dangerous goods and the ability to make a difference attracted him to the role.

"In the early 1980s, my role involved travelling the State for about 12 to 14 weeks of the year. I did safety inspections, primarily on fuel storage, explosives and transport operations including fuel tankers," Lawry said.

"In 1992, the Government brought in new regulations that included dangerous goods not previously covered, such as LP gas, chlorine and cyanide. My chemical background came in handy because we needed to know the chemical properties of a wider range of dangerous goods."

After 21 years as an inspector, Lawry took up a new challenge as the department's Principal Dangerous Goods Officer, which involves leading a team of a ten.

"The team is responsible for four sets of regulations. So we can prioritise the work, we look at incident statistics and trends, as well as the types and quantities of goods stored at various locations in the State, to determine areas that need extra attention. WA has about 4,000 licensed dangerous goods sites," he said.

"At the moment, I am finishing the investigation into a major petrol tanker fire at a service station in the Perth suburb of Maddington. Part of our role is to communicate learnings from incident investigations like this to prevent them happening again. We may even suggest improvements to national standards, such as the Australian Standards."

One of the major investigations that Lawry has been involved in was the 2002 fireworks explosion in a storage facility in the Perth suburb of Carmel.

"I was part of the team that investigated the explosion and prepared a very comprehensive report. The incident happened in March, and we finished our report in July. As part of the investigation, we talked to residents and the fireworks operators, took statements and gathered evidence to try and reconstruct what happened," he said.

"The investigation revealed that a man was sorting out boxes of fireworks inside a metal shed. He said that he put one of the boxes down and it started shooting out fireworks unintentionally while he was inside the shed. Fireworks shot to other areas that had fireworks stored, and in the end there was a big bang. No-one was hurt, fortunately, but there was a lot of damage.

"We cast our investigation quite widely as we had to gather all the metal fragments that came from the exploding containers. The investigation prompted a review into the classification of fireworks and helped communicate to the public to take more precautions when importing fireworks from overseas. We also published a report on the explosion, which was sent and utilised by the United Nations, as a similar event had occurred in the Netherlands."

After 27 years with the department, Lawry said he had seen an improvement in safety, although there was still work to be done.

"It's important to be out there to see what's happening at industrial and mine sites. You need to get those who are on site everyday, and may not see anything wrong with what they are doing, to think about the hazards," Lawry said.

"We take it for granted that everything is safe. A dangerous goods officer acts on behalf of the public to check that things really are safe. We are their eyes and ears in terms of dangerous goods.

"It is important to try and encourage sites to do the right thing. Ultimately, adhering to the safety rules will benefit everyone in the work place. The community will also benefit because everything is safe."

After a day of handling dangerous goods, Lawry enjoys handling the basketball. He has been playing for more than 30 years and currently competes twice a week.

From chemistry to explosives to basketball, Lawry Lim is certainly a man of many talents.

SMOKING RATES IN WA MINING

Health surveillance refers to any health assessment or biological monitoring used to identify changes in the health of workers. This includes, but is not limited to, the statutory initial and periodic health assessments of mine workers (MineHealth assessment). The purpose of any health surveillance system is to enable early identification of adverse health effects that may occur in a population from exposure at work. The *Mines Safety and Inspection Act 1994* requires employers to establish a health surveillance system for their employees.

The objectives of the health surveillance system for Western Australian 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.

SMOKING RATES AT THE INITIAL MINEHEALTH ASSESSMENT



To help with the development of occupational health policy, the MineHealth data was analysed recently to identify any significant risk factors contributing to poor health. The most striking observation related to smoking rates. The graph shows the proportion of smokers for males and females in selected age ranges at the time of their initial assessment. The smoking rate for all ages combined is 35.5% for males and 32.6% for females at initial assessment.

Fortunately, a reduction in these smoking rates is observed in mining employees who have had more than one MineHealth assessment. However, smoking rates persist at about 27% for both genders by the third assessment.

Analysis of the MineHealth data also shows that blue-collar workers are more likely than white-collar workers to smoke at rates exceeding the national average of 17.5%.

Health statisticians around the world have now confirmed that smoking tobacco is the single most preventable cause of ill health and death. Not only is it the major cause for some respiratory conditions, but it also contributes as a major risk factor to coronary heart disease, stroke, peripheral vascular disease and cancer.

	SMOKING RATES	
	1st assessment	3rd assessment
Blue-collar worker in WA mining industry	36.7%	29.4%
White-collar worker in WA mining industry	20.4%	18.0%
National average	17.5%	



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Members of the working group who attended the final meeting. *Left to right:* Louise Coubrough (Alcoa), Lorraine Lovatt (Iluka), Sara Kirwan (Monadelphous), Suzanne Bannerman (Alcoa), Dianne D’Arcy (Citic Pacific Mining Management), Lindy Nield and Wendy Pietrocola (Resources Safety), Stewart McDonald (Minara Resources), Danielle Soares (Chamber of Minerals and Energy WA), Stephen Sandilands (Fortescue Metals Group)

MANUAL TASKS GROUP WRAPS UP

After meeting regularly since August 2008, the tripartite Manual Tasks Working Group met for the last time on Friday 13 November 2009.

The working group’s initial aim was to identify tools that would help mining companies to manage the hazards associated with performing manual tasks at work. Resources Safety’s expert ergonomist, Wendy Pietrocola, then converted the wish list into a suite of resource materials that have been reviewed, and in some cases road-tested, by the group.

The resulting guidance will be available from the Resources Safety website in the hazardous manual tasks area of the occupational health section:

- implementation guide on managing hazardous manual tasks;
- workplace training package; and
- high impact function audit tool that can be used to self-audit (will also be used by Resources Safety inspectors).

These resources accompany the ten Manual Tasks in Mining Fact Sheets that are already available.

If you don’t know what a hazardous manual task is, or why you should care, then visit www.dmp.wa.gov.au/7221.aspx

Wendy and the project manager, Resources Safety’s Lindy Nield, explained that, while there was a core of hardworking regulars, the working group fluctuated in number from ten to 30 highly motivated and interested people.

“The whole process was a really positive experience for all of us,” they said. “The success of this project is that, through consulting with the people who do the work — our field experts — we came up with useful solutions that the participants wanted and need and, more importantly, will use.”

The contribution from everyone involved, including those who could not make it to the photo shoot, was invaluable and greatly appreciated.

WHAT'S NEW IN HEALTHY ACTIVE WORKPLACES

The Department of Sport and Recreation has produced a workplace physical activity and health resource kit, and online health and wellbeing questionnaire.

The resource kit may be used as a planning guide. It contains information for setting up both simple and more detailed programs at the workplace, and covers program design, implementation and evaluation.

To help establish a baseline for the workforce, the online survey allows the collection of employees' health behaviours to create a non-identifiable overall picture of their health and wellbeing, and suggestions on how to make improvements. Individual feedback and advice are also provided to employees who complete the survey.

To order the resource kit or download the survey:

- visit the workplaces section at www.dsr.wa.gov.au
- phone 08 9492 9700
- email activeworkplace@dsr.wa.gov.au
- write to PO Box 329, Leederville WA 6903



A resource kit for physical activity and health in the workplace

Sport and recreation builds stronger, healthier, happier and safer communities



FIFO RESEARCH REPORT RELEASED

The size and contribution to the economy of Western Australia's resources industry are no secret. The mining sector employs almost 70,000 people in more than 300 mine sites with a significant percentage participating in fly-in fly-out arrangements (FIFO) and extended working hours. Many people in Western Australia are either directly or indirectly affected by this pattern of employment, so there is curiosity and concern about the social, family and personal impacts of such work.

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As reported in previous issues of *MineSafe*, Ms Susan Clifford of The University of Western Australia, recently completed her PhD research project, "The Effects of Fly-in/Fly-out Commute Arrangements and Extended Working Hours on the Stress, Lifestyle, Relationship and Health Characteristics of Western Australian Mining Employees and their Partners".



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The following information has been extracted from Ms Clifford's report, which is available at www.ihs.uwa.edu.au/research/mining

Ms Clifford's research largely disputes many anecdotal claims that FIFO employees are much more likely to have high stress levels, poor relationship quality or poor health than daily commuters. The study suggested that, although there were some negative impacts of this type of work on aspects of the lives of employees and their partners, the results were comparable to those of daily commuters.

There have been many claims over the years that FIFO has a detrimental effect on work satisfaction, lifestyle, relationships and health. Some also suggest that this type of employment can lead to increased stress levels and result in depression, binge drinking, recreational drug use and relationship break-ups.

Ms Clifford's research was conducted between July 2006 and July 2008, and comprised:

- Study One, which focused on long-term impacts; and
- Study Two, which focused on short-term impacts (a roster length limit of 35 days).

Study One involved a retrospective survey, which was circulated to a sample of 196 daily commuters and FIFO employees and partners with varying mining rosters. Study Two was a more detailed prospective examination of the impacts of extended working hours on a sample of 32 employees and their partners. This study involved participants keeping daily diaries and submitting saliva samples (to measure cortisol, a commonly used marker for stress levels). The data collected was used to analyse stress, mood, lifestyle, relationship and health over the short-term or on a day-to-day basis.

Work dissatisfaction

The findings of Study One indicated that:

- there were moderately negative impacts from FIFO and

extended working hours on employees' work satisfaction; and

- FIFO was reported to be disruptive to employees' and partners' lifestyles over the long term.

However, these negative results were at levels comparable to those of the wider community.

The research also suggested that the length of rosters (how long was spent at on-site accommodation) had an impact on work dissatisfaction. Workers with the longest and shortest rosters demonstrated the highest level of dissatisfaction, while those with moderate rosters were the least dissatisfied. It is noted that less than five per cent of employees in Study One recorded "very dissatisfied" with FIFO and their work rosters.

Stress levels

Study One candidates demonstrated long-term stress levels very similar to those of the wider community. Study Two candidates had low perceived stress levels and normal psychological stress levels (as measured by the saliva samples), but there was some fluctuation throughout the roster.

Most candidates demonstrated elevated psychological stress levels toward the "leave-work transition period" (the period before returning to work) of an employee's roster. It has been found previously that misunderstandings and arguments are more likely to occur in this period. The study suggests that both employees and their partners use sufficient coping mechanisms to deal with this type of stress.

Study One showed that transition periods were particularly stressful over the long term. These results may be less accurate due the survey data being retrospective. This type of data is more likely to lead to more emotional memories (e.g. arguments, missed birthdays) being remembered rather than ordinary events.

Results also showed that FIFO and extending working hours employees were just as likely as daily commute employees to



suffer from stress, bad moods and fatigue during times of shift transition periods.

Employees and partners both recorded “the anticipation of the employee returning home” and “spending quality time together” as being the most positive aspects of FIFO activity.

Lifestyle and relationships

The research demonstrated that FIFO and extending working hours did have a negative impact on lifestyle (as also identified in previous studies), the most negative aspects recorded by participants being “missing important events” (e.g. Christmas, birthdays) and being “unable to participate in the community”.

Participants reported that these types of working arrangements had a negative impact on their relationship. However, they also recorded their “relationship quality” to be high, therefore unaffected. The fact that this work activity has a negative impact on relationships but does not affect the quality is most likely the result of successful use of coping mechanisms.

Anecdotal claims that FIFO employees were more likely to get separated or divorced compared to daily commute employees or those in the wider community were not supported by the Study One data.

The proportion of employees who described their situation as divorced was 0.7 per cent, compared to 4.8 per cent for daily commuters and the Australian community average of 8.4 per cent for men and 10.8 per cent for women.

Although FIFO employees and partners reported more negative than positive impacts, 60 per cent reported that they would continue in this work for at least another year. It is worth noting that financial income was probably not weighed up when considering positive versus negative effects. Financial gain was the highest recorded reason for employees participating in FIFO working arrangements.

Health

The results of Study One showed that FIFO employees had similar and, in some cases, significantly better health behaviours compared to daily commute employees. Overall, it was found that FIFO employees were healthier. FIFO employees also recorded higher levels of sleep and exercise on-site.

Although FIFO employees demonstrated better health behaviours, both groups reported similar high levels of obesity and fatigue. Some 45 per cent of daily commute and FIFO employees recorded feeling fatigued as a result of rotating shifts. This is an obvious cause for concern due to the potential of fatigue-related accidents. Day shift employees reported adequate levels of sleep and moderate levels of fatigue.

It has been claimed that FIFO workers are more likely to participate in recreational drug use while on leave. This was not borne out by the research, which showed that 15 per cent of all employees used recreational drugs while on leave in the previous year.

The use of alcohol by employees was of some concern. During their work period, one quarter of employees drank alcohol at “binge drinking” levels, with an even higher proportion doing so in leave periods.

Although Ms Clifford’s results showed that FIFO and extended working hours had some negative impacts on respondents’ work satisfaction and lifestyle, they did not adversely affect many other aspects, including relationship quality, moods, stress levels and health, any more than for daily commuters.

This article is published with the approval of the researcher, Ms Susan Clifford of The University of Western Australia, and for the interest of our readers. The views and opinions expressed in this article do not necessarily state or reflect those of the Department of Mines and Petroleum.

WHAT'S HAPPENING OUT THERE?

At the 2009 Exploration Safety Roadshow, attendees were surveyed about the resources they would like Resources Safety to develop. Some requested information about recent exploration incidents that could be discussed at toolbox meetings.

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In response, a selection of reports submitted to Resources Safety for 2008-09 in the category of "Exploration – not on a mine site" has been collated and is available under "Accompanying handouts" in the toolbox section at www.dmp.wa.gov.au/8054.aspx

The reports are presented as received, apart from some minor editing for clarity and conciseness. Some relating to serious or potentially serious injuries are reproduced on page 29.

For drilling and fieldwork, as for most mining workplaces, hazardous manual tasks make a significant contribution to the injury statistics.

Particular hazards are posed by drilling equipment and the risks must be assessed and managed at all times.

SELECTED SERIOUS OR POTENTIALLY SERIOUS EXPLORATION INJURIES 2008-09

Driller's assistant – strain – wrist – 35 days lost, 193 days off

The offsider was returning an aircore drill rod to the rack when he strained his left wrist. At the time of the incident he was performing normal aircore and rod handling duties. The driller was notified and drilling ceased immediately, before continuing with another offsider. The injured offsider had previously injured his wrist while working for another employer and this incident may represent a recurrence or aggravation of that injury. The injured worker was initially assessed by a general practitioner and given restricted duties. However, he was later referred to a specialist who subsequently performed an operation on the wrist to re-attach the tendon. The offsider was then reclassified as unfit for work.

Driller – amputation – finger/s – 10 days lost, 88 days off

While running casing down the hole, the driller raised the head of the drill drive while placing his hand on the top of the latch for the guard. This created a pinch-point as the head of the drill drive rose, trapping the driller's glove and finger tip.

Driller's assistant – laceration – finger/s – 69 days lost, 95 days off

While the offsider was changing a cutting disc on a hand grinder, the power switch was accidentally activated. The offsider's hand was on the disc when it was engaged, and the spinning disc cut into the small finger of his right hand. The disc lock was not engaged and the grinder power cord was plugged into the power source.

Driller's assistant – effects of exposure to heat – general body – 1 day lost, 1 day off

The assistant was working as usual when he appeared to faint, had a headache and showed signs of overheating. He was immediately given water to drink and water was applied to his head. He was then moved to the air-conditioned site office, given more to drink and two Panadol. He fell asleep for about an hour before being taken back to camp, where he showered and went to bed. The assistant reported for work the next day and worked easily, although taking frequent rests in the shade and air-conditioned truck cab. The following day he again reported for work but appeared to faint and was disoriented upon leaving

the cab when the site was reached at 7 am. He was immediately taken to the regional hospital, where he received intravenous fluids for rehydration. After several hours he was released from hospital and collected by a company representative and returned to Perth. He was offered light duties at the company's office but declined and went on break a day earlier than scheduled.

Field assistant – strain – neck and trunk – 9 days lost, 16 days off

The assistant was photographing core trays, which involved repetitive bending and twisting, and lifting and manoeuvring of the camera frame over long periods. This led to severe muscle tension in the neck and lower and upper back.

Field assistant – strain – back – 12 days lost, 33 days off

The field assistant suffered a strained back when changing the wheel of the 4WD, after a day of quartz vein sampling.

Field assistant – bruise or contusion – arm/s – 27 days lost, 89 days off

The downhole geophysical logging technician was injured travelling from the drill site to the exploration office when he lost control of the 4WD troop carrier he was driving and the vehicle rolled.

Field assistant – infection – lower leg – 10 days lost, 11 days off

The field assistant went to start soil sampling in a hilly, rocky and remote part of the Pilbara. He felt nauseous and was sweating profusely. His leg was hurting and swollen around a small abrasion sustained during soil sampling about ten days earlier, before his seven-day break. He had slipped on rocky ground and knocked his shin on rock. Until the incident ten days later, there had been no ill-effects and the abrasion was thought to be healing. He was taken back to the field camp and then an outpatients clinic in Port Hedland later that afternoon, where the leg was inspected and antibiotics prescribed. The leg was still sore and infected five days later so he went to a doctor in Perth, where the infected area was cut and cleaned, and more antibiotics prescribed.

Days lost covers the days the person did not work when scheduled to do so.

Days off is the total time between when the person was disabled to when they returned to their regular job (i.e. what they were employed to do). It includes days lost, rostered days off, and days when alternative or light duties are performed or hours are restricted.

REVISITING THE HEAT STRESS HAZARD

One of the incident reports on page 29 concerned a driller's assistant who was affected by exposure to heat. Heat stress was one of the topics covered at the 2009 Exploration Safety Roadshow, and the presentation is available in the toolbox section of the Resources Safety website.

Eleven years ago, *MineSafe* reported on an exploration incident the previous year when the outcome was not so positive, and the person paid the ultimate price. Significant Incident Report No. 95 *Death of exploration worker*, issued in August 1998, describes the incident in detail.

During December 1997, a nineteen-year-old exploration employee met his death in circumstances suggestive of heat exposure. The cause of death was not determined by post-mortem examination, but the pathologist reported that there were indicators consistent with death due to exposure to extreme heat.

The deceased was a geology student, newly employed by a field investigations company, which was contracted to assist a company with an exploration program in an arid area. He had little previous field experience.

The exploration party, consisting of a supervisor, the vacation student and a second field assistant, drove from Perth to the destination and set up camp. The next day was spent working mainly in and around the camp area. During the night, the vacation student began to exhibit gastric symptoms and vomited several times. He continued to vomit the following morning when his fieldwork commenced. He and the second field assistant were working together sampling on foot along pre-marked lines while the supervisor was working some distance off with the party's vehicle. Around mid-morning, he

was unable to continue work and set off alone to walk to the vehicle to rest. He never arrived.

The weather conditions in the area were hot and dry (maximum temperature of 41°C, minimum of 25°C, relative humidity 1-12%). The field assistant had no water with him when he set off to walk to the vehicle.

Now, as then, this tragic death demonstrates the need for employers to ensure that all employees are properly trained, have the necessary skills and resources to survive in the harsh environments commonly experienced in Western Australia, particularly (although not exclusively) in the arid zones. It is well known that death from dehydration can take place very quickly under certain circumstances and conditions. Prevention strategies are eminently practicable, being well known and relatively cheap and easy to implement.

Some medical conditions, such as vomiting and severe diarrhoea, can cause a person to dehydrate. People suffering such symptoms should not work alone. If symptoms are prolonged or severe, medical assistance should be sought immediately.

Anyone working in adverse weather conditions should be taught to recognise the symptoms of heat strain.

The Australian Institute of Occupational Hygienists has produced *Heat stress standard and documentation developed for use in the Australian environment*, commonly termed the "Heat Stress Standard". This standard is concerned only with health considerations and not those associated with comfort. The Heat Stress Standard provides guidance in the form of a decision-making process, based on available scientific data. A tiered risk assessment approach is recommended, starting with a basic thermal risk assessment, escalating through a detailed analysis using rational methods such as the predictive heat strain index, to heat strain (physiological) monitoring. Visit the Institute's website at www.aioh.org.au/product_pubs.asp for more information.

ALL ABOUT HEAT

HEAT STRESS is the sum of environmental influences (air temperature, radiant heat, humidity, air velocity) that, when coupled with metabolic heat generation and the effect of clothing, may result in heat strain.

HEAT STRAIN is the physiological response to heat stress on the body. For example, to lose heat and maintain the body's core temperature, blood vessels in the skin expand (peripheral vasodilation) and additional blood is diverted to the skin to bring body heat to the surface, decreasing the core temperature. To maintain cardiac output, the heart rate increases.

SWEATING can be very effective in controlling body temperature, with the surface of the skin cooling as the water in the sweat evaporates. However, its effectiveness decreases with increasing humidity.

INDIVIDUAL RISK FACTORS

- Lack of acclimatisation
- Low level of physical fitness
- Medical conditions (e.g. diabetes, cardiovascular disease, gastroenteritis)
- Some medications (e.g. diuretics)
- Drug and alcohol use
- Dehydration
- Age (especially greater than 60 years old)

WORKPLACE RISK FACTORS

- High frequency, duration or intensity of physical activity
- Environmental conditions
- Requirement for use of personal protective equipment and clothing (may increase humidity levels and prevent air flow across the skin)

HEAT-RELATED ILLNESSES

Heat oedema – mild form of heat illness resulting in pooling of fluid in legs brought about by transient peripheral vasodilation

Heat rash – skin that has been persistently wetted by sweat may develop a rash characterised by raised lumps that may be intensely itchy. These bumps are caused by blocked sweat glands, which subsequently burst, giving a stinging sensation

Heat fatigue – additional blood is diverted to skin to decrease

the core temperature (peripheral vasodilatation), reducing output to the brain and internal organs, and resulting in fatigue and reduction in strength

Heat cramps – painful involuntary muscle spasms resulting from electrolyte dilution arising from hard work in hot environments, heavy sweating and excessive water intake

Heat syncope (pronounced sing-kuh-pee) – dizziness or fainting brought about by lowered blood pressure arising from vasodilation, pooling of body fluids into legs and resultant lack of blood flow to brain

Heat exhaustion – mild form of shock with symptoms including extreme weakness or fatigue, uncoordinated action, giddiness, nausea, headache and a weak rapid pulse

Heat stroke – body's thermoregulatory system has failed to prevent core body temperatures rising to critical levels above 40°C

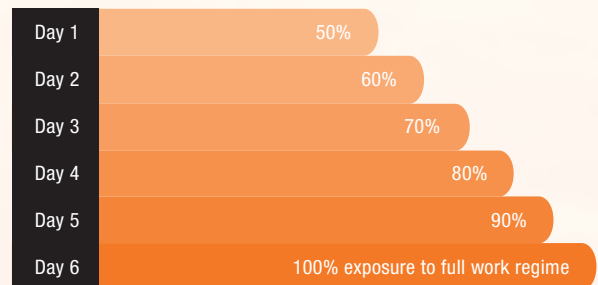
Symptoms include:

- lack of sweating and hot dry skin
- confusion
- irrational behaviour
- loss of consciousness
- convulsions

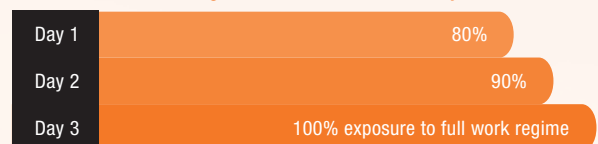
Heat stroke may result in permanent damage to the brain and other vital organs; death may occur. URGENT medical attention is required.

RECOMMENDED ACCLIMATISATION SCHEDULE

Unacclimatised



Acclimatised but returning to work after more than 9 days off



REGULATION OF PETROLEUM AND GEOTHERMAL SAFETY IN WA

The upstream oil and gas industries in Western Australia are regulated under the following Acts, administered by the Department of Mines and Petroleum:

- ***Petroleum Pipelines Act 1969 (PPA)***;
- ***Petroleum and Geothermal Energy Resources Act 1967 (PAGERA)***; and
- ***Petroleum (Submerged Lands) Act 1982 (PSLA)***.

The PPA and PAGERA apply onshore to the mean low-water mark, while the PSLA applies to State waters and waters inside State waters, collectively termed the “adjacent areas”.

The National Offshore Petroleum Safety Authority (NOPSA) is the defined safety authority under the PSLA and, therefore, is responsible for safety regulation in the waters of the adjacent areas up to the mean low-water mark.

The Department of Mines and Petroleum regulates all onshore activities through administration of the PPA and PAGERA.

OFFSHORE SAFETY MANAGEMENT

NOPSA is a statutory authority regulating Commonwealth, State and Territory coastal waters with accountability to the relevant Ministers. The Authority has its headquarters in Perth and commenced operations on 1 January 2005.

It was legally established by amendments to the Commonwealth *Petroleum (Submerged Lands) Act 1967* by the Commonwealth *Petroleum (Submerged Lands) Amendment Act 2003*. Part

IIIC was added to establish NOPSA, set out its governance arrangements, and define its functions in relation to petroleum activities in Commonwealth waters.

The Commonwealth *Petroleum (Submerged Lands) Act 1967* was subsequently replaced by the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006*. Schedule 3 of this Act establishes a modern occupational safety and health (OSH) regime for petroleum activities at facilities (including pipelines) located in Commonwealth waters.

The main features of the OSH regime are:

- duties of care — specific categories of persons (e.g. operators, employers) who are involved in offshore petroleum activities at facilities are required to “take all reasonably practicable steps” to protect the safety and health of the facility workforce and of any other persons who may be affected;
- consultation provisions — mechanisms are set out that will enable effective consultation between each facility operator, relevant employers and the workforce regarding OSH; and
- powers of inspectors — NOPSA’s OSH inspectors are granted powers to enter offshore facilities or other relevant premises, make inspections, interview persons, take evidence and otherwise take action to ensure compliance by duty holders.

Each State and the Northern Territory made corresponding amendments to their Petroleum (Submerged Lands) Acts, so as to create an equivalent OSH regime for petroleum activities

in State and Territory coastal waters. This was achieved in Western Australia by proclaiming Part 4 of the *Petroleum Legislation Amendment and Repeal Act 2005* (PLARA).

A current compilation of the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* is available from the Commonwealth Law website at www.comlaw.gov.au

ONSHORE SAFETY MANAGEMENT

Petroleum

Two schedules are applied to onshore petroleum activities in Western Australia through licensing and permit requirements:

- *Schedule of General Requirement for Occupational Safety and Health (1993)*
- *Schedule of Onshore Petroleum Exploration and Production Requirements (1991)*

The current schedules can be downloaded from the Department of Mines and Petroleum website at www.dmp.wa.gov.au

Resources Safety promotes OSH in the mining, onshore petroleum and geothermal energy sectors, and the safe use of dangerous goods through education, enforcement and provision of specialist advice. In this context, Resources Safety provides safety and health regulatory services and technical advice to the Department of Mines and Petroleum's Executive Director Petroleum and Environment Division in relation to onshore petroleum, pipeline and geothermal operations. Resources Safety staff are appointed as inspectors under the petroleum legislation.

A safety case approach is applied in relation to all aspects of onshore petroleum and pipeline operations. This approach is initiated as part of the licensing or permit requirement, and broadly aligns with the methodologies applied by NOPSA for offshore facilities. Safety case submissions are processed and assessed in a similar manner, and early dialogue is considered essential to ensure the timeliness of approvals.

Currently, regulations are being developed covering OSH matters and management of safety. Once these are completed, Parts 2, 3 and the remainder of Part 5 of the PLARA will be proclaimed, thereby introducing comprehensive OSH and duty of care requirements into the existing petroleum legislation. At that stage, Resources Safety will assume full responsibility for OSH regulation of onshore petroleum activities.

The duty of care obligations align with the Commonwealth approach and apply to operators, licensees, persons in control, employers, manufacturers, suppliers, constructors and employees.

Geothermal

Geothermal activities will increase significantly in the near future. The *Petroleum Amendment Act 2007* incorporated these activities into the *Petroleum Act 1967*, which was renamed the PAGERA. The regulations will apply a safety management system (SMS) approach that aligns with current Australian Standards to these activities.

This SMS approach will also apply to seismic activities and exploration drilling, whether petroleum or geothermal, once the new regulations come into force.

RISK ASSESSMENT FOR DANGEROUS GOODS

Dangerous Goods Safety Guidance Note S02/09 on risk assessment for dangerous goods is now available from the Resources Safety website in the storage and handling guidance section.

This guidance note assists operators of dangerous goods sites in Western Australia to complete a risk assessment under the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007 (the Storage and Handling Regulations). In particular, it helps those storing and handling dangerous goods in quantities exceeding those specified as “placard quantities” in Schedule 1 of the Storage and Handling Regulations to comply with regulation 48 relating to risk assessment.

It will also assist applicants for a dangerous goods site licence to comply with their obligation to develop a “written report” under regulation 26(2)(c) of the Storage and Handling Regulations, as the Chief Officer has decided that the requirements under regulation 48 are the same as those for the “written report”, so the risk assessment may be applied to both.

The guidance note describes a detailed process that complements the discussion in Chapters 3, 4, 5, 6 and 7 of Resources Safety’s *Storage and handling of dangerous goods – code of practice*. The guidance note also contains a template that can be used to document the risk assessment.

Use of the procedure and template should not be regarded as the only way to carry out the risk assessment, but the guidance note does identify the types of issues that need to be addressed in a thorough risk assessment for dangerous goods. If alternative processes are used, they should give a realistic assessment of the risk.

The ultimate aim of any risk assessment is to identify appropriate control measures that will reduce the risks from the dangerous goods to people, property and the environment to as low as reasonably practicable (ALARP).

For a dangerous goods site, the risk assessment is a document that:

- identifies all hazards relating to the dangerous goods at the site;

- for each hazard
 - assesses the probability of the hazard causing a dangerous goods incident
 - assesses the consequences of the potential incident to people, property and the environment
 - identifies the risk control measure(s); and
- explains the rationale behind the judgements made.

A separate hazard identification and risk assessment should be undertaken for each dangerous good and each dangerous goods installation.

Hazard identification and risk assessment can be relatively simple or highly complex, depending on circumstances. The nature of the dangerous goods involved and complexity of the handling systems will dictate the level of complexity of the risk assessment and associated documentation. The risk assessment can range from a short simple document perhaps referring to a single code of practice, to a longer more complex document that contains both approved codes of practice and risk assessments for processes not covered by any codes of practice.

The Storage and Handling Regulations require that the risk assessment be made available to employees for comment, and that employee comments should be considered before preparing a revised assessment or plan.

The risk assessment must be reviewed:

- at least every five years or
- if the site is involved in a (significant) dangerous goods incident or
- if there is a change in circumstances such that the risk assessment is no longer applicable, such as a change to the storage or handling system, the emergence of new vulnerable facilities off-site, or changes in the state of knowledge about the hazards or availability of control measures.

Resources Safety actively encourages operators to conduct risk assessments, not just to fulfil legal obligations but as the foundation of safe operations. Operators need to understand the risks if they are to manage them effectively. The risk assessment process is a structured way of building that understanding.



Photo courtesy Coogee Chemicals



INNOVATION RECOGNISED AT TRANSPORT AWARDS

The WA Road Transport Industry Awards commenced in 1994 and are presented by Transport Forum WA. The awards recognise and reward excellence within the Western Australian transport industry. In 2009, there were six awards covering the diverse operations of the industry.

Resources Safety sponsored the Dangerous Goods Innovation Company Award, which recognises excellence in developing and implementing a solution to an identified dangerous goods transport safety issue. The judging panel comprised Bevan Fernandez (Resources Safety), John Rossiter (Main Roads) and Steve Rhodes (WorkSafe).

There are many elements of safe handling and transport of dangerous goods in Western Australia that have been introduced through the experience of specialist carriers. These include:

- stable tank design
- packaged load restraint
- managing incompatible goods
- specialist emergency incident response
- driver training initiatives
- explosive mixing vehicle design.

Companies directly involved with dangerous goods road transport, including explosives transport companies, were invited to nominate for this award.

The 2009 winner was Coogee Chemicals. The company manages the logistics of transporting essential ingredients to mining operations in the northern goldfields, and came up with a specialised vehicle design to address an issue associated with transport of one of the dangerous goods. Mr Rob Hennessey, Transport Manager at Coogee Chemicals, was asked about the company's winning submission.

Q. What was the particular dangerous goods transport safety issue?

A. To provide a safe mode of transport by which to despatch sodium hydrosulphide (NaSH) from Kwinana to northern goldfield

mine sites. The product is particularly hygroscopic (absorbs moisture from atmosphere), and can become unstable and evolve a toxic fume.

NaSH also becomes unstable when it degrades in quality or is handled inappropriately, and may spontaneously combust.

Q. What solution was developed to address the issue? How original and innovative was the solution?

A. The concept of a "SToL" (Solids To Liquids) trailer was developed. This is a large capacity 316 stainless steel trailer — more resembling a road tanker, but with certain distinguishing features that allow it to be classified under the *Australian Dangerous Goods Code* as a BK-1 dry-bulk container.

SToL works on the sparge principle whereby solid products are dissolved in-situ, but this is the first time that the concept has been applied in a totally mobile and independent vehicle.

Q. What improvement in dangerous goods safety has resulted from implementing your company initiative?

A. Coogee Chemicals has negated on-road incidents involving the transport of this product by various transporters in the past and, to date, has not had any incidents relating to the transport of this difficult-to-handle product.

The SToL has produced increased levels of safe handling and economic benefits for both Coogee Chemicals and the customer. Customers previously had to accept solid product and dissolve on-site, which created occupational safety and health issues. Coogee Chemicals has been able to address this issue with implementation of the SToL vehicle.

Q. What potential is there for the solution to have broader application across industry?

A. The properties of NaSH lend themselves to this process, and Coogee Chemicals has simply taken this process to the next level with some very careful planning and engineering.

Although this process works very well with NaSH, it could be applied to a variety of products, including xanthates and copper sulphate.



Photo courtesy Transport Forum WA

Resources Safety's Phil Hine (left) presenting the Dangerous Goods Innovation Company Award to Rob Hennessey of Coogie Chemicals

CONSULTATION CODE DISCUSSES “HOW TO”

Resources Safety recently released a new code of practice on consultation at work. Developed by the Mining Industry Advisory Committee (MIAC), the code came into effect on 27 October 2009 after approval by the Minister for Mines and Petroleum.

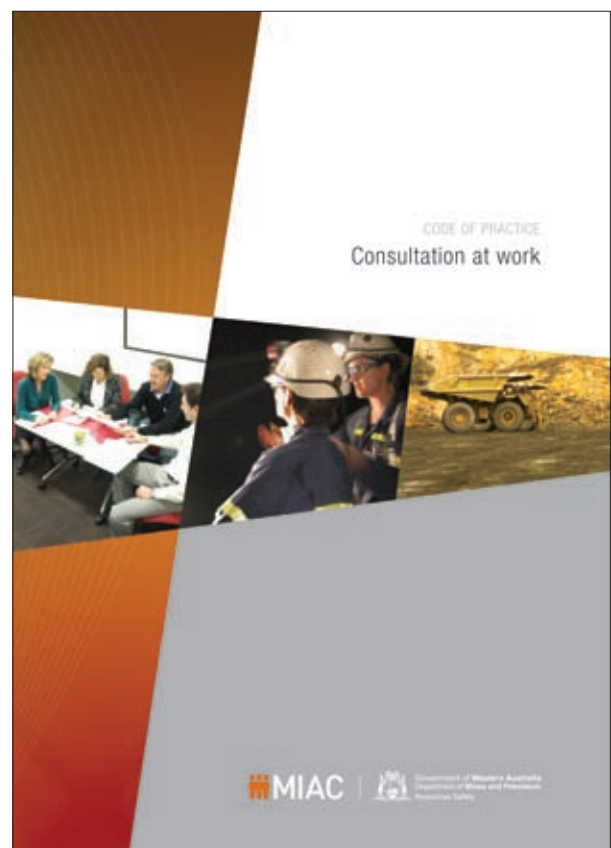
Code of practice – Consultation at work is aimed at providing guidance on what constitutes demonstrable consultation between employers and the workforce. Its development was brought about by MIAC members believing it was important to develop a user-friendly code on “how to” consult, particularly for those workplaces that operate without formally elected safety and health representatives or committees.

MIAC also recognised the critical importance of workforce participation in any new approach to safety management that may be developed and implemented in the mining industry.

A particularly vital aspect of consultation is the training of employees and management as a means of ensuring all parties are “tuned in” to consultative mechanisms, with the provision of feedback a key element in the communication flow.

To help workplaces enhance their consultative techniques, the code provides examples of meeting-related documentation, along with a useful sample audit and evaluation tool to assist in planning, undertaking and evaluating the consultation process.

The code supplements the 2006 joint guidance note issued by MIAC and the Commission for Occupational Safety and Health entitled *Formal consultative processes at the workplace: Safety and health representatives, safety and health committees and resolution of issues, including consultation on PINs*.





DATA POSTED FOR 2008-09

The reporting season is in full swing at the Department of Mines and Petroleum, with recent releases listed below. These publications can be downloaded from www.dmp.wa.gov.au or printed copies ordered through RSDComms@dmp.wa.gov.au

Safety performance in the WA mineral industry

Each year, Resources Safety compiles accident and injury statistics from the data submitted by Western Australian mining operations, as required by section 76 of the *Mines Safety and Inspection Act 1994*. The annual compilation is presented as a digest, and summarised on a poster. The poster is now available, with the digest to follow in early 2010.

In addition to the traditional lost time injury (LTI) reports, disabling injury statistics have been collected since the beginning of 2001–02. This program was initiated with a view to establishing a more effective safety performance indicator than the LTI-based system. There has been expanded coverage of disabling injury statistics in the annual compilation since 2006–07.

Previous annual compilations did not report injury statistics for exploration activities away from mine sites or on exploration leases. However, the *Mines Safety and Inspection Act 1994* was amended in 2008 to clarify provisions that deal with the duties of exploration managers. An exploration manager has duties under the Act, including the requirement to report injuries. The annual compilation for 2008–09 includes injury statistics for the exploration sector.

In general, the injury statistics for 2008–09 showed a slight but continuing improvement in the overall safety performance of the Western Australian mining industry. However, seven workers lost their lives over the year, which is not acceptable under any circumstances.

Safety performance in the WA onshore petroleum industry

This is the first time that accident and incident statistics have been published for Western Australian onshore petroleum facilities and pipelines. The 2008-09 data are presented in a poster format and were compiled from reports submitted to the Department of Mines and Petroleum for that period.

There were no fatalities reported and relative few lost time injuries, which is very pleasing.

WA mineral and petroleum production statistics

The mineral and petroleum statistics digest for Western Australia is produced by the Policy and Coordination Branch of the Department of Mines and Petroleum. It contains key statistical information and editorial on the State's resources industry.

It draws on a range of sources to provide comprehensive coverage on the composition, magnitude and performance of the Western Australian mineral and petroleum sectors. It also includes information on major commodities, price trends, exports, royalty receipts, exploration, investment and employment.

The statistics presented in the latest digest highlight the resilience of the State's resources industry in 2008-09, and the significant contribution it continues to make to both the Western Australian and national economies.

HISTORICAL EXTENSION TO FATALITIES DATABASE

The Western Australian mining fatalities database contains information on workplace fatalities recorded in Western Australian mines and the results of inquests relating to them. It can be accessed through the “Online systems” tab on the Department of Mines and Petroleum’s website at www.dmp.wa.gov.au

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Data can be sorted by category (underground or surface), commodity (e.g. base metals, coal, gold), date, fiscal year, occupation, rider (e.g. accidental, natural causes) and status (preliminary, intermediate or final report).

The report status is categorised as:

- Preliminary — under investigation by Resources Safety inspectors
- Intermediate — Resources Safety has completed its investigation, awaiting the Coroner’s report
- Final — Coroner’s report received and published online.

As at early December 2009, the database goes back to 1943, when 15 fatalities were recorded, including three fatalities in one incident on 17 July 1943. A separate report is provided for each fatality.

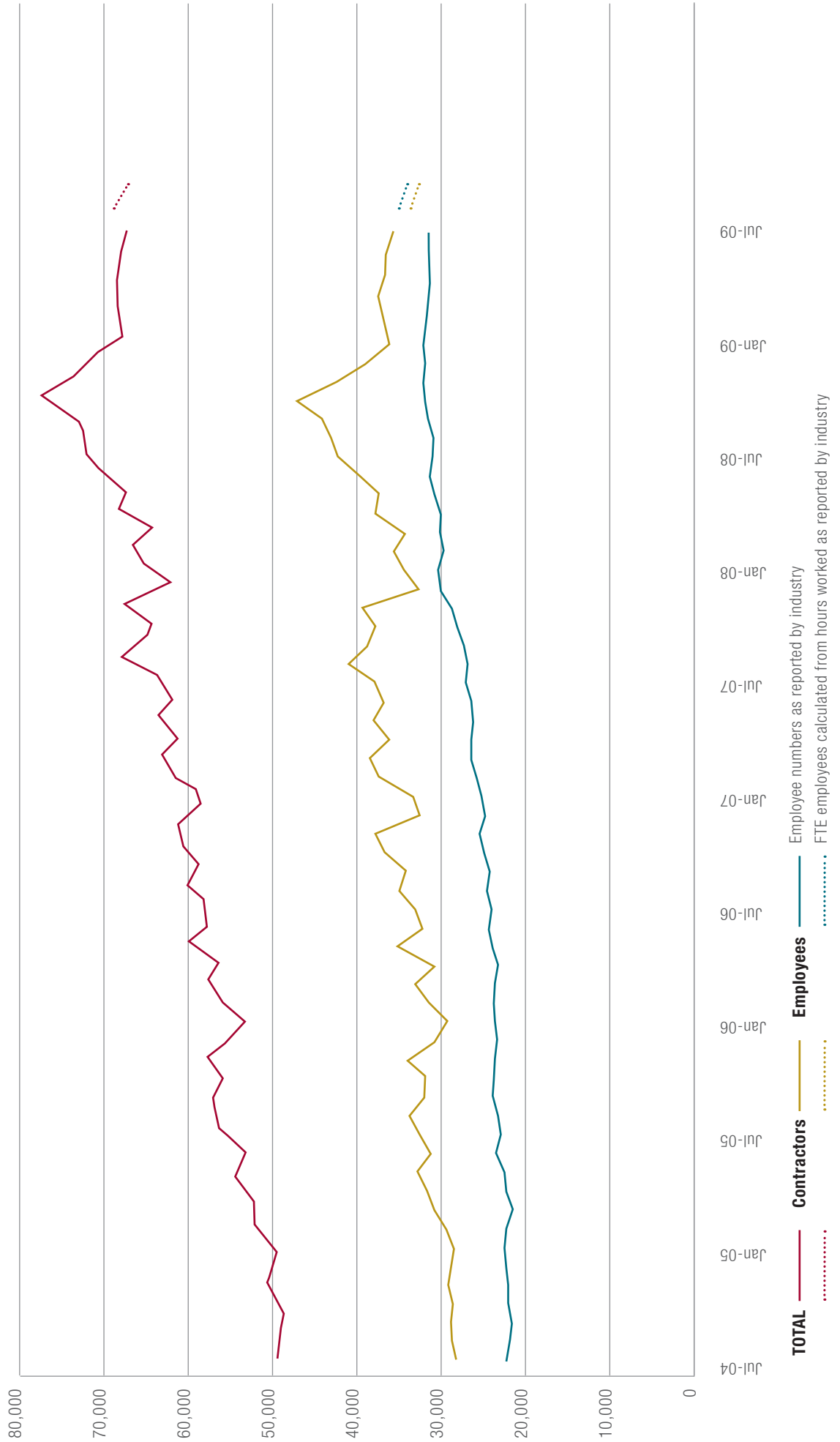
The database will eventually extend where records are available, to 1896.

Given the historical theme of this *MineSafe*, why not visit the database? Go back some 66 years to 1943, when the reported average workforce was just over 6,200, and read the 15 fatality reports. In terms of fatal injuries per 1,000 workers, 1943 was a “quiet” year compared to 1942 and 1944.

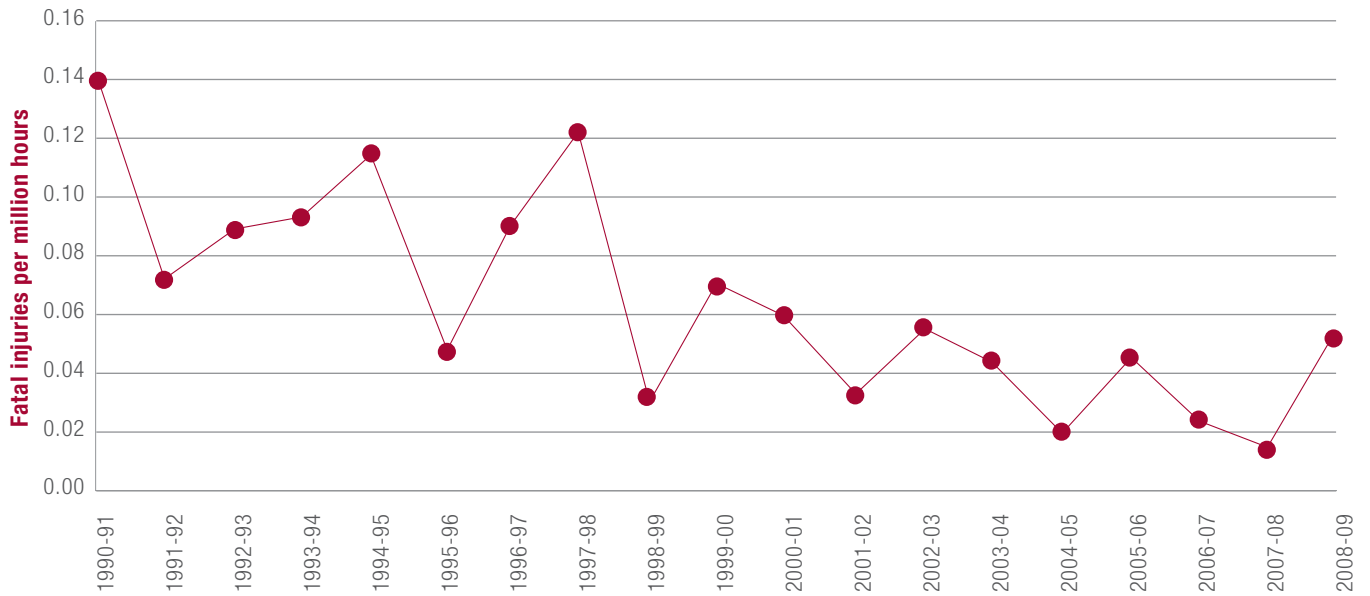
After reading the reports, ponder on how community expectations and the industry’s safety culture have changed since then, but also consider what work is still to be done. In calendar year 2008, the fatal injury frequency rate was 0.049 fatal injuries per million hours. Mining is heading towards “zero harm” — but we are not there yet.

MONTHLY MINING WORKFORCE

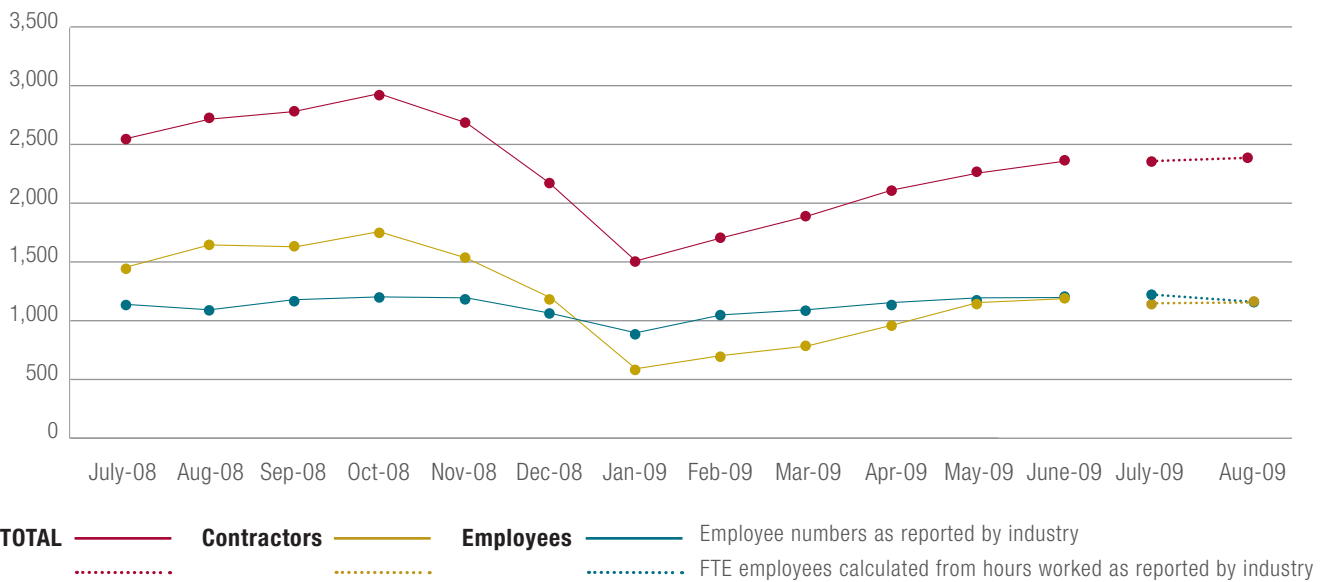
NOTE: From 1 July 2009, monthly mining workforce figures are plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year



FATAL INJURY FREQUENCY RATE - MINING EXCLUDING EXPLORATION



MONTHLY EXPLORATION WORKFORCE

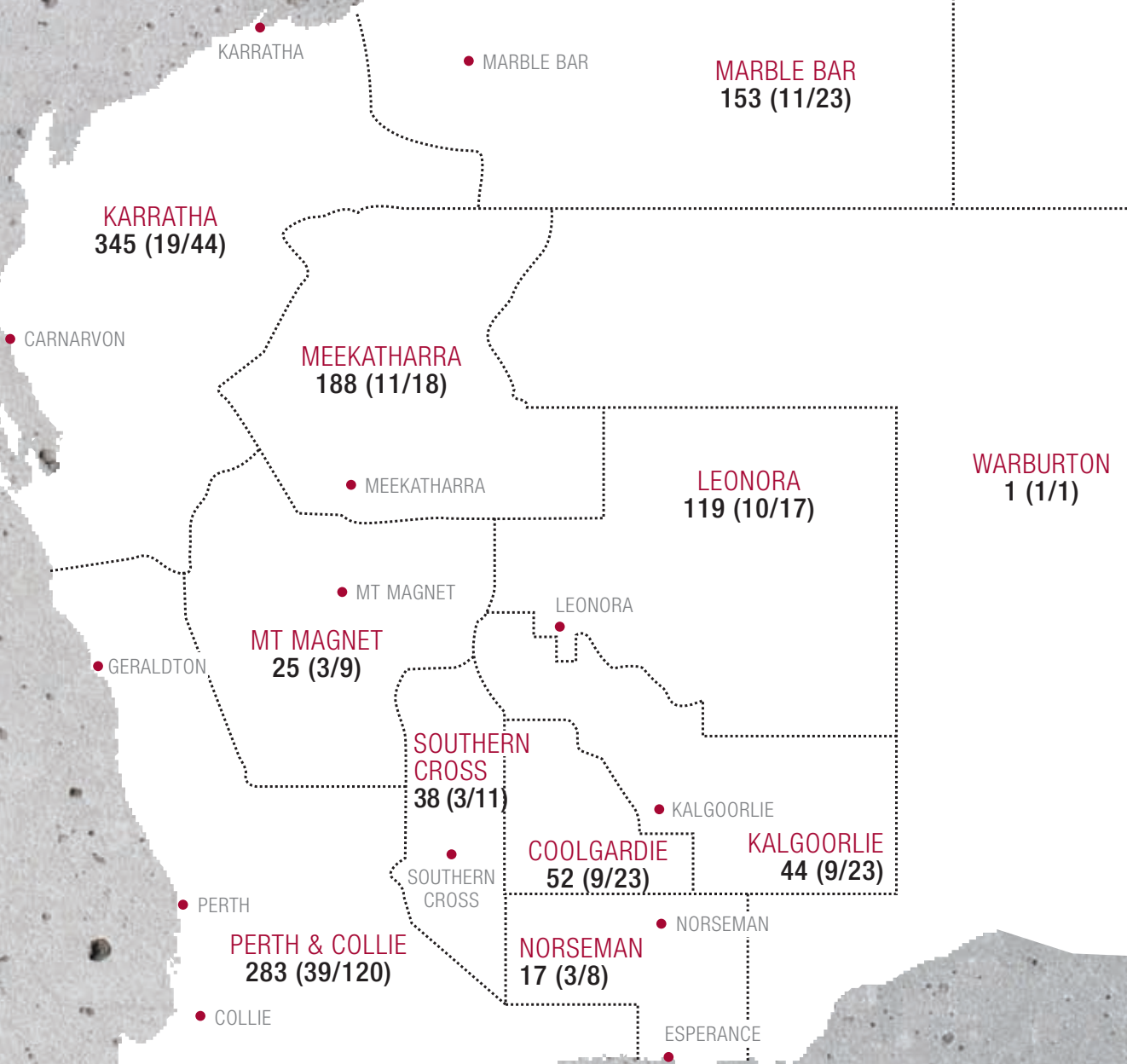


NOTE: From 1 July 2009, monthly mining workforce figures are plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year

DISTRIBUTION OF SAFETY & HEALTH REPRESENTATIVES AS AT 23 NOVEMBER 2009

- Mining registrars administration boundary
- MARBLE BAR** Administration region
- 153 (11/23)** Number of SHRs (Number of sites with SHRs/Total sites)
- Town/city

KIMBERLEY
66 (12/34)



Total active (incl. C&M) mine sites = 330
 Mine sites with SHRs = 130
 Total SHRs = 1,356
 SHRs attached to mine sites = 1,331
 Others (e.g. exploration) = 25

ADDING TO THE TOOLBOX

Following the 2009 roadshows, the toolbox collection in the mining guidance section of the Resources Safety website has expanded significantly, and there is now a new section for accompanying handouts.

The Perth session of the 2009 Mines Safety Roadshow included two presentations that were not given in the regions. However, the proceedings were recorded, so contact 08 9358 8178 or RSDComms@dmp.wa.gov.au to receive the DVD.

Also, the presentation on the Earth Moving Equipment Safety Round Table (EMESRT) is available from The University of Queensland's Minerals Industry Safety and Health Centre website at www.mishc.uq.edu.au

The latest additions are listed below. Note that there is duplication where a presentation is categorised under several headings.

Dangerous goods

- Dangerous goods in processing operations

Exploration

- Exploration safety issues in Western Australia
- Radiation safety - Part 1: Naturally occurring radioactive material (NORM)
- Radiation safety - Part 2: Managing the risks

Fatigue management

- Nodding off - What rest works?

Hazard identification

- Mines safety issues in Western Australia
- Nodding off - What rest works?
- Safe access to vehicles and other mobile equipment

Legislation

- Reporting - Part 1: Legislative requirements
- Reporting - Part 2: Health surveillance

Machinery and plant

- EMESRT presentation available from www.mishc.uq.edu.au
- Safe access to vehicles and other mobile equipment

Manual tasks

- Manual tasks - implementing an effective program to manage risks

Occupational health

- Manual tasks - implementing an effective program to manage risks
- Nodding off - what rest works?
- Reporting - Part 2: Health surveillance
- Heat stress
- Radiation safety - Naturally occurring radioactive material (NORM) and managing the risks

Radiation safety

- Radiation safety - Naturally occurring radioactive material (NORM) and managing the risks

Reporting requirements

- Reporting - Part 1: Legislative requirements
- Reporting - Part 2: Health surveillance

Risk management

- EMESRT presentation available from www.mishc.uq.edu.au
- Manual tasks - implementing an effective program to manage risks
- Safe access to vehicles and other mobile equipment
- Nodding off - what rest works?
- Heat stress

Safety performance

- Safety performance in the Western Australian mineral industry 2007-08
- Mines safety issues in Western Australia

Accompanying handouts

Some of the toolbox presentations refer to handouts that were used by Resources Safety as part of the original roadshow presentation. Other handouts have been generated in response to roadshow feedback.

- Manual tasks case studies
- Selected exploration incidents reported in 2008-09
- Selected musculoskeletal disorders reported in 2008-09
- Vehicle access incidents selected from Resources Safety's incident database



TALKING ABOUT THE TEAM AND TIMELY TRAINING

It makes sense for employers and employees to talk to each other about safety at work. Safety and health representatives can make a difference.

A safety and health representative is the key to communication by making it easier to exchange ideas and concerns about safety between employers and employees. Safety and health representatives may raise and discuss safety issues and concerns with employers and managers so they can work together and arrive at solutions to make the workplace safe.

Employees sometimes feel more comfortable using their safety and health representatives to raise an issue or present an idea about occupational safety and health rather than going directly to management.

When everyone works together as a team, great things can happen, such as improving work conditions and keeping people safe. You can tell when you walk into a workplace that operates this way — employees feel involved, people are more committed to working safely, the working environment is happier, people want to work harder, productivity is higher, and there are less accidents and injuries.

To get the most out of being a safety and health representative, it is important to know what your roles and responsibilities are, and training provides this knowledge.

Once elected as a safety and health representative you have the right to attend an accredited course within 12 months of being elected. However, to enable you to fulfil all of your functions, you should try to enrol in an accredited introductory

training course within the first three to six months of being elected.

You are free to choose, within reasonable limits, which training course to attend. This choice should be made from the list of accredited providers, accessed through the Resources Safety website, in consultation with your employer and any other relevant parties at the workplace, such as the safety and health committee or a relevant union.

If you are interested, adding a work-based project to the introductory safety and health representatives course gives you the option to have your training recognised as a *Certificate III in Occupational Safety and Health* within the vocational education and training system. This option is entirely voluntary. If interested, talk to your training provider when you get to the course.

If you have previously received training, you may consider a post introductory course to update your knowledge.

Safety and health representatives are not safety and health officers or coordinators, and they are not responsible for solving safety and health problems in the workplace. That's still up to the employer. But the safety and health representative is an important link between employers and employees.

WHERE HAVE WE BEEN?

In preparation for his retirement as State Mining Engineer*, Martin Knee delved through his archives to see what could be retained for posterity. One of the documents Martin unearthed was the “History of the State Mining Engineer’s Branch”, prepared by Jack Faichney, Deputy State Mining Engineer from 1979 to 1984, just before his retirement 25 years ago.

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An edited and abridged version is published here as a record of the State’s mines safety regulator to 1984 and for those interested in history. It is an opportunity to look back and reflect on where we have been before RADARS** is fully implemented and Western Australia continues on the journey to “zero harm” in the resources sector.

1902 – The beginning

The State Mining Engineer’s Branch probably originated in November 1902, as a report of the State Mining Engineer appeared in the annual report of the Department of Mines for that year.

The State Mining Engineer, Mr A Montgomery, wrote “As I only entered upon my duties early in November, there was but little time available for the examination of the mining districts of the State.” He concluded his report with “as you have now been pleased to put me in general charge of the work of the Inspectors of Mines, I have now to forward a synopsis of their annual reports.”

The Branch started with an Inspector of Mines for each of the Kalgoorlie, Kanowna, North Coolgardie, Mount Margaret, Coolgardie and Dundas Districts, and another covering the Collie Coalfield and Donniebrook Goldfield.

An Acting Inspector of Mines was appointed to take up duties in the Pilbara and West Pilbara in 1903 until the progress of the mineral field justified the appointment of a special officer. Mr P C Hughes, District Engineer of the Mines Water Supply, continued in this position until 1909 when the appointment apparently lapsed.

When the State Sampling Works at Ravensthorpe (Phillips River Goldfield) started in June 1903, the Government Ore Buyer was appointed an Inspector of Mines as “this field being quite out of reach of other inspectors.” This appointment ran until the facility closed in about 1912.

1907 – Legislative changes

On 1 June 1907, the *Mines Regulations Act 1906* came into force and, in his annual report for that year, State Mining Engineer Montgomery wrote “New Act and Regulations appear to have met with general appreciation from the mining community on the whole.”

In 1907, Lawlers was established as the headquarters for an Inspector of Mines for the East Murchison Field, taking in Wiluna and Black Range. An inspector was also appointed to relieve the Inspector of Mines for the Greenbushes, Phillips River and Northampton Fields.

The first reference to a Senior Inspector appeared in 1909, when Mr J O Hudson submitted his annual report for the East Coolgardie Field, as there was now more than one inspector at Kalgoorlie.

In 1913, Sandstone replaced Lawlers as the headquarters for the East Murchison District.

* Historically, the *Mines Safety and Inspection Act 1994* refers to the “State mining engineer” but the position title is capitalised in *MineSafe* for clarity.

** Reform and development at Resources Safety; see pages 2 to 4



DEPARTMENT OF MINES.

REGISTRATION
MINISTRY OFFICE

Department of Mines on Hay Street, Perth, in the 1890s

1915 – Legislative changes

The *Mines Regulations Act 1906* was amended in 1915 to provide for the appointment of Special and Workman's Inspectors, who were elected for two year terms and based in Kalgoorlie (two), Leonora and Meekatharra. The same year, an inspector was appointed for "the betterment of ventilation of mines".

Two of the inspectors enlisted in the Australian Imperial Force (AIF, Australia's first national military force) in 1916, and Mr R C Wilson (later to become State Mining Engineer) was appointed an inspector.

Mr T Blatchford, Assistant Government Geologist, transferred from the Geological Survey Branch in April 1919 to become the first Assistant State Mining Engineer.

1920 – Restructure

May 1920 saw a reshuffle of inspectorates such that the Inspectors of Mines were allocated as follows:

- four at Kalgoorlie to cover the Menzies, Ularring, North East Coolgardie, Coolgardie, Broad Arrow and Dundas Fields;
- one at Cue for the Black Range, Peak Hill and Murchison Fields;
- one at Southern Cross for the Yilgarn, Phillips River and Yalgoo Goldfields; Greenbushes, Northampton and Yandanooka Mineral Fields; and Swan, Kendenup and Roelands Mining Districts;
- one at Leonora for the Wiluna, Lawlers, Niagra and Yelirra Mining Districts and Mount Margaret Goldfield; and
- one at Collie.

Mr Wilson resigned as Inspector of Mines in March 1920 to take up the more lucrative position of Superintendent for Hampton Gold Mining Areas. On 1 March 1922, after apparently returning as a field geologist for the Geological Survey, he took over as Assistant State Mining Engineer when Mr Blatchford (later to become Government Geologist) returned to the Geological Survey.

1928 – Changing of the guard

Mr Montgomery retired as State Mining Engineer in December 1928, with his replacement, Mr A M Howe, starting the same month. Mr Howe was State Battery Manager in 1905, Inspector of State Batteries in 1906, and Superintendent of State Batteries from 1912. He had been appointed Chief Inspector of Machinery in July 1928.

Mr E E Brisbane (later to become State Mining Engineer) commenced duties as a Dust and Ventilation Officer in Kalgoorlie in 1931. Mr J S Foxall (also later to become State Mining Engineer) was appointed District Inspector of Mines in Kalgoorlie in January 1935.

1933 – Changing of the guard

Mr Howe relinquished the position as State Mining Engineer in September 1933 and Mr Wilson (BSc, BE, MIMM) returned to duty in March 1934 as Acting State Mining Engineer after a term of three years on loan to Broken Hill Proprietary Ltd. He was appointed State Mining Engineer in November 1934.

1935 – Legislative changes

Regulation 17A was added to the *Mines Regulation Act 1906* in November 1935. It required certificates of competency be held by those employed as underground supervisors (shift bosses). The Board of Examiners held examinations in May and October in 1937 and, of the 125 candidates, 86 were successful. Such examinations have been held ever since.

1944 – Changing of the guard

State Mining Engineer Wilson retired in July 1944 and was succeeded by the Assistant State Mining Engineer, Mr Foxall (BE, MIEAust), who was succeeded by Mr Brisbane.

1949 – Legislative changes

During the years preceding the Second World War, action had begun to rewrite the *Mines Regulation Act 1906*, culminating in an Act (no. 54 of 1946) to consolidate and amend the law relating to the inspection and regulation of mines, and for other related purposes. The *Mines Regulation Act 1946* was assented to on 24 January 1947 but it, and accompanying regulations, did not come into operation until 1 May 1949. With this legislation, the term "Senior Inspector" was defined for the first time.

In the ensuing years, the activities of the Branch revolved mainly around the mining of gold, with some lead, copper, iron, manganese, asbestos and other minerals. The Branch also dealt with applications for assistance under the *Mining Development Act 1902*.

1952 – Changing of the guard and new directions

In February 1952, Mr Foxall retired and Mr Brisbane (BCE, AMIE, AMAusIMM) was appointed State Mining Engineer the following month. Mr L C Olive, a District Inspector of Mines at Kalgoorlie, was appointed Assistant State Mining Engineer in June 1952 but died suddenly at Collie two weeks later. Mr J K N Lloyd, also a District Inspector of Mines at Kalgoorlie, took up the position in October 1952.

It was about this time that the drilling section of the Branch was developed, partly due to a Government policy to ascertain the extent of coal measures at Collie and explore for possible extensions of orebodies on previously worked gold mines. The work had increased to such an extent that a District Inspector of Mines was transferred to Perth in 1955 to oversee the Drilling Section, Store and Workshops. The drilling section later became involved with exploration for groundwater being undertaken by the Geological Survey's hydrological section.

Early 1960s – Restructure

In the early 1960s, in response to a change in emphasis on the minerals being mined and the location and extent of mining operations, the inspectorate was rearranged as follows:

- Senior Inspector of Mines and three District Inspectors retained at Kalgoorlie;
- District Inspector was based in Perth to cover the South West Mineral Field and part of the Murchison Goldfield; and
- District Inspector based at Cue transferred to Port Hedland to cover the Pilbara and Kimberley regions.

1967 – Changing of the guard

Following Mr Brisbane's retirement in February 1967, Mr A Y Wilson (AWANM, AMAusIMM) was appointed State Mining Engineer.

Just before this, in 1965, preparations had begun to amend the mining regulations and *Mines Regulation Act 1946*. In 1967, the Senior Inspector of Mines was transferred from Kalgoorlie to Perth, possibly to add a measure of varied experience to the relatively limited experience of the new State Mining Engineer and to ensure that the review of the mining legislation, begun by the Senior Inspector in 1965, was continued.

1976 – Legislative changes and new directions

The legislative amendment process begun in the mid 1960s was finally completed in the 1970s, with the legislation taking effect on 5 April 1976.

A Drilling Engineer with extensive groundwater drilling experience was appointed in 1968, and managed the drilling section under the control of the State Mining Engineer. A Petroleum Engineer was also engaged that year to administer the oil drilling responsibilities of the Branch but it became evident that more than one engineer was required. Eventually, a Petroleum Branch was established, separate from the State Mining Engineer's Branch.

Early 1970s – Restructure

In the meantime, due mainly to increased bauxite, iron ore and nickel mining, it became obvious that the existing structure of the Branch could not adequately deal with the inspection activity required under the *Mines Regulation Act 1946*, the work required under the *Mining Act 1904* with respect to mining tenements, the loss of officers due to improved opportunities in the mining industry, and other problems. A new structure gradually evolved and, by 1972, there were three semi-autonomous inspectorates covering the strategic areas of the Eastern Goldfields (Kalgoorlie), Pilbara-Kimberley region (Port Hedland then Karratha) and the Murchison-South Western region (Perth). The Collie inspectorate for coal mining remained unchanged.

The organisation comprised staff positions for the inspection of metalliferous mining operations that are familiar today, including:

- Senior Inspectors of Mines (one for the State, and one each for the Kalgoorlie, Karratha and Perth inspectorates)
- District Inspectors of Mines (including some specifically assigned to Ventilation)
- Special Inspectors of Mines (Ventilation, Mechanical Engineering).

The coal mining industry was still serviced by a departmental Senior Inspector of Coal Mines.

Workmen's Inspectors of Mines were elected for three-year terms by mining employees in several mining districts, with two for the Kalgoorlie inspectorate and one each for the Perth, Karratha and Collie inspectorates.

Early 1970s – Return of the machinery inspectors

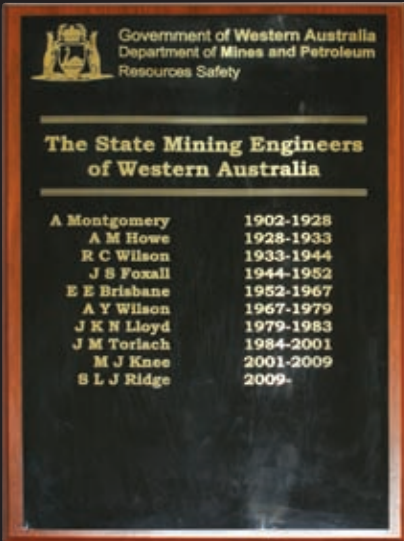
The inspection of all machinery in the State was a function of the Mines Department, and the State Mining Engineer's Branch in particular, for many years — the State Mining Engineer was Chief Inspector of Machinery. In 1969, the section had been transferred to the Department of Labour and Industry. However, due to the

desire of the mining industry to deal with only one legislative body, it was eventually decided that machinery inspectors from the Machinery Inspection Branch of the Department of Labour and Industry should be seconded to the State Mining Engineer's Division to carry out their statutory function on mines. They were appointed Special Inspectors of Mines (Machinery) and came under the direction of the Senior Inspector of Mines for the inspectorate, but obtained technical advice from the Mechanical Engineers of the Division. Two inspectors were based in Karratha, one in Kalgoorlie and two in Perth.

Late 1970s, early 1980s – Changing of the guard

Mr Wilson retired as State Mining Engineer in March 1979 and Mr Lloyd (AWASM, MIMM) was appointed to the position in May 1979. Mr J M Faichney, who was Senior Inspector of Mines for the State was appointed Assistant State Mining Engineer in August 1979. This position was retitled Deputy State Mining Engineer in December 1981.

After more than 31 years in the Division, Mr Lloyd retired as State Mining Engineer on December 1983. Mr Faichney retired in July the next year. Mr J M Torlach took up the position of State Mining Engineer on 9 April 1984.



Government of Western Australia Department of Mines and Petroleum Resources Safety	
The State Mining Engineers of Western Australia	
A Montgomery	1902-1928
A M Howe	1928-1933
R C Wilson	1933-1944
J B Foxall	1944-1952
E E Brisbane	1952-1967
A Y Wilson	1967-1979
J K N Lloyd	1979-1983
J M Torlach	1984-2001
M J Knee	2001-2009
B L J Ridge	2009-

Editor's note: Mr Faichney's account covered the mines safety inspectorate's history until 1984. Subsequently, Mr Torlach was responsible for the complete overhaul and modernisation of mine safety legislation, culminating in development of the *Mines Safety and Inspection Act*, which was introduced and passed by Parliament in 1994. It brought the administration of mine safety in all types of mines under a single administrative body and piece of legislation, repealing the *Coal Mines Regulation Act 1946* and *Mines Regulation Act 1946*. The *Mines Safety and Inspection Act 1994* received the Royal Assent on 7 November 1994 and commenced in December 1995.

MINESAFE TURNS 20

The timeline for *MineSafe* over the past 20 years, since it was first published in October 1989, not only traces its evolution to the flagship magazine it is today for Resources Safety, but also reflects changes in technology and records the host department and division names.

MineSafe was a joint initiative of Catherine Stedman and the State Mining Engineer Jim Torlach, with strong support from Senior Inspector Dave Collie, who saw the need for general communication with the mining industry. It was set up to not only convey messages about occupational safety and health but also news and information about the Mining Engineering Division, as it was then, and inspectorate. The bulletin was the first government publication in Australia to focus on mines safety and health.

The editorial team for the first issue comprised Catherine Stedman (Editor), Jane Scanlon (Research Officer) and Simon Wood (Research Assistant and Librarian). Articles were supplied by inspectors, the State Mining Engineer and Assistant Director (Metalliferous).

Staff members were invited to participate in a "Name the Bulletin Competition". Jim Torlach judged the competition and the winner was Mark Brown, who suggested the title "*MineSafe*".

The magazine has come a long way since those early days when it was a typed and photocopied eight-page document. In December 1991, it was printed in two colours. By September 1996, the first colour photographs were featured. In this 61st issue, colour and illustrations are an important aspect of attracting attention to important issues and making the magazine easy to read.

Mrs Stedman was a stalwart of *MineSafe*, editing it for a decade before her untimely death in 1998. An inspector, Patrick Burke, took on the editor's role for ten issues from May 1999 to

December 2001, after which there was a two-year hiatus. Two issues were produced in 2004, one edited by Jennifer Gordon and the other by Richard Langford.

A dedicated publications and promotions section was set up in Resources Safety in 2005. The magazine is now edited by Communications Manager Su Ho, with graphic design skills provided by Donna Hunt. Since 2007, *MineSafe* has been issued three times a year and its scope now includes the inspectorates for occupational safety and health of the petroleum and geothermal sectors, and the safe use of dangerous goods.

Although there have been technological and design changes to the way *MineSafe* is produced, its primary aims haven't altered since those early days:

- provide and update information on safety in mining;
- notify the industry of hazards and their risks, and critical incidents;
- advise of relevant seminars, conferences and training opportunities;
- inform the industry of inspectorate activities, and introduce staff and provide contact details; and
- provide a forum for contributions and viewpoints from people in the industry.

Over the years, a great deal of valuable information has been provided to industry, and the content continues to be varied and of interest to a range of readers. Some 6,500 copies are currently distributed to the managers of mining, exploration and service companies; safety and health representatives; and others interested in safety and health.

Together with Resources Safety's website and roadshows, *MineSafe* has an important role in raising general awareness of safety and health issues. Significantly, this publication also has the capacity to generate action and interest that far outweigh the cost of production and distribution.

MINESAFE.

Vol. 1, No. 4



Joe Turkish
Mine Safety Engineer

The additional resources and expertise which have resulted from the restructuring have enabled the Division to undertake a considerable range of initiatives for the protection of health and safety in the mining industry. Some of these will be referred to in this and succeeding issues of MINESAFE.

A brief resume of the Divisional and Inspectorate structures is included as a back feature in this Bulletin. A brochure is being prepared in the form of a more comprehensive guide to the Division and its functions and this will be both distributed and available in future on request. It is intended that this be updated yearly or twice yearly according to need.

The purpose of this and future issues of the Bulletin will be to provide updated information on safety matters, to notify of more exceptional incidents or accidents, to advise on future services, training opportunities and other initiatives which people in the industry may wish to take part in; and to inform the industry generally on activities and developments in the Inspectorate.

It is intended to commence this Bulletin on a quarterly basis. I commend its contents to your attention and ask that you discuss it with others.

Joe Turkish

October, 1999 MINESAFE Page 3

MINESAFE.

Vol. 2, No. 1

FORMAL INQUIRY SAFETY IN UNDERGROUND GOLD MINES



The first formal inquiry into an underground gold mine was held in the United Kingdom in 1994. The inquiry was held in the presence of the Health and Safety Commission, the Health and Safety Executive, the Health and Safety Inspectorate, and the Health and Safety Executive's Health and Safety Inspectorate.

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October, 1999 MINESAFE Page 3

MINESAFE

ISSUED BY THE MINING INSPECTORATE DIVISION OF THE DEPARTMENT OF MINERALS AND ENERGY

ROCKFALLS




ROCKFALLS - Check the Right Side for the Job

DECEMBER 1998 M.I.N.S.A.F.E. 3

MINESAFE

ISSUED BY THE MINING OPERATIONS DIVISION OF THE DEPARTMENT OF MINERALS AND ENERGY (DME)



"QUICK-FIX METHOD OF WORKING"

One wrong step and you are gone

DECEMBER 1998 M.I.N.S.A.F.E. 3

MINESAFE

ISSUED BY THE MINING OPERATIONS DIVISION OF THE DEPARTMENT OF MINERALS AND ENERGY (DME)

SPLIT RIM TYRE EXPLODES



The split rim of this mobile crane wheel failed catastrophically resulting in a fatality.

DECEMBER 1998 Vol. 2, No. 1

MINESAFE

Department of Mineral and Petroleum Resources

Merry Christmas!

Dropping in on old workings . . .



. . . not if you can 'a-void' it!

... see inside cover

DECEMBER 2001 Vol. 12, No. 3

MineSafe

Special issue on changes to the Mines Safety and Inspection Act



General duty

Electing safety

Department of Industry and Resources

October 2001

MineSafe

Keep your seat



Cyclone reminder

Safety case approach

Department of Consumer and Employment Protection and Energy and Water Security

Resources Safety

October 2001

minesafe

ISSUED QUARTERLY

Volume 13 No. 2 - OCTOBER 2001



Supervision key to safety

MINING TALENT

DISASTERS IN UNDERGROUND MINES

LEGAL AND REGULATORY DEVELOPMENTS

October 2001

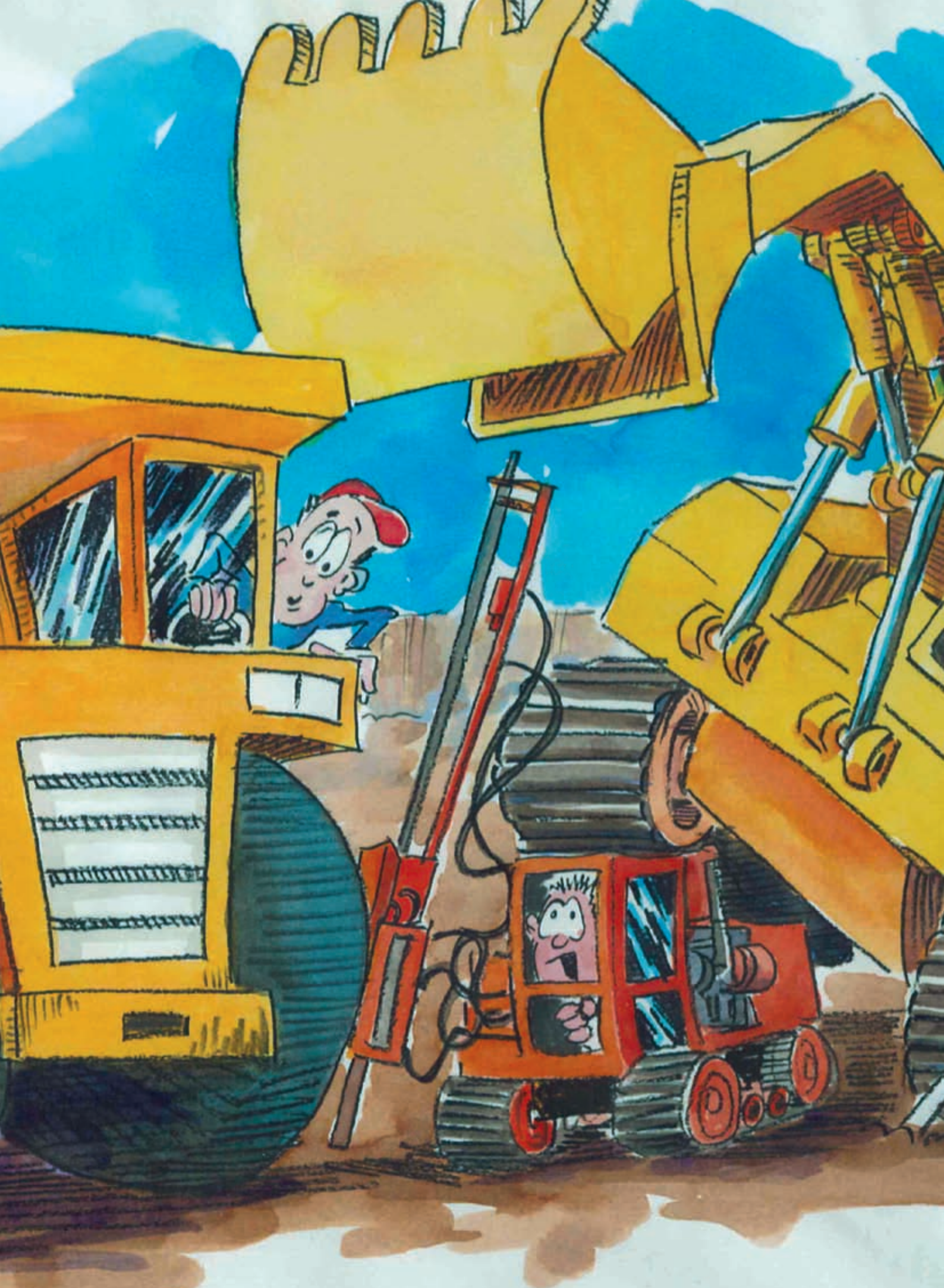
NUGGET – BLAST FROM THE PAST

Nugget was introduced in the March 1991 edition of *MineSafe* as the “resident safety expert”. “I’m here to help,” miner Nugget had said.

Nugget was created by Doug Blythe, who was a photographer with the Surveys and Mapping Division of the department, and had a Diploma in Media Design. Doug was also an extremely talented cartoonist, and Nugget and some of his not-so-careful mates featured in mines safety brochures for at least eight years. While he spent a lot of time in an open pit, Nugget was apparently also quite at home underground.

When Resources Safety was packing to move from East Perth to its current location in Cannington, nine of Doug’s original drawings were uncovered. After framing to preserve them, they now adorn one of the main passageways in the new head office.







ALMOST A TONNE FOR GOLDFIELDS MINE RESCUE

Western Australia has a long tradition of mine rescue competitions, starting in the Goldfields in 1911. The first event tested first aid and breathing apparatus skills.

Ninety-eight years later, on 7-8 November, 14 mine rescue teams worked their way through theory tests and seven emergency scenarios at the Chamber of Minerals and Energy of Western Australia's 2009 Underground Mine Emergency Response Competition.

It is fitting that the Resources Safety Division of the Department of Mines and Petroleum continues to sponsor the Breathing Apparatus Skills Award, which has featured since the first competition, because mines inspectors were often involved in rescue efforts in the early decades of the 1900s. In more recent decades, inspectors have made significant contributions to the

competitions through roles such as membership and chairing of the organising committee, adjudication and event management.

In recognition of their importance in the mines safety calendar, the competitions have also featured prominently in contemporary *MineSafe* magazines.

The Goldfields competition's significance on the mines safety calendar was highlighted by the attendance of the Hon Norman Moore MLC, Minister for Mines and Petroleum, at the presentation evening, where he addressed more than 350 guests.

The Chamber's Eastern Regional Council Chair Russell Cole acknowledged the efforts of all those involved in organising the competition.

"The efforts of the competing teams, adjudicators, sponsors and volunteers over this weekend demonstrate our industry's unwavering commitment to zero injuries and fatalities," he said.



In November 1914, James Gorey died in a mine disaster at Marvel Loch. The *Argus* newspaper (Melbourne) published the following on 19 May 1915.

MARVEL LOCH HERO



BRAVE MINER HONOURED

PERTH, Tuesday — The Minister for Mines (Mr. Collier) visited Marvel Loch on Tuesday and presented a miner, Frank Mazza, with the departmental certificate for bravery.

In November last James Gorey, Frank Maza (sic) and Michael O'Brien were tributing in the Marvel Loch mine, and while engaged in the work of taking out stone a heavy fall of earth occurred in a stope over them, instantly killing Gorey and pinning O'Brien in a position which rendered him unable to extricate himself. Mazza, at great personal risk, and with the ground crumbling all around, and, though twice driven from his task, succeeded in the third attempt to release his remaining mate just in time to avoid a further fall of earth, which would have overwhelmed them both. Making their way to a sounder part of the mine, the two were subsequently imprisoned for 8½ hours before a rescue party, working under extreme difficulty and in immediate peril, effected their release.

Source: newspapers.nla.gov.au

Photo courtesy of Martin Knee

2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION



TYC Eddie Boeg

BARRICK STEPS UP AS HOST

Barrick Kanowna's Bullant mine was the home of the 2009 Underground Mine Emergency Response Competition. The underground gold operation, located about 70 kilometres northwest of Kalgoorlie, hosted the two-day event, with six scenarios set underground and two on the mine's surface.

.....

Evan Spencer, General Manager of Barrick Kanowna, said that hosting the underground competition reaffirmed the company's commitment to safety.

"Barrick sees itself as an industry leader in safety and this event raises the profile of safety. Our involvement also supports the mine rescue process, which is a vital part of the resources industry," he said during the competition.

"The competition is a great opportunity for the sites to learn from one another and look at each other's skills and practices. We hope we never have to use these skills in real life, but the competition is a great place to test them."

Evan said a collaborative approach by his company and the Chamber of Minerals and Energy's (CME) Eastern Regional Council Mine Rescue Committee (ERCMRC) had helped make the competition possible.

"The committee and CME are highly experienced at organising this competition, and we have been assisting them in preparing

for the event," he said

"We have deferred production from the underground operation for three days to accommodate the event, and brought in overtime staff and staff rostered on for the weekend to assist during the competition. These staff members have assisted as marshals, event coordinators and have transported people up and down the mine site.

"There has also been a solid month of helping to set up scenarios and transporting the equipment required for each scenario underground. During the set up, we have also had to ensure that, from the very start, we were not endangering anyone on site. This included performing job safety analyses (JSAs) and risk assessments of each scenario."

The Bullant underground mine has been operating since 2002 and is due to close in December 2009. There are four other Barrick operations in Western Australia that span 70 kilometres of the Eastern Goldfields.

Evan said his role in hosting the competition included ensuring the event maintains Barrick's site standards and practices.

"Obviously, industry works pretty closely when it comes to safety so, in most ways, it's been a pretty straight forward process. We have just made sure that all JSAs and risk assessments for all the scenarios were adequately assessed and understood before the scenarios took place," he said.



TYC

Evan Spencer

“

BARRICK SEES ITSELF AS AN INDUSTRY LEADER IN SAFETY AND THIS EVENT RAISES THE PROFILE OF SAFETY. OUR INVOLVEMENT ALSO SUPPORTS THE MINE RESCUE PROCESS, WHICH IS A VITAL PART OF THE RESOURCES INDUSTRY

”

EVAN SPENCER

Barrick has been involved in the mine emergency response competitions for more than ten years. This year, in addition to hosting the underground event, the company put forward two competing teams, Barrick Yilgarn and Barrick Kanowna. Barrick owns 50 per cent of Kalgoorlie Consolidated Gold Mine (KCGM), which also competed.

Evan said that feedback from Barrick competitors had been very positive.

“Every year Barrick competitors say the scenarios are more challenging. The people designing the scenarios adapt to new technologies and the changes in the mining sector so they always stay relevant. All credit must go to the event managers who think up something new every year to make it a valuable experience for competitors,” he said.

“We hope that this is only time we actually require the skills from our mine rescue people. You do need to put these skills to the test in a competition environment, but the competition is not about winning, it’s about learning and becoming prepared if the situation arises.”

Evan said that Barrick would always be very keen to support the competition, and the company had benefited from both competing and hosting the event.

“There has been an excited buzz in the air here during the competition. The site’s Underground Mine Foreman, Eddie Boeg, has been instrumental in not only keeping the operations

going but setting up for the competition. The staff on site have loved being a part of it — it’s exciting and it’s a break from their normal everyday work,” he said.

Eddie Boeg not only led the preparation work for the event but has been a competitor, being a member of the Yilgarn Star team in the 1990s. He said that the staff at Bullant had been extremely helpful and accommodating during the preparation of the competition.

“CME representatives came on site and we walked around to identify what needed to be done,” he said.

“The mine is nearly at its end, so we didn’t have a lot of areas to work with in terms of identifying scenario locations underground. We utilised what we could find.

“We spent three days double meshing the mine’s decline to make it safe for the fire fighting scenario. The rope scenario was always going to be a challenge too, as we had to comply with the standards for open holes.

“Many man-hours went into setting up all the scenarios, with safety being our number one priority. Another driving force behind our efforts was that we wanted to have the best set up for the competition. I think my team has done a fantastic job and to say I’m proud of all of them is an understatement.”

Eddie added that it had been a great experience to be involved in such a valuable and proactive event.



FIRST AID AND BA IN THE NEW MILLENNIA

What has happened to the first aid and breathing apparatus scenarios since the mine rescue competitions started in the Goldfields in 1911? What are they testing in 2009? Here we take a look at both scenarios and see what teams face nearly 100 years later.

FIRST AID

Five people involved in the situation, four of them casualties. One casualty is pinned in an underground drill rig with his skin pulled back and he is in agony.

This is what mine rescue teams faced in 2009 when they tackled the first aid scenario.

Todd Smoker, one of the “casualties” and a past competitor, said he had seen a continual improvement in the first aid event, with scenarios becoming more realistic and more tailored around patient care.

“First aid is heading towards more patient care, whereas before it was more about snatch and grab and just finishing. Now it’s

more about how you treat your casualties, what you do with them, and following the correct procedures. The scenarios are also becoming more realistic so you gain more out of it,” he said.

Realism was definitely shown in this scenario, with the situation based on an event covered in a significant incident report issued by Resources Safety.

Todd said first aid was an extremely important component of mine rescue and therefore was an element of almost every competition scenario.

“I think first aid is basically why we are here in rescue, as we are here to help people and save lives. With other scenarios, your medics are exposed to the first aid component but generally the other team members aren’t. However, the first aid scenario is an opportunity for the whole team to get involved, increase their first aid skills, and receive feedback so the team can improve. First aid is definitely something that every mine site should nail,” he said.

First aid had two event managers, Andrew Chandler and Sue Steele, who came up with the idea for the scenario. Andrew said they introduced some new elements that had not been tested on teams for a while.



TYC

Todd Smoker (left)

“FIRST AID IS HEADING TOWARDS MORE PATIENT CARE, WHEREAS BEFORE IT WAS MORE ABOUT SNATCH AND GRAB AND JUST FINISHING. NOW IT'S MORE ABOUT HOW YOU TREAT YOUR CASUALTIES, WHAT YOU DO WITH THEM, AND FOLLOWING THE CORRECT PROCEDURES.”

TODD SMOKER

“We have not had cardiopulmonary resuscitation (CPR) in a scenario for a while so we have bought that in. We have also made sure that the team does defibrillation because a lot of teams have not been doing defibrillation with their CPR,” Andrew said.

“In our scenario, we have a casualty who arrives late at the scene. He gets chest pains and suffers a heart attack, so the team must perform CPR on him.”

Andrew said managing resources and personnel was the key to succeeding in the scenario.

“There are four casualties during the event, with three of them critically injured so they need to be stretchered out. Teams need to figure out how they will get four casualties out with only six rescue personnel, all in 45 minutes, so managing resources is the key,” he said.

“The scenario really helps teams improve on their team work and their defibrillation skills.”

BREATHING APPARATUS

Equipment for breathing apparatus (BA) may have been around for the past century but it has evolved and remains a vital part

of mine rescue. BA is worn by people such as rescue workers and firefighters to provide breathable air in a hostile irrespirable environment.

Event manager of the BA skills scenario, Tobias Byrne, said that in 2009 they have gone back to testing core BA skills, but added a leadership component.

“Traditionally, BA was about apparatus knowledge and the competitions I have been to in the past tested knowledge and how to use BA equipment. That’s what we have gone back to this year — we have gone ‘old school’,” he said. “We did, however, made it more challenging by adding in problem solving skills and a more ‘divide and conquer’ approach. Previously, each person would be in charge of only their own set of equipment, and they tended to work in isolation.

“This event has 13 stations that have an interlinking web of relationships. In order to achieve the whole project, the captain must realise how they link together. If you break that link or can’t see the correlation between each one, the team will not score well.”

In the BA skills scenario, which is sponsored by Resources Safety, each station tests the core knowledge required to

2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION



TYC Sunrise Dam, winner of BA category, with Resources Safety's Jim Boucaut (right)

maintain BA equipment and follow the official procedures for using the equipment. Teams also work in an environment that is a long way ahead of fresh air.

Tobias said that the problem solving component for the team captain was that the stations were not required to be completed chronologically.

"The best way to go into this scenario is to work out how the stations are related. The captain has to allocate resources appropriately after assessing each task and its relationships," he said.

"There is more pressure on the captain because, in many other scenarios, the captain traditionally has in a more autocratic leadership approach with symbiotic team procedures. The captain has control of the team and everyone works around the stretcher. Everyone does the same thing at the same time.

"In this scenario, the comfort of team members being able to back up other team members is taken away. This allows team members to shine and I think that's the main reward for them."

Tobias said BA was a very important element of mine rescue because it was critical in protecting the safety of mine rescue teams.

"BA skills are so important because if you don't know your core selection, use and maintenance skills for the equipment, you can't look after yourself or your team. It's one of the most critical elements as this piece of equipment allows teams to work ahead of fresh air for long duration," Tobias said.

"Teams can't fight a fire or do search and rescue without their BA. You need to know these skills to be competent in underground mine rescue."



TYC
 ERCMRC Chairman Brad Stearnes (left)
 and Minister for Mines and Petroleum
 Norman Moore



TYC Shane Skinner at the podium

XSTRATA EXCELS UNDERGROUND IN 2009

The team most on award presenters' lips at the 2009 Underground Mine Emergency Response Competition Awards Evening was Cosmos Nickel from Xstrata Nickel Australasia. Overall winner of the competition, the team won the categories for team skills, search and rescue, team safety, fire fighting and best captain.

When *MineSafe* spoke to the Xstrata team on the final day of the two-day competition, team members appeared confident with their performance so far.

"There are 20 of us who train as part of the Cosmos emergency response team. We then chose six people and one reserve to come down and compete," Brendan Murphy said.

"The mine site has been competing for the past four years, and over that time it's really been about getting people the experience. We would send a new team every year to try and increase team members' skills and experience, as these competitions really prepare you the best for a real life incident, and we have had to deal with one in the past.

"This year we decided to send a more experienced team to have a crack at winning, which we hope to do and are feeling pretty confident about at the moment."

The winning team trains once every two weeks for half to three-quarters of a day, but had spent five solid days training in the lead up to the competition.

Brendan, who competed in 2007 and was back as a competitor in 2009 after taking a break last year, said the training helped

to ensure the team's skills were up to scratch for the event. He said the team liked the scenarios.

"Compared to 2007, there has been a big improvement. The scenarios resemble something that could really happen," he said.

"In tackling the BA scenario, breathing apparatus skills are important but the key is working as a team. You're not going to get things done on your own. Everyone has a role within the team and the key to doing well is sticking to your role, working together and not getting angry."

"The search and rescue scenario was very physically challenging, while fire fighting was challenging because you had lots of hazards you couldn't see, and you had to deal with that claustrophobic feeling. The ropes scenario was also tough because there were some new regulations that we were not aware of.

"Usually there is a stand-out scenario but I can't really pick one this year as they have all been challenging. The guys have gone to a lot of effort this year, which is good to see."

The members of Xstrata Nickel's winning team for 2009 were:

- Shane Skinner (Team Captain)
- Brendan Murphy
- Shaun Van Der Merwe
- Nicole Kublanck
- Rory Reed
- Stephen Simpson
- Craig Walker
- Jeremy Lykke



TYC Rope rescue

2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION



TYC

KCGM

LADIES LEADING THE WAY

The 2009 underground competition saw several women step up to the team captain role, with three of the fourteen competing teams having female captains.

Kalgoorlie Consolidated Gold Mine (KCGM) team captain, Jess Baker, said the underground competition was the first time she had ever taken up the captain role.

"This is my third time in the competition but my first time as captain. I have previously been a medic but I love the captain role. It's challenging but it's good to see the scenarios from a different perspective and get the overall picture," she said.

"When you are a team member you focus on just your individual duties, but as captain it's good to step back and see how it all works together. Being a captain is much more about organising everyone else and making sure the information gets through to everyone instead of focusing on your own individual task. You need to deal with things you don't expect so you're always on your toes."

Jess, a mine geologist, has been working for KCGM for the last two and half years. She took up the opportunity to be captain as she felt she was ready to step up to the challenge and wanted to learn new skills.

"The role of team captain is a challenging one for me but I'm really proud to be leading our team. I do find it a bit difficult yelling at people as I have that real caring and motherly side — being a medic is where I get to show that side a little bit more," she said.

"Rescue is my passion. If I could, I would take up a career in it straight away, so I'll definitely keep going with it. Who knows, I might eventually be able to do it full-time rather than just volunteering."

Jess said that over the last three years of competing, she had seen the scenarios get better and better.

"It takes a lot of effort to organise an event and we just appreciate all the work that goes into it," she said. "I think the event managers take a lot of pride in their events these days, and there's a bit of a competition to see who can come up with the best scenario. It makes it better for us and better for them, as it's lots of fun."

Jess said the competition is the best training you can get as it simulates a real-life pressure environment.

"You're outside of your normal working environment when you compete in this event. You want to do whatever you can to help your mates and that's why I'm involved. I want to know how to

help my work mates if they get into a difficult situation.

"It is also good to be part of one of the longest competing teams, although that also raises expectations as KCGM have done really well in the past.

"We feel that as industry has become a bit more stable, so has our team as we have been able to train together a bit more. We also recently got a new emergency response coordinator, Garry Oliver, and he has done incredible things with us and put in a lot of effort. I'm excited about this competition and the direction the team is moving in."

Bree Galloway from the Jaguar-Gwalia team was also competing as team captain for the first time. The past competitor and volunteer has been involved in the competition for the last two years as a medic and a casualty. She said her first time as captain has been very different.

"I was the medic last year and was more focussed on getting to my casualty and caring for them. You overlook a lot of things as your captain takes care of the team. Now I have had to step right back and look after the team, the conditions and a whole heap of other stuff I never had to consider before," Bree said.

"Leadership is a key skill in this role, especially being a female. I have a huge personality as it is so, for me, being loud is not too much of a problem, but you really need to get that leadership respect and get people to listen, so you can get the results that you want. You feel a little bit harsh but you have to set a standard and clearly communicate how things are going to be done. It's a bit hard the first few times but it gets easier after that."

MineSafe spoke to Bree on the second day of the event. She said the most challenging scenario for her had been search and rescue.

"Although you get double the time to complete search and rescue than other scenarios, it's really hard work. It draws on a

number of elements like ladders and ropes, breathing apparatus skills, first aid and fresh air-based skills. There is a lot to do in an hour and a half, plus you have to walk up the mine decline with all your gear," she said.

"The breathing apparatus scenario was also quite challenging as it really tested me in my leadership role. It drew a lot on my captain skills as I had to assess the ability of all my team members, and assess all the stations. I also had to make sure I had good communication, gave direct instructions and ensured everybody was doing what they were supposed to be doing. It was quite hard."

The former underground geological technician now works as a medic and emergency response trainer on site. She said it was really good to see females stepping up to captain role.

"Every guy that I have ever worked with in emergency response training has shown so much respect toward me but it's great to be able to get in there and show you can do what they can do. They don't mind being told what to do after they see you can do that," Bree said.

"If I did get the opportunity to be captain again I think it would be really good because this is a learning experience, so you learn more for the next time you come back.

"You don't come here to take home the trophy — it's just a bonus if you do. You come here to learn and I have already learnt so much this year. However, I'd also be happy to give someone else that learning opportunity."

The female team captains for the 2009 underground competition were:

- Jess Baker – Kalgoorlie Consolidated Gold Mine
- Bree Galloway – Jabiru Metals and St Barbara Mines
- Sian Nichols – La Mancha Resources

“RESCUE IS MY PASSION. IF I COULD, I WOULD TAKE UP A CAREER IN IT STRAIGHT AWAY, SO I'LL DEFINITELY KEEP GOING WITH IT. WHO KNOWS, I MIGHT EVENTUALLY BE ABLE TO DO IT FULL-TIME RATHER THAN JUST VOLUNTEERING.”

JESS BAKER





TYC Kambalda Mutual Aid

THINKING ABOUT THEORY

Being an emergency mine rescue team member is not just about correctly using the equipment or being physically fit, it's also about drawing on knowledge. Theory has been a component of the underground competitions for more than 30 years, and although it has evolved over the years, it has remained an integral part of the program.

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The 2009 theory test proved a little more controversial than previous years, encompassing more elements than had been drawn on in the past.

Patrick Burke, who marked the theory test, said it was more of a memory test this time around. He said items that may have been regarded as more controversial included questions on rock mechanics.

"Some people don't actually think parts like this are relevant, but they are. This competition is not just about winning. It's primarily about learning and that's the key thing teams must take away with them," he said.

"That's also why we ask these curly questions — to make people think and stretch their minds. When you go into a real-life underground mine rescue situation, you must be able to think clearly on your feet and have the appropriate knowledge. That's a lot of what we test in theory."

The competition's theory component comprised six parts covering various aspects of the core abilities, including team skills, breathing apparatus, fire fighting, theory, first aid and ropes.

Questions are based on official emergency response training and modules used by training organisations.

Teams have five minutes preparation time, followed by 55 minutes to complete the test. A nominated team member is individually tested while the rest of the team completes another test paper.

"Theory is always testing the same suite of things, but in different ways. For example, a question could be about gases and test knowledge like identifying the type of gas or gas levels," Patrick said. "When you're in a real emergency situation you can't take text books in with you to check these things. It's just got to come to you, it's knowledge."



TYC Newmont Jundee

Patrick said the team part of the test looks at the managerial ability and team dynamics while the individual part is more about simply testing knowledge.

He said the range of marks over the years has been decreasing.

“Sometimes we end up splitting marks to separate teams. There is usually only about a 20 per cent margin of difference between the lowest and top team, clearly showing that they are on the same page,” Patrick said.

“A real life example that showed teams are on the same page occurred at the underground competition a few years ago. A team was on its way to the competition and saw smoke coming from the side of the road. A car was on its roof burning and there was a man inside it.

“The team went into recovery mode and members had started doing what they had to do when another team came along. A chief adjudicator was driving behind the second team and he stayed back from the scene while the second team went in to help.

“Within seconds, they were acting like one team, showing the

consistency of their emergency response training and thinking. It was amazing how the uniformity and the quality of the training came through very clearly. They saved the guy’s life.”

The winner of the individual theory category for the second time in 2009 was Peter Appel from Barrick Yilgarn. The team from Barrick Yilgarn also took out the team theory category, which it had won at the surface competition in May.



TYC Barrick Yilgarn with Patrick Burke (second from right)

ROLLCALL OF COMPETITION STALWARTS

Mine rescue competitions in the Goldfields have left an impression on many people over the years. Some have stayed on board to experience a variety of roles, including competitor, adjudicator, event manager, casualty and committee member.

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This year's chief adjudicator, James Donnelly, is someone who has quite a history with the competitions. Involved for the past 17 years, James has been a competitor, adjudicator, event manager and, for the last five years, the competition's chief adjudicator.

In 2005, James received the *Harry Steinhauser National Mine Chaplaincy Award*. This award was created in 2001 to acknowledge the significant contribution by individuals and groups to mine rescue in Western Australia.

James, who first started competing for a team in Kambalda in 1994, said the competitions have always been challenging.



TYC James Donnelly

“The scenarios have become even more challenging and realistic over the years. There is a great deal of planning and preparation that goes into them these days. At the last surface competition, the best scenario was like a Hollywood production,” James said.

“The Goldfields event has become the biggest mine rescue competition in the Southern Hemisphere, and when we get feedback from participating teams from other States, the feeling is that this is the competition everyone really wants to compete in and win. This is the “blue ribbon” event.

“We have had up to 18 teams compete in the surface competition. New South Wales and Victoria have about five or six teams in their competitions. Here it's the West, and we are the biggest and the best!”

James said that the cost of running the competition had increased over the years, but support from volunteers and sponsors enabled it to keep running successfully.

“Mining companies have always been very flexible and supportive in letting their teams compete as they know how important it is,” he said.

“As for costs, which have gone up, we get sponsorship from those servicing the mining industry. It costs about \$100,000 to put this competition on. That does not include wages and a lot of the equipment. Much of these costs is covered by the

voluntary work everyone puts in and the donations we get for things like equipment.”

James said that he planned on being involved in the competition for some time to come because of the value it places on mine safety, and the learning opportunities it offers teams.

“This weekend is all about learning. Yeah, sure, people are going to win events and trophies, but what we want every team to take away with them from the weekend is increased knowledge,” James said. “The scenarios are very challenging. We hope teams won't come across these situations in real life, but will go back to their sites with the knowledge to deal with them if they have to.

Fourteen teams from around Western Australia competed in the 2009 underground competition. More nominations were received than places available but 14 is all that the competition could take.

“That number is what we can accommodate in terms of ensuring the logistics run smoothly, such as teams getting to their scenario on time. We do try and share places around so that everyone gets an opportunity at some time to compete,” James said.

“We also try and keep up with the latest advancements and technologies. At last year's event, for example, we had fibre optic cameras that teams could use underground and infrared

2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION



TYC

equipment, which is available again this year.

“It’s very hard for the event to get bigger, logistically, but we have a centenary coming up for the competition the year after next so we will see if we can make the ‘whiz bang’ even bigger. We will keep trying to challenge the teams and using the most up-to-date equipment and technology.”

Kevin Broadbent is another person with a long association with the mine rescue competition. Involved in mine rescue for the past 25 years, and the competition for nearly 16 years, Kevin has done everything from competing as a team medic, vice-captain and team manager to being an event manager and adjudicator. He was the driving force behind the creation of the North Eastern Regional Combined Team, which bought together personnel from Leinster Nickel, Agnew Gold Mine and Jubilee Cosmos Nickel.

“These sites couldn’t field a whole team so we created the North Eastern Regional Combined Team, which took out best new team category. It was great to see the Cosmos Nickel team, which was part of that combined team back then, take

out overall winner at this year’s awards as they were unable to source a full team back then,” Kevin said.

“I have also been the event manager for the fire fighting scenario and was involved in the first emergency coordinator event in 2005. That event added a new scenario to the competition, and challenged the leaders of each team when managing a major incident. The event has now been included in teams’ overall points.”

Kevin was acknowledged with the *Harry Steinhauser National Mine Chaplaincy Award* in 2006. Kevin said he had no idea that he had been nominated by his peers for the award and was very surprised on the night.

“It was a really special night as I was presented the award by Harry Steinhauser’s son, Colin. I was lost for words and had no speech prepared. What a great night though,” he said.

Kevin, who has attended almost every surface and underground competition since 1989, said the event has improved over the years.



“The camaraderie of the teams and events seems to reach new heights each year. I feel it’s a credit to the Chamber and all involved who keep putting on an event that is rated highly by the State’s mining industry and nationally,” he said.

“The competition continues to challenge teams. In my eyes, all teams go back to their sites as winners, no matter if they receive a trophy or not. You can’t put a price on the skills they learn in this competition.”

Another very significant contributor at mine rescue competitions over the years has been Resources Safety’s Peter O’Loughlin.

Now Senior Inspector of Mines based in Collie, he first became involved in 1989 as a competitor for KLV, now known as Kalgoorlie Consolidated Gold Mine (KCGM). Peter has chaired the Mine Rescue Committee, as well as been an event manager and, more recently, chief adjudicator.

The 2003 Harry Steinhauser Award recipient said the competition had really evolved over the last 20 years.

“In its early days, the competition only had a few teams from

Kalgoorlie and Kambalda, and sometimes a team from Norseman or Leinster,” Peter said.

“However, it really kicked off in the 1990s when we had up to 16 teams competing. There was increasing professionalism and involvement from companies. Many companies were employing emergency services officers, and safety was becoming a bigger thing.”

Peter said that the competition has always been a valuable event and offers a fantastic learning experience.

“You can learn more in the training leading up to the competition and during the competition itself than in six to 12 months of regular training. It puts you in situations you hope you never find yourself in, but develops your skills to be able to cope with pressure situations when they do arise. Over the years, the scenarios have become more realistic and are testing more realistic injuries,” he said.

As well as the mine rescue competitions in the Goldfields, Peter is also involved in the South West Emergency Response Skills Challenge.

2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION



Competition and training photos courtesy of Focus Minerals

FOCUSING ON THE EXPERIENCE

Three new teams were on board at the 2009 underground competition to showcase their skills in emergency mine rescue.

The emergency response team from Focus Minerals, Coolgardie Three Mile Hill, was definitely in new territory as none of the team had competed in a mine rescue competition before.

Zane Padman, Focus Minerals team captain, said his team became involved in the competition to gain more experience and improve their skills and emergency response capabilities for their Coolgardie operations. He said that although the team had not known what to expect, members took a lot from the weekend experience.

“We have probably made some mistakes but we have learnt so much by competing. And now we know what we have done wrong, we can improve. We are feeling more confident after the weekend,” he said.

“You have to have a competitive streak to push yourself as the competition helps to test yourself against other competitors, but for us the key was definitely learning.”

The team from Focus Minerals trains every second Thursday on site but, due to different work rosters, members had never actually trained together until just before the event.

“We did three weeks of training before the competition, which was the first time we had trained as a team. We had all done bits and pieces with some members but not as a whole group



because of the different rosters. Whoever is on site and available does the training,” Zane said. “However, we still know each other really well, so team-wise we worked well and have good team dynamics. Team work is the key.

“As team captain, it has been nerve racking because it’s my first time and I really didn’t know what I was getting myself into. I just tried to do a lot of study before the competition and looked at past captains to see what they had done right. The whole Focus team has been great though.”

Zane said the team had found the fire scenario the most challenging.

“Before the competition when we trained for the fire fighting, we ran through how you would set up your fresh-air base and

have your incident controller there, but when you’re facing the scenario in the competition, you can’t have that,” he said.

“They had a person sitting in a rescue chamber. You had to get the information from him and bring him down and make him the fresh-air base coordinator. So you are kind of on your own as there is nobody else to ask questions. It challenged us, but we just tried to rely on what we had been taught.”

Zane said the team had learnt a lot and that it would be good to work on the things the team could have done better.

“This event is a great way to train. This weekend we have learnt more about ourselves and about how we do things than we ever have before,” he said.

2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION



NEW TEAMS JOIN FORCES

The underground competition's other two new competitors included the Kambalda Mutual Aid Emergency Response Team and the Jaguar–Gwalia Mutual Aid Emergency Response Team. Both had emergency response representatives from different mine sites to form their teams.

Three local nickel mines — Lightning Nickel, Silver Lake Resources and Mincor Resources — joined forces to create the Kambalda team. Team member Scott Turbitt said that only two members of the team had been involved in the competition before.

“We only had three days of training leading up to the event, and this was the first time we had trained as the whole team so we weren’t sure how we would go. However, it’s going really well, we are working together well and our training is quite consistent,” he said during the competition.

“The training for everyone is quite similar in the industry as we follow specific guidelines, so when we came together as a team we have found our mines rescue techniques are very comparable.”

Scott said that the competition was an important part of the mine emergency response process in general.

“The scenarios have been great practice, and they help you see that if you ever have to render assistance, you will be capable. The scenarios have been consistent — you always have a few stand-out scenarios but overall it’s a very professionally run event,” he said.

This year was also the first time that Jabiru Metals and St

Barbara Mines had come together to form a team. Heath McGuire, team emergency response coordinator, said some of the team members had only started their emergency response training six months ago.

“Only the team captain and I have ever competed in the competition before. The rest of the team is quite new,” he said. “They love the competition though. We brought the right kind of people to this competition. Everyone on the team is exactly the type of person you would want in an emergency response team. They are in it for the right reasons, and are really soaking up everything this competition has to offer.”

Heath said team members had undertaken six days of intensive training together before the competition, but had been training collaboratively over the last 12 months.

“We have a clear set of objectives that were developed by me and St Barbara’s emergency response coordinator to help make our Jaguar–Gwalia Mutual Aid more solid,” Heath said. “We also have a system where we swap training and train on each other’s sites. We are located about 45 minutes to an hour away from each other so it’s very important that there is no stuffing about if we were called to an emergency. By training collaboratively and on each other’s site we know who to speak to, where to go on site and how to get there. It also creates camaraderie.”

Heath said the event was the only opportunity that teams had to face real-time pressure and to feel the adrenaline and experience you would get in a real life situation without anyone actually getting hurt.

“The competition is a great experience. It solidifies our mutual aid and allows our team members to learn things they can bring back to site,” Heath added.



2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION



HONOUR BOARD

1st Best Team	Xstrata Nickel Cosmos	Team Skills	Xstrata Nickel Cosmos
2nd Best Team	Barrick Yilgarn	Team Safety	Xstrata Nickel Cosmos
3rd Best Team	Newcrest Telfer	Theory	Barrick Yilgarn
Incident Management Scenario	Craig Stonham (BHP Billiton Leinster)	Theory Individual	Peter Appel (Barrick Yilgarn)
Fire Fighting	Xstrata Nickel Cosmos	Best Captain	Shane Skinner (Xstrata Nickel Cosmos)
First Aid	Barrick Yilgarn	Best New Captain	Michael Hobbs (AngloGold Ashanti Sunrise Dam)
Overall First Aid	Newcrest Telfer	Best New Team	Avoca Resources
Search and Rescue	Xstrata Nickel Cosmos	Best Scenario	Rope Rescue
Rope Rescue	Newcrest Telfer		
Breathing Apparatus Skills	AngloGold Ashanti Sunrise Dam		

2009 UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION





COMPETITION TEAMS

- AngloGold Ashanti Sunrise Dam
- Avoca Resources
- Barrick Kanowna
- Barrick Yilgarn
- BHP Billiton Leinster
- Focus Minerals
- Goldfields St Ives
- Jaguar-Gwalia Mutual Aid
- Kambalda Mutual Aid
- KCGM
- La Mancha Resources
- Newcrest Telfer
- Newmont Jundee
- Xstrata Nickel Cosmos

2009 SOUTH WEST EMERGENCY RESPONSE SKILLS CHALLENGE



SH Peter O'Loughlin (left) with Greenbushes team captain Vince Jurewicz

TEAMS RELISH RETURN TO OPERATIONAL SETTING

The 2009 South West Emergency Response Skills Challenge was held on Sunday 18 October at Talison's Greenbushes operation.

The event, organised by the Chamber of Minerals and Energy of Western Australia, provided the opportunity for emergency response teams from five resources companies to demonstrate their skill and professionalism, and put their training to the test in a series of realistic scenarios. The teams were drawn from companies based in the South West, Peel and Kwinana.

The prime mover for the day's activities was Greg Kennedy, Safety and Emergency Response Manager at Greenbushes, who organised all the scenarios and made sure the day's program went

smoothly, at the same time as running the fire fighting event!

Chief Adjudicator Peter O'Loughlin said that it was great to see the event return to the South West. The fact that it was held on a mine site made for more realistic scenarios. There were many positive comments from team members and trainers about the benefits gained from the event and its location.

"All the teams are looking forward to next year's event and I've heard that a couple of other South West teams want to participate next year, making for a bigger and better event," Peter said.

Pat Scallan, Talison's General Manager at Greenbushes, agreed that the setting made for a great experience by providing realistic challenges that were hard to replicate off site, and added that the site was pleased to host such an important event.





HONOUR BOARD

Fire Fighting	Alcoa Pinjarra Refinery
Confined Space Rescue	Talison Greenbushes Operation
First Aid	Boddington Gold Mine and Alcoa Pinjarra Refinery
Hazardous Materials	Talison Greenbushes Operation
Rope Rescue	Premier Coal
Theory	Premier Coal



2009 SOUTH WEST EMERGENCY RESPONSE SKILLS CHALLENGE





COMPETITION TEAMS

Alcoa Pinjarra Refinery
Boddington Gold Mine
Premier Coal
Talisson Greenbushes Operation
Tiwest Kwinana

2009 SOUTH WEST EMERGENCY RESPONSE SKILLS CHALLENGE



MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 157

WORK PLATFORM STRUCK BY SKIP AND DISLODGED INTO SHAFT 8 SEPTEMBER 2009

Incident

At an underground mine, routine non-destructive testing (NDT) of a skip conveyance rope was being conducted from a work platform placed across the skip compartment at the shaft brace. The NDT instrument was located on the platform and installed around the rope. The platform was fabricated from steel and weighed about 900 kg.

While conducting the test, the conveyance was lowered to the bottom of the shaft as per the procedure outlined in the task risk assessment. A decision was made to conduct another test, and the winder driver was instructed to bring the skip to the surface in readiness for another test run.

As the skip was brought to the surface, the rope attachments struck and dislodged the platform, which fell 4 metres into the shaft before coming to rest when it wedged between the skip and shaft furniture.

No injuries and minimal actual damage were sustained. However, had the platform fallen to the bottom of the shaft (1000 m), the consequences could have been more serious, including serious injury to persons and major disruption to winding operations.

Immediate causes and contributory factors

- The platform was dislodged into the shaft when it was inadvertently struck by the skip being brought to the surface. The method of securing the platform in place did not prevent it from falling into the shaft.
- There was no standard procedure for this routine task. Risks were identified using a task risk assessment process and form.
- The risk assessment and change management processes for the task were inadequate — not all risks were identified; the actual task sequence was different to the planned sequence; and not everyone involved in the task signed onto the original task risk assessment. When the task was modified, the task risk assessment was not reviewed and, as a consequence, controls were not put into place to manage the new risks associated with raising the conveyance with the platform covering the shaft brace.
- Communication between the personnel conducting the NDT and the winder driver was inadequate. The winder driver was not informed that the platform was still in place, and the skip was raised faster than normal with a platform in position.
- Detection and protection systems or devices to alert the winder driver that a platform was installed or to limit hoisting speed were not in place or were inadequate. A closed circuit television (CCTV) monitor showing a view of the shaft brace area was available in the winder room but not easily viewed by the winder driver when operating the winder.

Comments and preventative actions

To avoid a recurrence of this type of incident, the following actions should be implemented.

- Ensure formal risk assessment is conducted for tasks involving the use of platforms in and around shafts. The scope of the risk assessment should consider all activities involved in the life cycle of the task, including installation and removal of the platform. The risk assessment team should contain persons involved in the task, including contractors.
- When a platform is used in a shaft, it should be secured to prevent it falling into the shaft due to inadvertent contact or other means of failure. A platform should be properly designed, constructed and installed to be fit for purpose and minimise risk of harm to persons, considering operational and environmental factors.
- Appropriate detection and protection devices should be considered based on the risk assessment. This may include warning devices when platforms are installed, speed limiting devices and CCTV monitors. Ergonomic factors need to be considered when designing the layout of visual displays and instrumentation.
- Rigorous change management procedures and practices need to be established outlining actions to be taken when tasks are modified, including review of risk assessment and required authorisations.
- Appropriate documentation must be prepared outlining safe work procedures and controls to manage the risks associated with the task. All personnel involved in the task, including contractors and the winder or hoist driver, need to be properly trained and instructed in the performance of the task.
- Communication methods need to be established to ensure that all personnel understand the task and any instructions given during the task, including during an emergency situation. If a stage or any other object is placed in the shaft affecting the winding path, an entry should be made in the winding engine log book maintained under regulation 11.8 of the Mines Safety and Inspection Regulations 1995. Should there be any doubt then personnel should not proceed with the task until clarification is obtained from appropriate personnel or authority.
- Adequate supervision is required for such high risk tasks to ensure proper task allocation and instruction, job planning and monitoring of performance.
- Where work is undertaken that could result in an object falling into a shaft, precautionary measures and controls should be in place to ensure the safety of persons working below (e.g. at or near shaft plats). These may include physical barriers, warning signage, temporary suspension of man-riding, and consideration of risks and interactions during job planning.

MINES SAFETY BULLETIN NO. 88

ELECTRIC SHOCKS FROM WELDING EQUIPMENT

26 OCTOBER 2009

Background

The number of electric shock incidents from welding equipment has increased noticeably in the past four months, with 16 incidents reported to Resources Safety. This is a worrying trend that needs to be addressed by responsible persons at Western Australian mining operations.

Immediate causes or contributory factors

Analysis of the incident reports identified the following issues:

- faulty or damaged equipment, such as broken hand-pieces;
- careless work practices, such as direct contact with the electrode or work piece with bare hands, arms or other exposed parts of the body;
- failure to identify and address the hazard levels presented by the working environment; and
- damaged, wet or inappropriate gloves and protective clothing.

Recommendations

- Review welding procedures at the mine site and ensure measures include the identification of welding environments and the necessary risk controls for each environment type. As a minimum, all procedures must comply with Australian

Standard AS 1674.2:2007 *Safety in welding and allied processes – Electrical*.

- Ensure employees and contractors who carry out or supervise welding work are trained in the use of these procedures and any associated checklists.
- Remind employees who carry out welding work about the dangers of electricity and the necessary safe practices when welding. Resources Safety's *Mine Safety Matters* brochures on these topics are available from the website.
- Ensure welding machines, cables and appliances are all suitable for the work environment.
- Use hazard reducing devices such as voltage reduction devices (VRDs) or trigger switches.
- Where possible, use DC welders in preference to AC welders.
- Ensure welding machines, cables and appliances are maintained in good condition and regularly checked by a competent person, and defective equipment is not used.
- Where possible, perform work on a dry insulated floor. Wooden platforms, rubber mats and dry areas provide extra protection, particularly in confined spaces.
- Check personal protective equipment and clothing before use and change it if it becomes wet.
- Refer to the Welding Technology Institute of Australia's *Technical Note 7: Health and safety in welding*, which is an approved code of practice under the *Mines Safety and Inspection Act 1994* and an excellent resource for training, refresher programs and toolbox meetings.

MINES SAFETY BULLETIN NO. 89

EARTH-MOVING EQUIPMENT TYRES AND USE OF TYRE HANDLING MACHINERY

13 NOVEMBER 2009

Background

This bulletin is prompted by concern relating to a series of accidents involving heavy earth moving equipment tyres and the operation of tyre handling machinery. Seven fatalities involving the handling of tyres have occurred at a various mines in the Australasian region in the past few years, including one in Western Australian in 2008.

An independent study of some 82 tyre accident events in the period 1987 to 2008 revealed:

- 33 per cent resulted in a fatality;
- 50 per cent clearly had the potential to result in a fatality;
- nine per cent resulted in a serious injury; and
- the remainder caused significant damage.

Clearly, earth-moving equipment tyres, rims and wheel assemblies must be regarded as safety critical items that need to be maintained by competent persons in accordance with documented systems of work addressing all of the risks involved.

Previous safety alerts issued by Resources Safety on this topic include Mines Safety Bulletin 9 (1993) and Mines Safety

Significant Incident Report 124 (2003). This bulletin serves as a reminder for responsible persons at mines to review current work practices and ensure they are adequate.

Contributory factors and consequences

The independent report also confirmed that many employers, supervisors, operators and contractors were not sufficiently aware of all the hazards involved with the changing and inflating of earth moving tyres or the use of tyre handling machines, and existing safety procedures were not always followed.

Common identified causes included:

- employee induction and training processes did not effectively evaluate the trainee's understanding of the tyre changing process;
- operator competence was not re-assessed periodically or when tasks, procedures or the work environment changed;
- failure to plan tyre fitting tasks and ensure available employees had the necessary skills;
- failure to establish appropriate systems of work and workplace arrangements;
- operators were unaware of operational safety limits of equipment being used;
- defective or incorrectly assembled components and incompatibility of rims and tyre sizes; and
- inflation of tyres while being held in the "grab" arms of the tyre handling machine.

Possible consequences of incorrect tyre inflation practices include:

- complete failure of any tyre handling machinery being used at the time;
- uncontrolled movement of the tyre or equipment being used to restrain the tyre; and
- wheel and rim components projected with explosive force.

In these circumstances, serious or fatal injuries to employees or bystanders are foreseeable.

Recommendations

- Employees carrying out tyre fitting work must undertake formal training and assessment prior to commencing work and when any changes to the task equipment or environment occur. Training of workshop supervisors is also necessary to ensure effective supervision.
- Tyre fitting workshop facilities should be constructed and arranged to minimise risk to both the operator involved and other persons that may be in the vicinity. Facilities should be periodically audited and expert advice sought as required.
- Comprehensive tyre fitting procedures must be established and adhered to. For further information, refer manufacturer's instructions and Australian Standard AS 4457.1:2007 *Earth-moving machinery – Off-the-road wheels, rims and tyres – Maintenance and repair – Wheel assemblies and rim assemblies*.
- Ensure tyre handling machines are inspected and tested regularly by a competent person. Maintain records of equipment component change-outs, repairs, testing and inspection.
- Tyre handling machines must only be used for the purpose for which they were designed, and information provided by the manufacturer should be kept readily available. All necessary safety warning decals (Figure 1) should be prominently displayed on the equipment and maintained.
- During inflation, tyre pressure should be continuously monitored via a suitably scaled gauge from a safe distance, which avoids any need to stand in front of the tyre or between the arms of a tyre handling machine.
- Inflation of a tyre held in the clamping arms of a tyre handling machine can produce extreme forces capable of causing the machine to catastrophically collapse. Hydraulic pressure limiting devices to safeguard against such a high potential event are strongly recommended. Any loose bolts securing sections of a machine's "grab" arm are an indicator of previous overload conditions and should be monitored during maintenance and pre-start checks.

Further information

Department of Industry and Resources, Western Australia, 2003, Significant Incident Report No. 124 – Tyre inflation fatal accident [available at www.dmp.wa.gov.au/6713.aspx#7002]

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Department of Minerals and Energy, Western Australia, 1997, Significant Incident Report No. 72 – Tyre inflation – fatal accident [available at www.dmp.wa.gov.au/6713.aspx#7002]

Earth Moving Equipment Safety Round Table (EMESRT), Design Philosophy 12 – Tires and rims [available at www.mirmgate.com/tires_and_rims.asp]

MIRMGate, Causal factors database - TYREgate: Tyres & rims risk management decision support tool [available at www.mirmgate.com/tyregate/index.php]

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Otraco, 2004, Otraco incident notice update, 23 July 2004 incident, 2 September 2004 update: Fatal haultruck tire and rim disassembly during a tire change [available at www.otraco.com/techcentre/index.asp]

Otraco, 2004, Otracom incident notice, 9 February 2004: Catastrophic haultruck tire and rim disassembly during tire change [available at www.otraco.com/techcentre/index.asp]

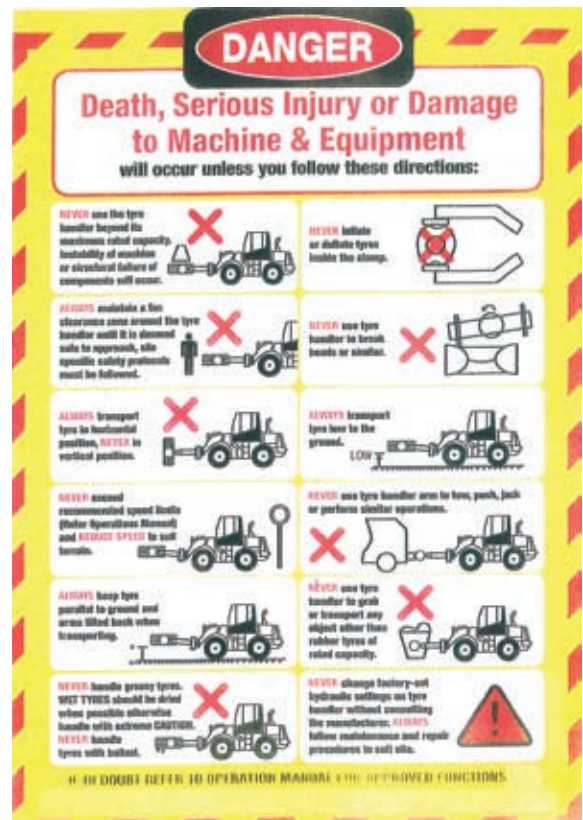


Figure 1 Example of tyre handler operating restriction decal

Courtesy of Austin Engineering

DANGEROUS GOODS SAFETY BULLETIN NO. 0109

ATTEMPTED UNAUTHORISED ENTRY OF AN EXPLOSIVES MAGAZINE

16 NOVEMBER 2009

Incident

On the evening of 8 October or early morning of 9 October 2009, an unauthorised entry attempt was made on an explosives magazine at a quarry in the Perth metropolitan region. The front gate lock was cut to gain access to the site. Damage to the 10-tonne explosives magazine indicated that:

- a grinder was used in an effort to remove the hinges;
- the tubular extensions surrounding the key holes were cut off;
- the lock was drilled;
- the D-bar handle was significantly distorted; and
- the perpetrators also attempted to remove the gauze from a side ventilator to further try gaining access to the magazine.

The construction of the magazine complied with Australian Standard 2187.1:1998 *Explosives Storage, transport and use Storage* and it satisfactorily withstood the attack.

No explosives were being stored within the magazine at the time of the attack. It is of interest that the magazine had been on site for a week or two, and the attack occurred as soon as fencing started being erected around the compound.

It appears that the attempted theft of explosives was not

opportunistic but rather a planned, organised event, which was sustained for a significant length of time while various entry tactics were applied. It is evident from the damage that the offenders did not have an understanding of the security mechanisms inherent in explosives magazines. In the early hours of the next day following the event, unauthorised individuals were observed at the site exhibiting suspicious behaviour before fleeing.

Like many quarries in or near built-up areas, this site is frequented by people riding off-road motorbikes and quad bikes. In order to increase security at the site, vehicle obstructions have been placed at potential access points to the magazine compound, and boulders are moved daily in front of the main gate to prevent after-hour vehicle access to the site.

Recommendation

Explosives storage licence holders should conduct a review of the security measures for their magazines. Where the need has been identified for additional security measures, these should be implemented as soon as possible.

Further information

Any theft or attempted theft or any unexplained loss of an explosive must be reported to a dangerous goods officer as per the provisions of regulation 44 of the Dangerous Goods Safety (Explosives) Regulations 2007 and section 9 of the *Dangerous Goods Safety Act 2004*.

Information on reporting of dangerous goods incidents and the associated dangerous goods incident report form are available from Resources Safety's website at www.dmp.wa.gov.au/ResourcesSafety

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For dangerous goods emergencies or accidents requiring attendance of emergency services, caller must dial 000

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