



MineSafe

Western Australia



**2005 Surface Mine
Emergency Response
Competition**



**Boom time is
no time to relax** page 4

**Vigilance needed
at depth** page 16



Department of Consumer
and Employment Protection
Government of Western Australia

Vol. 14, No. 2
July 2005

Resources Safety 

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Published by

Resources Safety
Department of Consumer and Employment Protection
100 Plain Street
EAST PERTH WA 6004

Editor: Susan Ho
Enquiries: (08) 9222 3573
TTY: (08) 9327 8838
Website: www.docep.wa.gov.au/ResourcesSafety

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

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ISSN 1832-4762

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Main cover photo courtesy Michael Lovitt

In this issue

Welcome to the first issue of *MineSafe* after the move by the Department of Industry and Resources' Safety and Health Division to the Department of Consumer and Employment Protection. As detailed on the opposite page, this move was made in response to recommendations made by the Mines Safety Improvement Group following the Ritter Inquiry.

The division will now be known as Resources Safety. It will continue the commitment to protecting employees and the community by educating and regulating industry and promoting best practice in safety and health with companies and employees involved in dangerous goods, mining, petroleum and major hazard facilities.

With the resources sector in Western Australia continuing to boom, this issue of *MineSafe* highlights some of the issues facing the industry, including increased production demands and a national skills shortage.

I am pleased to see the commitment from everyone in the industry to improving workplace safety and health. Many of the participants in the 2005 Surface Mine Emergency Response Competition gave up their own time to train with their teams. Competitions like this provide an opportunity for mine rescue teams to apply their skills, and for workers from all over the State to learn about new techniques and equipment. My congratulations go not only to the winners who are listed on page 13, but to everyone who participated in the event and contributed to its success, including mine managers, event organisers, adjudicators, 'casualties' and helpers. Many of the photos in this issue of *MineSafe* were taken during the competition.

A new section has been introduced to *MineSafe* for safety and health representatives. On pages 14 and 15 you will find information on what's involved in being a safety and health representative, advice from one of our inspectors, and details of the support available from Resources Safety, including publications and information sessions. The role of safety and health representatives is integral in effectively regulating safety and health in the mining industry, and I urge everyone to read this section.

The recurring theme in this issue of *MineSafe* is that safety is the responsibility of every individual. From ensuring your fitness for work to acquiring appropriate skills and training, or participating in events that increase awareness and expertise in safety and health, each of us can contribute to making the workplace safer for ourselves and those around us.

Malcolm Russell

Executive Director, Resources Safety
Department of Consumer and Employment Protection



Photo courtesy Michael Lovitt

Move to new mines safety regime

The Western Australian Government has provided an additional \$1million to improve safety regulation of the resources and dangerous goods industries.

In a joint statement released on 27 May 2005, the Minister for State Development Alan Carpenter and the Minister for Consumer and Employment Protection John Kobelke said the additional funds were part of a Government strategy to improve the way in which mine safety was regulated in Western Australia.

Mr Carpenter said the extra money would strengthen the capability of the regulator to deliver a quality service to the industry and the community.

He said the State Government would conduct a feasibility study into establishing a new safety authority for the resources and dangerous goods industries.

The feasibility study, to be conducted over a three-month period, will be undertaken under the auspices of the Minister for State Development.

Mr Carpenter said the study would also look at how much such a move would cost and the transitional arrangements needed to introduce a new regime.

The feasibility study will examine methodologies, systems, procedures and funding as well as reporting arrangements for the resources safety regulator.

While the feasibility study is under way, the Minister for Consumer and Employment Protection is responsible for administering the relevant legislation, including the *Mines Safety and Inspection Act*.

This has involved all staff previously employed to administer these Acts in the Department of Industry and Resources moving to the Department of Consumer and Employment Protection from 1 July. The staff now operate as a separate, stand-alone unit.

Mr Kobelke said the recommendation to conduct the feasibility study was

contained in an interim report prepared by the Mines Safety Improvement Group (MSIG), established in January to advise the Government on how to implement the recommendations of the Ritter Inquiry 2004.

The group consisted of two representatives each from unions, the mining industry and Government. Two independent experts, Professor Andrew Hopkins and Mr Peter Wilkinson, advised the group.

Releasing the MSIG's report for public comment, Mr Kobelke said the group had made 46 recommendations for improvements that would be required to achieve a world-class safety regulatory regime specifically in the minerals industry. However, many of the recommendations could also be applied to the administration of safety in the resources sector generally.

'The report is an important step in our work to ensure WA has a well-resourced, world-class specialist regulator overseeing safety and health in our vital resources sector,' Mr Kobelke said.

'It sets out the features of a proposed framework to regulate occupational safety and health, including promoting occupational safety and health in the minerals industry, policy formulation and the setting of appropriate standards for the industry.

'It also highlights the skills and resources — both human and financial — we need to ensure we have the most effective and efficient regulator. This includes attracting and retaining qualified staff and the role of on-site safety and health representatives.

'Our minerals industry is a vital contributor to Western Australia and we are among the world leaders in many areas associated with it.

'The report highlights some areas where we can make improvements and I see no reason why we should not also be world leaders in another aspect — the safety and health of the people who work in the industry.'

For more information, telephone the MSIG executive officer on 9282 0565 or visit www.docep.wa.gov.au/ResourcesSafety

Welcome to Resources Safety



On 1 July 2005, the Safety and Health Division of the Department of Industry and Resources (DoIR) transferred to the Department of Consumer and Employment Protection and became Resources Safety.

At this stage, the Perth office of Resources Safety continues to be housed in Mineral House at 100 Plain Street, East Perth, and telephone and fax numbers have not changed. There has been no change to the regional offices in Kalgoorlie, Karratha and Collie.

Email addresses now take the form of first name initial followed by surname @docep.wa.gov.au (e.g. fred.bloggs@doir.wa.gov.au becomes fbloggs@docep.wa.gov.au) but messages to DoIR addresses will continue to be forwarded for some time.

Importantly, web content for Resources Safety now resides at www.docep.wa.gov.au/ResourcesSafety but, as for email messages, redirections are available on the DoIR website.

Boom time is no time to relax

The latest statistics may show a slight but continuing improvement in the overall safety of the Western Australian mining industry, but this certainly does not mean it is time to become complacent.

In fact, with the State's current resources boom plus a national skills shortage, the mining industry should be looking to do quite the opposite.

Since mid-2003 the recovery of the global economy, driven by strong economic growth in the US as well as China's huge appetite for natural resources as inputs into its rapid industrialisation, has helped to spark a boom across almost the entire Western Australian resources sector.

As a result of the rising demand for resources and surging global prices for most commodities, investment has poured into projects across the State. According to the Australian Bureau of Statistics, investment in Western Australia's mining sector rose by 22 per cent last year, from \$3.9billion in 2002-2003 to \$5billion. This is the second highest level in a decade, following a significant slump in the late 1990s.

That investment helped to drive record-breaking production and sales volumes for many Western Australian

commodities last year, as well as the development of massive expansion programs and new projects. Sales volumes of iron ore, alumina, salt and cobalt all reached record levels in 2003-2004, while the value of nickel sales also increased, by 21 per cent to a record \$3billion.

Looking ahead, the International Monetary Fund predicted solid global growth for 2005, while the Department of Industry and Resources (DoIR) estimates that there are more than \$45billion worth of resource projects currently under way or in the pipeline.

Producers are also acknowledging the impact of the boom and adjusting safety and health management to deal with the increased pressure

Although this resource boom bodes well for the State economy, with gross state product rising by a better than expected 7.5 per cent, it doesn't necessarily mean the same for mine safety. Often, the strong incentives to maximise production also come with potentially negative consequences for worker safety

and sustainable supply. While this may not be so evident in the current overall safety record, an indication may be seen in the iron ore sector, which is particularly booming.

Last year, driven by Chinese demand, Western Australia's iron ore sales reached record volumes for a fifth consecutive year, increasing by seven per cent or \$202million. The industry contributed \$5.3billion, or about 20 per cent, of the State's mineral and petroleum sales.

However, the potential conflict between safety and productivity was noted by the recent Ritter Inquiry, which was commissioned by the State Government. The inquiry considered that a desire for success measured in terms of production, output and ultimately profitability is an ever-present factor that can impact on health and safety.

As well as heightening the production versus safety conflict, the boom also increases risks in the mining industry in other ways.

'With the industry booming, there are a lot of new employees in the industry,' said Resources Safety Executive Director Malcolm Russell.

With those new employees comes inexperience and with inexperience comes the increased chance of



Photo courtesy Michael Lovitt



Photo © Alan Francis

mistakes and even accidents. Training levels can also be an issue in boom times, Mr Russell said, as companies face increased pressures to boost production or meet construction deadlines.

The number of WA mining industry employees increased by 5 per cent last year, from 45,771 in 2002–2003 to 48,227 in 2003–2004. That number is again expected to increase this year with the continued huge investment in the industry.

Combined with the industry's sudden increased demand for employees is a national skills shortage impacting across a wide range of Australian industries, but particularly the mining and resources sector. As well as driving up costs in the mining industry, the lack of adequately skilled labour is an added element that is magnifying the lack of experience in the industry.

'The message is they [employers] have to redouble their efforts with all the new employees flooding into the industry. It's not just a case of it will be alright if they installed safety systems a couple of years ago and trained the employees then,' Mr Russell said.

The good news is that much of this is happening and industry is responding.

Following a recent week of briefings and site visits with some of Western Australia's major resource companies, Mr Russell said he was

happy to report that safety appeared to be a number one priority.

'I was encouraged in my talks with a number of companies to find that they are talking safety as the key objective in their business plans.'

'But I was also encouraged by what I actually saw at the mine sites,' he said.

Safety and health executive officer for peak mining industry group, The Chamber of Minerals and Energy of Western Australia, Nicole Roocke agreed that, with the current increased activity, now was not the time to become complacent in regard to safety. She said the industry itself was advocating increased safety awareness.

This was one of the outcomes from a recent interim report compiled by the Mine Safety Improvement Group (MSIG), convened following recommendations by the Ritter Inquiry and comprising unions, industry, academic and government representatives. As well as recommending that a feasibility study into establishing a new resources safety regulator be conducted, the report called for greater workforce participation in mine safety to try and improve the public perception of safety in the mining industry.

'This is particularly important at the moment with mining industry's demand for workers and the current skills shortage,' Ms Roocke said.

She also indicated that there is a need to offer people a safe working environment because people are making decisions about where they work based on safety.

Producers are also acknowledging the impact of the boom and adjusting safety and health management to deal with the increased pressure.

Rio Tinto is midway through a US\$1.6billion expansion program at its Pilbara Iron operations. To handle the expanded operations, and to cover natural turnover, Pilbara Iron is seeking to recruit 1000 new staff this year.

Rio Tinto spokesperson Matthew Coomber said that the safety and health risks associated with expanding production are very different to those associated with mining and processing iron ore and require a different approach to manage them. To respond to this, he said that while Pilbara Iron maintains a single set of safety and health standards at all operations, with emphasis on higher risk activities, a separate Expansion Projects Division has been established, giving employees clearer focus.

'This strategy has enabled employees in Expansion Projects to focus on the risks related to expanding the production capacity, and operational personnel to maintain their focus on operational activities,' Mr Coomber said.

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Another major producer, Alcoa, which is one of the world's leading producers of alumina, is also enhancing its safety procedures. Alcoa spokesperson Louise Boylen said Alcoa is currently implementing a groundbreaking major hazard management system in Western Australia, the culmination of three years work involving more than 300 people.

'Combining safety cases with real-time compliance monitoring and measurement, it is one of the most advanced major hazard management

systems in Western Australia,' Ms Boylen said.

The system's development required an exhaustive hazard-mapping program to analyse all possible risks and requirements associated with most equipment. The system monitors compliance with these requirements and is hosted on the refinery's web portal, making it highly transparent to all employees.

'If, for example, a scheduled maintenance task is not carried out or an operator does not have the required training, an alert is raised,' Ms Boylen said.

Just as the increased pressures of the boom can have an impact on the mining industry, they also affect the regulator.

Resources Safety's Malcolm Russell said that it was important that the industry recognised this and operators took responsibility to maintain safety, rather than rely on the inspectorate to keep them in check.

As well as the increasing demands on the regulator, Mr Russell said that the current boom combined with a national skills shortage was making it difficult for the inspectorate to attract and retain qualified staff.

Public comment sought on working hours

Concern about the safety and health risks from the long hours being worked by some Western Australian workers has led to the development and release of a draft code of practice for public comment.

The State Government completed a review of extended working hours in May 2004, and the Minister for Consumer and Employment Protection John Kobelke then asked the Commission for Occupational Safety and Health (COSH) to develop the code of practice. COSH formed a tripartite working party consisting of employer and union representatives and experts in the field, chaired by WorkSafe WA Commissioner Nina Lyhne.

In announcing the period of public comment, Commission Chair Tony Cooke said that there were many issues to consider in refining and finalising the Working Hours Code of Practice.

'One of the issues workplaces must consider is maintaining safety standards and preventing incidents arising from fatigue,' Mr Cooke said.

'As with other safety and health issues in the workplace, any safety and health risks arising from shift

or roster arrangements and long working days must be addressed.'

The draft code of practice suggests ways to reduce risks at workplaces such as identifying tasks and operations in which fatigue may be an issue, and reviewing schedules to avoid worker fatigue.

The public comment period is an open invitation to anyone to submit comment on any aspect of the code of practice. The closing date for submissions is 16 September 2005.

Copies of the draft can be downloaded from www.safetyline.wa.gov.au or are

available by telephoning WorkSafe on 9327 8626.

'Preventing incidents and risks arising from extended working hours is important to the safety and health of workers in this State, and I encourage all interested parties to make a submission,' Mr Cooke said.

'I can assure anyone who does make comments that they will be fully considered, and that they will be making a valuable contribution to improving a situation that is of increasing concern in Western Australia.'



Fit for work — a growing responsibility

Just as Western Australia's mine employers are required by law to provide a safe, hazard-free workplace, mine workers also have a legal responsibility to themselves and others to be able to undertake work without compromising safety or health.

While there are many aspects to a mine employee's duty of care, such as the correct use of equipment and the ability to comply with an employer's instructions, an area of growing focus is an employee's overall fitness for work.

For some employees, such as mine emergency rescue teams, that may mean regular gym and fitness sessions, while for others it may simply mean ensuring that sleep opportunities between shifts are properly utilised. Whatever the requirement, by not being fit for work, individuals may compromise not only their own safety and health but those of others as well.

There are several components to an employee's overall fitness for work. These include extent of drug and alcohol usage, medical conditions and fatigue. There are also other factors that can affect working ability, such as an employee's physical or emotional fitness.

All these factors can inhibit the ability to function at work and are therefore recognised as potential safety and health risks that need to be managed. In Western Australia, guidelines have been developed to help industry and individuals manage and control these issues (visit www.safetyline.wa.gov.au).

While most employees understand that there is a safety obligation shared by employees and employers, many are unaware of legislation outlining their specific duty of care. The *Mines Safety and Inspection Act 1994* for Western Australia requires employees at mines to take reasonable care to ensure their own safety and health at work, and to avoid adversely affecting the safety and health of any other person through any act or omission. However, there is a huge range of understanding required with these issues, and employers need to



Photo courtesy Michael Lovitt

properly inform employees about their responsibilities at work. Essentially, it is a shared responsibility.

Fatigue is now recognised as a significant issue facing the industry. The limited data collected on fatigue-related accidents in the workforce on Australia's roads, suggests that fatigue accounts for between 10 and 40 per cent of fatal accidents — an amount thought to be higher in the heavy road transport industry.

By not being fit for work, individuals may compromise not only their own safety and health but those of others as well

University of South Australia's Centre for Sleep Research Fellow Sally Ferguson said that fatigue was a significant risk in the mining industry because of some of the tasks involved.

'The danger with fatigue is that it impairs performance. The more sleep deprived someone is, the more performance becomes impaired,' Dr Ferguson said.

She said fatigue was increasingly being recognised in a legal sense, while from a safety perspective it was as important an issue as drug and alcohol management.

Recent Government reviews have thrown the spotlight on the issue, including the Federal Government's

Beyond the Midnight Oil: Managing Fatigue in Transport, which came about following a series of high-profile road and air transport disasters, and the State Government-commissioned review of extended working hours.

As a result, Dr Ferguson said the transport industry is probably leading the charge in the fight against fatigue, but the mining industry is close behind. Many companies now implement their own fatigue management policies. However, because of the nature of fatigue-related injuries, it has been difficult to collect data where fatigue may have contributed to an accident in the workplace.

'You can't take a blood test to test for fatigue,' Dr Ferguson said. 'Both employer and employee need to cooperate to manage fatigue.'

'When we talk about fatigue we always talk about shared responsibility. That is, it is an employer's responsibility to make sure that working hours are structured in such a way that there is opportunity for employees to obtain sufficient sleep. And there is the employee's responsibility to utilise those sleep opportunities.'

Dr Ferguson said that fatigue proofing is also a method to address this issue. Fatigue proofing means firstly, assessing and preventing fatigue symptoms in individuals, co-workers and a workforce, and secondly,

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implementing strategies where there may be a high risk of fatigue. These strategies include checklists, buddy checks and closer supervision.

But while the company can have many checks and balances, fitness at work really comes back to the individual's responsibility to him or herself and those around them.

Nigel Hunter, an exercise physiologist, says a good diet and regular exercise

help to promote better sleep patterns as well as increased alertness at work.

"By looking after yourself you get better quality sleep," he said.

Mr Hunter said that as well as fatigue management, it was important to stay in shape for work in the mining industry simply because of the tough environment associated with mining. 'Things like the extreme vibrations of the trucks or moving over uneven or unstable ground — you have to be fit to handle that,' he said.

However, he added that functional strength and fitness should also be kept in mind.

'There is no point in doing 10,000 leg raises if you are lifting with your upper body all day,' Mr Hunter said.

He also said that for activities such as truck driving it is important for employees to go the gym, or at least stretch regularly. By working long shifts in sedentary positions, the lack of incidental exercise can increase the risks.

Diesel particulate matter added to CONTAM list

Hazards associated with diesel exhausts have been recognised since the introduction of diesel engines. A link between diesel particulates and cancer was formally proposed by the US Occupational Safety and Health Administration (OSHA) in 1988, leading to significant research and developments in regulatory control. Other countries have already imposed regulatory exposure standards. In June 2005 the US Government Mine Safety and Health Administration (MSHA) published its final rule for exposure to diesel particulates.

Until recently, both sampling and analysis for diesel particulates were prohibitively expensive. Samples had to be custom engineered and most sent overseas for analysis. Recent developments have enabled sampling that can be undertaken using specific SKC samplers. Analysis of the samples for diesel particulate matter (DPM), measured as elemental carbon (NIOSH Method 5040), is now available in Australian laboratories. A purpose built analyser employs a thermal-optical technique to measure the organic carbon and elemental carbon.

In Western Australia, Resources Safety has added DPM to the CONTAM atmospheric contaminants list and allocated a provisional exposure standard of 0.1 mg/m³, measured as elemental carbon. This standard has been sourced from *A Guideline*

for the Evaluation and Control of Diesel Particulate in the Occupational Environment, published by the Australian Institute of Occupational Hygienists (AIOH).

A program of DPM sampling in underground mines has been included in the CONTAM quotas for the 2005–06 sampling period. In addition, any DPM sampling undertaken outside CONTAM requirements is of interest to Resources Safety — sites are requested to submit DPM sampling results so that an accurate profile of exposure to diesel particulates in the mining industry can be developed.

Key factors that can influence the levels of DPM in a mine include:

- fuel quality
- emission controls on machinery
- maintenance regimens
- operating schedules
- ventilation.

For further information on diesel particulates please contact the Occupational Health Section in Resources Safety, occupational hygiene specialists or refer to the websites below. Future editions of *MineSafe* will contain further information.

Useful websites

Australian Institute of Occupational Hygienists (AIOH): Guideline from which DPM standard was sourced — www.aioh.org.au/resources/publications.htm

US National Institute of Occupational Safety and Health (NIOSH): Diesel emissions and measurement control in mining page — www.cdc.gov/niosh/mining/topics/diesel/default.htm
Manual of analytical methods — www.cdc.gov/niosh/nmam/http://www.cdc.gov/niosh/88116_50.html

SKC Inc.: DPM equipment manufacturer — www.skcinc.com/prod/225-317.asp
www.skcinc.com/labs/225-317-labs.asp

Coal Services Pty Ltd: Analytical services — www.coalservices.com.au

US Mine Safety and Health Administration (MSHA): Part II Diesel particulate final rules single source page — msha.gov/01-995/Dieselpartmm.htm

DieselNet: Online information service on clean diesel engines and diesel emissions — www.dieselnet.com

National Occupational Health and Safety Commission (NOHSC): Practical guidance material — www.nohsc.gov.au/OHSInformation/Databases/Archived/pamdetails.asp?pgmid=1308

2005 Surface Mine

Emergency Response Competition

The 16th Annual Surface Mine Emergency Response Competition was held in Kalgoorlie from Friday 13 to Sunday 15 May 2005. The competition was organised by the Chamber of Minerals and Energy WA and, for the second year, the rescue scenarios were set up in the historic grounds of the Mining Hall of Fame.

To coincide with the competition, the Mining Hall of Fame held an open day on the Sunday. Thousands of visitors took advantage of free entry for the day to experience some of the competition activities, and check out the historic gold mine and other attractions. The day was notable for the number of young families among the visitors. For many children watching the competition scenarios this was their only chance to experience firsthand what their parents did at work; for others it offered an insight into the hazards faced by miners.

Teams competed for honours in theory, as well as emergency scenarios that tested teamwork and rescue skills. The following report was compiled by Rhonda Jogia and Melina Newnan from Resources Safety, with input from many participants.

The emergency response teams

A record 18 teams competed this year, reflecting not only the importance of emergency response teams on working mines, but also the dedication and commitment of the men and women who make up the teams.

They spend many hours preparing and training for the competition, often in their own time after finishing their shifts. The demands of working on a mine are high and it may be difficult for a company to release workers for training. The biggest problem is to find a time when all members of the team are simultaneously present on site.

Kevin Broadbent, who has worked at WMC Leinster Nickel Operation



Jennifer Spivey, Marilyn Ward and Carmen ter Rahe at the vehicle extrication scenario

for 10 years, said that while WMC Resources management is supportive, time for competition preparation seems to be getting harder to find. The challenge, he said, is to put together a trained team able to tackle the scenarios.

The real benefit of all this hard work goes to the teams' fellow workers or other accident victims. A dedicated and professional response team is able to deal with any emergency. This

may be on the mine or elsewhere. Stuart McMahon from BHP Billiton Iron Ore Newman has been coming to the competition for about eight years. In Newman, he said, the emergency response team is important to the town as well as the mine. They provide valuable support to the fire brigade, SES and other agencies. If a tourist bus rolls over, the mine emergency response team will be there to help.

Despite the intense work and gravity of the scenarios the teams faced throughout the weekend, the most notable feature of the competition was the camaraderie and spirit of cooperation that was evident, not only between team members, but also between all who took part in the competition. Marilyn Ward, an adjudicator at the vehicle extrication scenario, said that she had noticed the same spirit at every competition she had attended. The scenarios are serious, she said, but everyone was there for the same purpose — to cooperate and help each other. A number of the contestants said that their experience with other teams had improved their skills and, in some cases, added to their knowledge about the equipment used.

Teams

Anglo Gold Sunrise Dam
Barrick Plutonic Gold Mine
BHP Billiton Iron Ore Newman
Goldfields St Ives
Harmony Gold South Kalgoorlie
KCGM
Lion Ore Black Swan Nickel
Lion Ore Lake Johnson
Lion Ore Thunderbox
Mount Magnet Gold
Newmont Golden Grove
Newmont Jundee
Placer Dome — Granny Smith
Placer Dome — Kalgoortie West
Placer Dome — Kanowna Belle
Robe River Iron — Pannawonica
WMC Kalgoorlie Nickel Smelter
and Concentrator
WMC Leinster Nickel

► Mine safety

Mark Flavell from Placer Dome Granny Smith, who was an adjudicator for the fire rescue scenario, has noticed changing attitudes to safety on mines. He said that, in general, attitudes were improving. People were now becoming more accountable for their own actions on the mine.

Employers are also taking mine safety very seriously. Many of the teams referred to the support they received from employers, both in providing the highest quality equipment to the emergency response teams, as well as trying to make it easier for team members to train together. Some of the managers had travelled to the competition to give both moral and physical support to their team. This support carried over to the mine site.

The increasing emphasis on safety is also reflected in the skill levels demanded from emergency rescue team members and a focus on better patient care. For example, the qualification required for the team medic used to be a

Senior First Aid Certificate but an Occupational First Aid Certificate is now preferred.

Behind the scenes

As well as the 126 competitors, there were 85 adjudicators, 'casualties' and helpers who made the event possible. These behind-the-scene workers are drawn from many areas; not all come from the mining industry. Many return year after year to support the event and most come because they enjoy it.

DoIR's Safety and Health Division (now Resources Safety) was actively involved. Peter O'Loughlin, District Mining Inspector in Kalgoorlie, coordinated the competition as one of three chief adjudicators. Patrick Burke, Manager Engineering Services, assisted with the examinations and Terry Siefken, Senior Occupational Health Inspector, assessed safety in the first aid event.

Event managers devise the scenarios that the competitors will tackle. Most are taken from real-life events,

introducing a sense of realism for both teams and spectators.

The team performance is closely watched by the adjudicators at each scenario. Teams reported that the feedback from adjudicators after the event was invaluable.

Theory

All team members sat a one-hour theory paper on Friday afternoon. One member from each team was nominated as the team's entrant for the individual theory award. The team theory award was determined from the pooled scores of all team members.

Scenarios

Rope rescue

High on the tower of the Mining Hall of Fame main building, two tradesmen had fallen from a collapsed scaffold. One was conscious and in considerable pain, the other was unconscious and appeared to have multiple injuries because of the



Photo courtesy Michael Lovitt



height of the fall. Rescuers had 45 minutes to recover both patients and deliver them to ground level to be taken to hospital.

Teams were assessed not only on their rope rescue techniques but also their ability to assess the scene and develop an appropriate plan of attack.

Fire fighting

In perhaps the most spectacular scenario in the competition, black smoke, flames and what appeared to be exploding drums spurred teams into action to put out fires burning in two locations. To complicate the situation, a casualty was lying on the ground not far from the blazing infernos. The rescue teams, in protective clothing and full breathing apparatus, quickly moved in to extinguish the fires and rescue the injured worker.

Team safety was the first priority. The captain's role in identifying the hazards, allocating resources and directing the team was vital. Assessment focussed on the team's technical skills in managing and extinguishing the different fires,

the appropriate and efficient use of equipment, and its first aid skills.

The physical and mental endurance of all team members was stretched to the limits by this exercise.

First aid

An earthquake at a mine had demolished a building. There were 31 people missing. Rescue teams were pulling people out of the rubble and bringing them to the boardroom, which then became a clearing house before the casualties were taken to hospital. In all, eight patients, some with horrendous injuries, were recovered and brought in at intervals. The emergency response teams had to assess each patient's injuries, treat them where possible, and move them to a waiting ambulance for transport to hospital.

The full extent of a team's knowledge, skills and efficiency was tested by its response to this situation and the multiple casualties. Again the role of the captain was crucial. Adjudicators were particularly looking at how the teams managed the

assessment of patient injuries and their immediate treatment, the appropriate movement of patients to the ambulance to give priority to the most seriously injured, and the handover of patients to the ambulance paramedics.

Event manager Danny Foale and his team were awarded top honours by the teams and chief adjudicators for devising and running this scenario.

Breathing apparatus

Choking levels of smoke had resulted in zero visibility for team members who had to venture into the scenario building. To simulate these conditions, team members donned full breathing apparatus and then had bags placed over their heads to make sure they couldn't see.

Each team was divided into three working parties, two of whom had to negotiate a particular path inside the smoke-filled building, directed only by the captain and an emergency communications officer (ECO) using a radio and plan of the building. Communication skills were at a premium as the captain tried to locate ►►



Clockwise from top left: competition entrant Kevin Broadbent from WMC Leinster Nickel; preparing equipment for the team skills scenario; lower-level casualty in the rope rescue scenario; preparing for the breathing apparatus scenario; fire fighting; moving a casualty out on a stretcher in the first aid scenario; theory winners from BHP Billiton Iron Ore Newman; assessing the teams at the fire rescue scenario; briefing a team

- ▶▶ the position of each team within the building, then direct them to complete the tasks set and exit to safety outside.

Adjudicators assessed the effectiveness of communication between the captain and the team, between team members and, perhaps even more importantly, the appropriate and effective use of equipment throughout the exercise.

Team skills

In most scenarios the teams were allotted 45 minutes to complete the exercise. The team skills scenario lasted for 100 minutes and involved two teams at once. It was designed to test the team and individual members in a variety of tasks related to emergency response. Discipline and safety were paramount.

The first task, aptly named 'The Maypole', required both teams to cooperate in untangling an array of ropes twisted together in a maypole.

One of the most entertaining tasks was the 'White Out' scenario. Each

team had to assemble a large jigsaw-like puzzle on the wall from pieces on the floor. The rescuers putting the pieces on the wall were blindfolded and were not allowed to speak. They took directions from their captains, who stood with their backs to the wall, relying on a small mirror to see what was happening behind them.

Hazardous chemicals

The team was called to a mine processing operation after a white cloud and smoke had been reported coming from the site. At least one person was known to have been working on site but there had been no response to radio calls. The team had to establish what hazardous chemicals were involved and contain them. Any casualties had to be rescued and treated on the scene before the ambulance arrived. After successful completion of these tasks, team members had to decontaminate themselves and their equipment.

It was important in this scenario for team members to protect

themselves and others from further harm. A feature of the exercise was the protective clothing and equipment used by competitors, and the extensive measures taken to decontaminate the site and the personnel involved.

Vehicle extrication

The team was called to a motor vehicle accident in Kalgoorlie. The brakes on a semitrailer had failed and the truck had rear-ended a vehicle that then hit a tourist's car. After donning appropriate protective clothing, the rescue team removed casualties from the overturned vehicle using vehicle extrication tools. The casualties had to be treated immediately to stabilise them before the ambulance arrived.

Teams were assessed on their ability to perform a safe extrication of casualties using hydraulic rescue equipment.

One of the casualties, Sean Terrahe, admitted to being 193 cm and 150 kg (6' 4" and 330 lbs for those who prefer imperial measurements).



Clockwise from top left: preparing for a rope rescue from the tower; decontaminating a casualty; the vehicle extrication rescue team working at the accident scene; teams assemble near the 'maypole'; best overall team winners from Newmont Jundee.

Results

There is no doubt that the teams were under pressure for the entire weekend, but there were rewards. All teams had a chance to show off their skills and learn from others. Competitors agreed that everyone who took part was a winner. But for those teams that excelled, the competition offered further rewards. Seventeen trophies were awarded, including presentations to the best team overall and best captain. Adjudicators, event organisers and casualties also received medals recognising their role in the competition.

Winners

Best team — 1st	Newmont Jundee
Best team — 2nd	WMC Kalgoorlie Nickel Smelter and Concentrator
Best team — 3rd	Barrick Plutonic Gold Mine
Theory – team	BHP Billiton Iron Ore Newman
Theory – individual.....	Vic Marwick, BHP Billiton Iron Ore Newman
Rope rescue	WMC Kalgoorlie Nickel Smelter and Concentrator
Fire fighting.....	Placer Dome – Granny Smith
First aid	Newmont Jundee
Breathing apparatus	Newmont Jundee
Team skills	WMC Kalgoorlie Nickel Smelter and Concentrator
Hazardous chemicals	WMC Kalgoorlie Nickel Smelter and Concentrator
Vehicle extrication.....	WMC Kalgoorlie Nickel Smelter and Concentrator
Team safety	Barrick Plutonic Gold Mine
Overall first aid	WMC Kalgoorlie Nickel Smelter and Concentrator
Best scenario	First aid scenario
Best new team	Barrick Plutonic Gold Mine
Best captain	Adam Armstrong, Newmont Jundee

Mine rescue competitions

As much as it is hoped emergency mine rescue teams never have to be deployed in response to an emergency, it is vital that teams adequately maintain their skills and fitness so they can respond if called upon.

In order to do this, team members spend hours training and honing their skills as well as learning new ones. They also prepare by competing in mine rescue competitions, where the pressurised environment simulates real life situations.

The annual surface and underground Mine Emergency Response Competitions in Kalgoorlie hosted by The Chamber of Minerals and Energy Western Australia are some of the biggest and best in Australia.

With the first regular mine rescue competition commencing in the Goldfields in 1911, the Kalgoorlie competitions are steeped in history.

The competitions are also hotly contested, drawing both large and small mining companies from all over the State. This year's surface competition attracted 18 teams (see feature article), while the prestigious underground competition even draws

interstate competitors. The success of the competitions has encouraged organisers to look at adding a national element.

The three-day competitions, which have been in their current format for the past 23 years, consist of a range of exercises that test skills including first-aid, breathing apparatus, fire fighting, rope rescue, hazardous incident and vehicle extrication.

The six-member teams are evaluated on their planning speed, efficiency and how safely they complete the exercises.

Because of the competitions' important role in helping to keep Western Australia's mining industry safe, Resources Safety is a keen supporter.

Resources Safety's Peter O'Loughlin has been a chief adjudicator for the competitions for the past four years. He said the competitions were beneficial for a number of reasons.

'They are seen as a good way of simulating real-life and they are a good way to find out where your team is at, like a benchmark,' Mr O'Loughlin said.

As well as the new rescue team recruits, who particularly benefit

from the competitions by learning to apply their skills under pressure, Mr O'Loughlin said that the entire industry gained from the exposure to new rescue and safety equipment and techniques that the various mining companies bring to the competitions.

'The competitions expose you to different situations and, because you are on the spot having to do it under pressure, this hones teamwork and decision-making skills so that a two- or three-day competition is effectively like six months of training,' Mr O'Loughlin said.

But it's not just the safety element that makes the Kalgoorlie competitions so strong. There is also a lot of pride and rivalry that goes with them.

'I have not seen another competition in Australia with as many teams or as aggressively contested,' Mr O'Loughlin said.

The latest Kalgoorlie underground event was held last November and was won overall by Newmont Golden Grove, followed by Placer Dome Asia Pacific Kanowna Belle then MPI Mines Black Swan Nickel and Coolgardie Mining Company. Less than two points separated these top three teams.

Safety and health representatives section

Ask an inspector

Jock Watson is an elected Employee's Inspector who joined the Mines Safety Inspectorate in August 2003. Before that, he spent 27 years in mines, the last 10 as an underground shift supervisor. He is based in Kalgoorlie.

Jock is often asked what defines noise on a mine site.

According to the *Minerals Industry Safety Handbook*, the definition of noise is an 'unwanted sound', and in the mining industry there is a great deal of unwanted sound.

Workers' hearing can be adversely and permanently affected if they are exposed to noise for extended periods of time.

Noise surveys are undertaken where exposure levels may be hazardous. These surveys can be done underground, at treatment plants, on drill sites and in workshops. Part 7 of the Mines Safety and Inspection Regulations 1995 covers noise control. Under the regulations, peak noise levels should not exceed 140 decibels (dB) and the noise exposure level should not exceed 85 dB.

Part 4 of the regulations deals with personal protective equipment

(PPE), which is to be supplied by the employer and must comply with Australian Standards.

Jock said that, as an Employee's Inspector, when he is inspecting a mine site — usually in the company of an elected safety and health representative — he looks for the following with respect to noise:

- signs indicating where hearing protection must be worn
- hearing protection being kept and made available to workers at various locations on the mine site
- evidence that workers are provided with information, instruction and training on the correct use of hearing protection
- workers actually wearing the protection where required.

There is a guideline on noise control in mines available online at www.docep.wa.gov.au/ResourcesSafety

To receive a hardcopy, please contact the Publications and Promotions Section (ph. 9222 3229; fax 9325 2280; email ResourcesSafety@docep.wa.gov.au).

SHR resources

If you are registered with us as a current safety and health representative then you will soon be receiving more resources to help you in your role. These include:

- a poster describing what a safety and health representative does
- a poster showing the process involved in issuing a provisional improvement notice (PIN)
- a notice that can be used to indicate who the safety and health representatives are and the areas or shifts they represent — with space for a photograph to facilitate identification, particularly where the workforce is more transient.

To keep our SHR contact list up-to-date, please advise Julie Steven in Resources Safety (ph. 9222 3438, fax 9325 2280, email jsteven@docep.wa.gov.au) if you are no longer a SHR or you are a SHR but do not receive this information pack.

Consolidated MSI Act and regulations available

The State Law Publishers website at www.slp.wa.gov.au now has consolidated versions, including all the latest amendments, of the *Mines Safety and Inspection Act 1994* and the *Mines Safety and Inspection Regulations 1995*.

Mines safety roadshow

Planning is under way for the inaugural 2005 Mines Safety Roadshow to visit the Pilbara, Kalgoorlie, Bunbury and Perth in October. There will be a range of presenters from Resources Safety. It is anticipated that the one-day program will include topics such as:

- the role of safety and health representatives
- the role of supervisors and managers
- provisional improvement notices
- reporting accidents and incidents
- emerging trends affecting safety issues
- access to safety and health information.

If you are on the *MineSafe* mailing list then you will receive further information as it becomes available. If you want to be put on the mailing list then please contact the Publications and Promotions Section (ph. 9222 3229; email ResourcesSafety@docep.wa.gov.au). Updates will also be available at www.docep.wa.gov.au/ResourcesSafety



Photo © Allan Francis

Safety and health representatives section

So you want to be a SHR?

The Work Safe 2005 Forum was held in May in Geraldton and Karratha, and attended by staff Patrick Burke, Susan Ho, Martin Knee, Cassie Mudge (Lines) and Melina Newnan from DoIR's Safety and Health Division (now Resources Safety). Several common themes were evident when participants were asked about what advice they would give a newly elected safety and health representative or workmate thinking about standing for election.

- Ensure you are properly elected and that the correct paperwork has been submitted (see forms section at www.docep.wa.gov.au/ResourcesSafety — many sites are still using old forms)
- Do the required training as soon as possible
- Understand your duties and responsibilities — research the role
- Focus on the safety and health problem, and don't get sidetracked

into personal or political issues — don't see the other parties as the enemy

- Consider the additional time and effort required to do the job effectively — depending on where you work or who you represent, it can be a high pressure position
- You are not the police
- Be a good role model
- Be positive and develop good relationships as part of the consultative process — the more you put in, the more you get out
- Don't do it alone — talk to other safety and health representatives (including those in other industries) and your workmates
- Remember that the training, exposure and consultative experience may help your career

Three main issues came through for managers and supervisors to consider:

- support your safety and health representatives, especially in terms of time
- be involved in the consultative process
- respond in a timely manner to issues raised.

The discussion of provisional improvement notices (PINs) indicated that these are typically viewed as a last resort for resolving safety issues. However, it is worth keeping in mind that if there is a disagreement and a review of a PIN is requested, this will introduce another party, the mines inspectorate, into the process. The emphasis should be on consultation and commitment to making the workplace safe for all concerned.

If you want to see other issues discussed in this section then please contact the Publications and Promotions Section (ph. 9222 3229; email ResourcesSafety@docep.wa.gov.au).

Recent releases

The following publications are available online at www.docep.wa.gov.au/ResourcesSafety

To receive a hardcopy, please contact the Publications and Promotions Section (ph. 9222 3229; fax 9325 2280; email ResourcesSafety@docep.wa.gov.au).

Guidelines

- Tyre safety, fires and explosions — describes some of the hazards associated with tyres, and provides guidance and preventative measures to avoid or minimise those hazards when working with tyres or combating tyre fires, explosions and potential explosions

- Refuge chambers in underground metalliferous mines — guidance on the safe use of appropriate refuge chamber facilities in response to hazards posed by irrespirable atmospheres underground
- Vertical opening safety practice in underground mines — emphasises the nature of some of the more obvious hazards associated with vertical openings, and recommends a system of procedures to avoid or minimise the risks associated with them

Code of Practice

- Mines survey — to be used in the compilation of a mine plan for each mining operation



Vigilance needed **at depth**

As Western Australia's near-surface mineral deposits start to become exhausted, mining companies are responding by significantly increasing the depth of their underground mines. This poses a major challenge not only to the engineers involved but, more importantly, to the people charged with the safety of the underground workforce.

Because experience and scientific measurement tell us that rock stress levels generally increase with depth, mining techniques that are typically employed in shallow mines may not be the safest at depth.

Some countries such as South Africa and Canada have a long history of deep underground mining, and have responded by developing equipment and techniques to deal with higher stress regimes.

Western Australia is fairly unusual in that there appears to be a much greater rate of increase in rock stress as the depth increases, compared with other parts of the world.

A recent study of rock stress measurements from around the world showed that the rate of stress increase in Western Australia's Yilgarn Craton was nearly three times that observed in South African gold mines, and almost double that observed in Canada and other parts of Australia.

The danger with mining in areas of high rock stress is that the stress does not just disappear when rock is extracted. It is re-distributed to

the surrounding rock mass and, as a result of mining, the stress around the excavation can increase or decrease — both have potentially adverse consequences for the stability of the rock mass surrounding the excavation.

High rock stress, either pre-mining or mining induced, can result in a seismic event — a failure of some part of the rock mass. A seismic event can sometimes cause a dangerous rockburst where rock, depending on its strength, can be forcibly ejected from an excavation.

WA is fairly unusual in that there appears to be a much greater rate of increase in rock stress as the depth increases

For industry this means that conventional underground mining techniques may not be reliable as mines go deeper, and Resources Safety believes increased vigilance is needed as underground mine depths increase.

Australian Centre for Geomechanics (a joint venture between CSIRO, Curtin University of Technology and The University of Western Australia) Research Fellow Marty Hudyma says that future mining practices are going to have to change as mines go deeper.

'You can't use the past to dictate future mining practices. Practices such as ground support, mine sequencing and fill are going to have to be approached differently. There are costs associated with this, but these are not insurmountable,' Mr Hudyma said.

Mr Hudyma, who is trained in rock mechanics, believes the industry is responding well to this issue.

'Yes, there are several research initiatives in Australia and the mining industry has also been utilising overseas research,' he said.

However, at this point the majority of the State's underground mines are still at depths of between 500 and 700 m.

'There is only a handful that have reached the 1000 metre mark,' Mr Hudyma indicated.

Mr Hudyma believes the challenge is not whether the industry is facing up to the issues associated with deep mining but how fast it can catch on. New technology is now allowing companies to mine deeper and faster than ever before, and Australian mining rates are some of the fastest in the world.

'A lot of (WA) mines are deepening at rates in excess of 100 metres per year, which is extraordinary compared to overseas mines.'

State Mining Engineer Martin Knee said that while sections of the Western Australian mining industry have begun to realise this more recently, there is still some lack of awareness of deep mining issues.

'What we are trying to get across is that it is imperative that the industry faces up to these issues,' Mr Knee said.

'Some of the companies that are going into deeper areas have responded quite well, but that is because they have had to. To a degree it is still a problem,' he said.



Photo courtesy WA School of Mines

Mr Knee said that some smaller mining companies, who may not have the personnel experienced in mining at depth, need to be aware of the risks.

He added that a particular concern was the responsibility assigned to the miners themselves.

'What type of ground support do you install, how much do you put in and when do you install it? Sometimes these decisions are left to the miners themselves.'

Beside the fact that there are fewer miners in the industry today with long-term experience and understanding of mining, Mr Knee said it should not be up to the miners themselves to be making these types of decisions.

'In the big picture these decisions should be made at the top level and money needs to be spent on examining the rock conditions,' he said.

According to Resources Safety Geotechnical Engineer Adrian Lang

there is no longer an excuse that there is a lack of appropriate information or engineering experience on deep mining techniques.

As well as local and overseas research and development, there is equipment available locally that can 'measure' rock stress, such as CSIRO's Hollow Inclusion Cell and acoustic emission technologies.

There are also local and international consultants and organisations, including university groups, who have deep mining, high stress knowledge.

However, this does not mean everybody is taking note. Rather, companies can sometimes have a somewhat 'gung ho' attitude as people are caught up in the immediate development of the mine at the expense of long-term mine design.

As the industry looks deeper, it is becoming increasingly important that everybody in the industry,

not just the mining engineers, understands that rock can behave differently at depth.

If properly trained, the underground employees who are the eyes and ears of the company are in a position to recognise the first signs of changes in ground behaviour and potential danger.

Even those not directly involved in the mining activities — such as investors who make investment decisions based on mine lives, and the body corporate, who can direct appropriate resources into understanding the rock mass — should have some understanding of deep mining issues.

'If we don't get it right then mining becomes unsustainable. It doesn't matter what the calculations are regarding ore reserves, if it can't be mined safely it is just an interesting geological feature containing gold, nickel, copper or another metal,' Mr Lang said.

Handbook on mine fill

Resources Safety's Adrian Lang has played an important role in the development of a new handbook designed to advance the safe, efficient and economic placement of fill within the mining industry.

Handbook on Mine Fill was developed by academics, consultants and representatives from the mining industry and Resources Safety.

Mr Lang recognised mine fill was a major issue in the industry and the successful use of fill would determine or contribute to the success of deep underground mining.

'The last book on mine fill was produced in 1979 and was no longer in print,' he said.

'During an investigation into an incident in which three people lost their lives at a Western Australian mine, it was established there was a

need to improve the understanding of the use of mine fill.

'I approached the Australian Centre for Geomechanics at The University of Western Australia, which then coordinated the project.'

Mr Lang edited the chapter on other fill types and practices, and wrote the chapter on hazards, risks and environment with input from various industry associates, including Resources Safety's Ian Misich.

He believes the book will be recognised worldwide, as it is relevant to mining operations in other parts of the world.

For more information about the book please contact Adrian Lang (ph. 9222 3396; fax 9325 2280; email alang@docep.wa.gov.au). The book may be purchased from the Australian Centre for Geomechanics (visit www.agc.uwa.edu.au).

Improving safety and health

Every so often our inspectors come across a really good idea in the industry — something that is cost efficient, easy to implement and very effective in making a job safer.

These ideas may be improvements to the way of doing a job, or might involve a new piece of equipment or tool designed for a particular task. The innovation has usually come from an individual or group of employees thinking about how to reduce the risks associated with their work.

Often these ideas can be applied across the industry and not just on the site where they were originally developed. If you know of a safety or health solution in the minerals industry that could benefit others then please contact the Publications and Promotions Section (ph. 9222 3573; fax 9325 2280; email ResourcesSafety@docep.wa.gov.au).



Safety bulletins and significant incident reports

The next issue of *MineSafe* will include a complete listing of all bulletins and reports, which are available online at www.docep.wa.gov.au/ResourcesSafety

Safety Bulletin No. 72
Released 6 May 2005

Loss of control of large mobile equipment on gradients

The hazard

Significant incidents have occurred recently where drivers of large mobile equipment have lost control of their equipment while driving up an incline.

In the most recent incident, a fully laden on-highway dump truck travelling on an internal sealed access road rolled backwards when it stalled after failing to reach the top of an incline.

The operator was attempting to negotiate the incline in too high a gear, which led to the engine stalling. Once the truck had stalled, the emergency service and park brakes were not adequate to hold it and prevent it from running away, despite the best efforts of the driver.

An examination of the induction records, procedures, training records and competency assessment documents for truck drivers at the site revealed that there was little or no information detailing the correct method to safely negotiate an incline.

Contributory factors

- Presence of steep gradients
- Presence of poor road surfaces reducing tyre grip
- Drivers negotiating the incline in too high a gear
- No signage displayed to warn of the hazard or instruct personnel to select low gear
- Poor procedures and training regarding how to negotiate an incline safely
- The braking systems of the truck were not adequate to prevent it

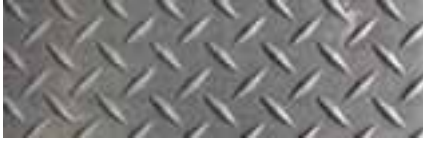
rolling back down the hill after stalling

Recommendations

- Each company needs to review its induction, procedures, training and competency assessments to ensure that the rules to safely negotiate an incline can be understood and practiced by all drivers prior to them being deemed competent or being allowed to drive on the mine.
- Consideration should be given to the need for signage, displayed in



Significant Incident Report No. 129



accordance with regulations 4.10 and 13.7(4) of the Mines Safety and Inspection Regulations 1995, to identify the presence of a steep incline and the need to select a low gear.

- Roads should be formed to ensure that planned gradients are designed in accordance with the vehicle limitations specified by the original equipment manufacturer (OEM). The roads should not be excessively steep and the road surfaces should ensure adequate tyre grip.
- Under regulation 13.2, the registered manager, the principal employer and any other employer must ensure that a motor vehicle is not used at the mine unless it is equipped and maintained with brakes capable of effectively stopping and holding that vehicle fully loaded under any condition of operation when driven in accordance with the manager's instruction.

**Significant Incident Report No. 129
Released 5 January 2005**

Derailment and fall of overhead crane

Incident

A derailment and fall of a bridge-type electric overhead travelling crane occurred recently at a workshop on a mine in the Northern Goldfields. Fortunately no injuries were sustained to personnel, but there were major disruptions to maintenance operations and the repair and replacement costs were estimated to be more than \$250,000.

Although uncommon, this type of occurrence presents an extremely serious hazard and risk of injury to personnel operating and working in proximity to similar cranes.

A boilermaker was undertaking refurbishment work to an underground truck tray (tub) and needed to turn the tub from its inverted position to an upright position and rest it on its base. The movement required several manoeuvres in the lifting process to turn it over.

During the final manoeuvre, the lifting chains were adjusted and the tub was raised to lie at an angle to assist in the turning process. The tub was lowered and the crane was moved to re-centre the load. The tub tipped over and the crane suddenly began to move uncontrollably, hit the long travel end stops, and derailed. One end of the crane fell into the tub. The boilermaker was very close to the tub when the crane fell.

Causes

The tub was not centralised under the crane. In the final tipping manoeuvre when the tub was in contact with the floor, the tipping of the tub caused a sudden change in the load distribution and exerted a side-pulling effect, causing an uncontrolled and accelerated movement of the crane when the crane was engaged to travel. This led to the flanged wheels of the long travel carriage closest to the tub riding up on their track and derailed just before hitting the long travel end stop, thus causing the crane to fall.

The suitability of the crane for the task was also questionable.

Preventative action

The company concerned is assessing its needs for a replacement crane, e.g. investigating whether the type or capacity of the crane is suitable for the task being performed at the time of the occurrence. The company is also ensuring the measures mentioned below are carried out.

From a regulatory perspective, nearly all occurrences involving cranes of all



Significant Incident Report No. 129



types result from non-conformance with the Australian Standards (AS) and Mines Safety and Inspection Regulations 1995 (MSIR) listed below, which should be observed.

- All cranes used at the mine conform in all respects with AS 1418.1:2002 pursuant to regulation 6.33 of the MSIR.
- The use of cranes at a mine must be in accordance with AS 2550.1:2002, which covers the general requirements for the safe use of cranes. This standard has separate parts covering various types of hoists and cranes. AS 2550.3:2002 covers cranes, hoists and winches including bridge, gantry, portal and jib cranes.
- Employees must be provided with adequate instruction, training, assessment and supervision pursuant to regulation 4.13 of the MSIR, which covers induction and training of employees.
- Cranes must be maintained and operated in a safe manner pursuant to regulation 6.2 of the MSIR. The overriding requirement is to have a system that identifies hazards and risks associated with plant and reduces or eliminates employees' exposure to those identified hazards and risks. This is also covered by regulations 6.17 and 6.18 of the MSIR.

Significant Incident Report No. 130
Released 14 January 2005

Employee sprayed with rocks when a truck tyre failed

Incident

Recently a truck driver escaped with minor injuries in a park-up area at shift change, when a truck tyre burst about 15 m away. The operator had alighted from his truck and was walking to the

shift change room, when a loaded truck commenced reversing. A tyre on this truck burst with the resulting air-blast lifting rocks and grit off the ground, striking the truck driver, who sustained numerous abrasion injuries causing him to collapse. The injuries could have been more severe had the truck driver been closer, or not wearing correct personal protective equipment (PPE).

Causes

- The burst tyre was weakened by a previous rock cut located between Pos 5 and 6.
- The previous rock cut was not formally inspected on a regular basis.
- The location of the previous rock cut was virtually impossible to observe during pre-start inspections.
- There was a lack of adequate knowledge by site personnel of the potential risks associated with being in close proximity to loaded trucks and the potential for a sudden massive release of energy.

Preventative action

- Tyre inspections should be carried out on a daily basis by competent employees to identify and monitor defects and wear.
- Good loading and trucking practices, and haul road design and maintenance practices should be implemented to ensure the load is evenly distributed and spillage is minimised.
- Equipment capable of removing spillage from pit floors, ramps, haul roads, ROM pads and dumps should be available. Procedures should be developed to effectively deal with spillage.
- Tyre rotation and discard criteria should be developed in accordance with manufacturers' recommendations.

- Purpose designed loaded truck park-up areas should be available and specific procedures for pedestrian traffic adjacent to loaded trucks should be developed.
- Employee awareness of the potential for rupture due to wear, spillage, overheating and poor operating techniques should be addressed in operator training.
- Employees need to wear appropriate PPE at all times, especially at end of shift when equipment is operational in their vicinity.

Additional information relating to other incidents may be found in Significant Incident Report No. 122 available at www.docep.wa.gov.au/ResourcesSafety

Significant Incident Report No. 131
Released 1 February 2005

Drill rig fire — self-rescuer failed

Incident

Recently an underground drill rig caught fire and was put out by the operator who shut the engine down and activated the fire suppression system, extinguishing the fire. The operator then realised the drive had filled with smoke and reached for his oxygen self-rescuer (MSA SSR 30/100). However, he was unable to release the clamp. The self-rescuer was removed from his belt and opened. In the process of opening the unit and removing the mouthpiece plug, the mouthpiece plug cord and nose clip cord tangled. The operator tugged the cord and in doing so the nose clip cord tightened around the breathing tube, closing it off. With the self-rescuer inoperable the operator put a rag over his face and ran 150–200 m through smoke to fresh air. MSA is undertaking a detailed investigation of the



circumstances involved, including a detailed design review.

Contributing factors

- The self-rescuer was being worn in a position on the operator's belt such that it could not be easily accessed.
- The self-rescuer was not deployed from the belt as per manufacturer's recommendations, which allowed the nose clip cord to be fouled by the mouthpiece plug cord.
- The nose clip cord was able to act like a slipknot around the breathing hose when tugged strongly. This resulted in the breathing hose becoming totally restricted.

Comment and preventative action

Oxygen self-rescuers are a very important item of safety equipment and are sometimes treated poorly. Employers should keep in mind the following comments when purchasing, using, maintaining and discarding self-rescuers and training employees in their use.

- Self-rescuers should be purchased to meet the site's needs with due consideration for their use by employees and conditions underground.
- Employees must be adequately trained in the use of self-rescuers based on the manufacturer's recommendations. This should include the opportunity to utilise a training unit and regular refresher training.
- Employers must ensure that each unit is maintained according to manufacturer's recommendations. This should include the recording of each unit in a database, and regular checks and maintenance to ensure that they are in a usable condition at all times. Criteria should be

established for units to be tested, and removed from service or discarded if necessary.

- Self-rescuers should be worn correctly on the miner's belt and checked daily for serviceability by each employee. Care should be taken to protect the self-rescuer from heavy knocks and any substances such as shotcrete and adhesives, which could potentially restrict opening of the unit in an emergency.
- The life of an oxygen self-rescuer is limited. Managers must ensure that out-of-date units are removed from service based on manufacturer's recommendations. The life of an oxygen self-rescuer varies from five to 10 years. Out-of-date units have been identified at some sites.

**Significant Incident Report No. 132
Released 3 February 2005**

Mine haul truck runs over a light vehicle following a driver change

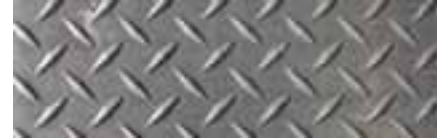
Incident

A mine haul truck ran over a light vehicle following a hot seat driver change.

The assigned driver of the haul truck, who had returned after a toilet break, requested the driver change while the haul truck was next in line to be loaded at a shovel. After receiving approval to approach the haul truck, the assigned driver parked the light vehicle and



Significant Incident Report No. 132



switched the engine off about 5 m away, directly in front of the truck, contrary to pit permit rules and procedures.

This situation was not rectified at the time by the relief truck driver, who changed vehicles, or by pit supervision. The relief driver got into the light vehicle but was not able to start it up. The assigned truck driver, having returned to the haul truck, observed that the shovel was waiting to load the next truck and so sounded the horn and started to drive off, believing that the light vehicle had left the area. The driver felt a resistance to movement and stopped the truck to investigate. It was found that the light vehicle was trapped under the truck.

As a result of the collision the light vehicle had been turned on to its roof, the cabin was crushed, and the vehicle ended up facing the rear

wheels of the haul truck. The alarm was raised and the injured person was finally extricated several hours later then evacuated for treatment by Royal Flying Doctor Service (RFDS), having suffered fractured ribs and severe bruising to the legs. The light vehicle was extensively damaged.

Recommendations

Many organisations currently place a heavy reliance on procedures to ensure safety within the mining industry. Failure to follow the rules can result in significant accidents and incidents.

Reliance on procedures alone to maintain a safe work place has limitations with respect to operator compliance. Where the possible consequence of a serious injury or fatality is potentially present in the risk evaluation, it is recommended

that the hierarchy of control methodology is invoked so that the hazard is eliminated, a safer method is substituted, or engineering controls are utilised in preference to procedural controls.

The recommendations below are made to prevent a recurrence of a similar event in order of effectiveness.

- Mine managers implement suitable methods of work to ensure that driver change and light vehicle parking issues are adequately controlled and managed. In accordance with the hierarchy of control, the following methods, some of which are currently in use in the industry, are recommended so far as may be practicable to reduce the level of risk:
 - installation of lockout devices, camera or collision sensor technology on haul trucks and other large machinery to prevent or reduce the chances of a blindspot collision taking place
 - provision of an elevated access platform for driver transfer at designated locations such as the crib or ablution area, removing the need for light vehicle transportation
 - provision of designated haul truck and light vehicle parking bays with vehicle separation bunds at suitable locations around the mine.
- Vehicles should never be parked in a blindspot, e.g. directly in front of or behind large equipment. It is recommended that a vehicle should be parked in a location outside the line of travel and where it can be seen from the driver's seat of any large mobile plant in the area.
- Improvements are needed with respect to procedures and training. Adequate documentation needs to be



Significant Incident Report No. 132



maintained to ensure that all the safety rules applying to any procedure are included on written questionnaires and practical assessment documents used in the operator competency verification process.

- Behavioural standards need to be raised to ensure that rules and standards are always followed. This may dictate rule revisions, where current rules are impracticable, and, in such cases, work may have to stop until new, viable rules are developed.

Significant Incident Report No. 133
Released 9 February 2005

Use of torque multiplier — fatal accident

Incident

A fourth year apprentice fitter, employed by the agent of an original equipment manufacturer (OEM) supplying mobile mining equipment, suffered a serious head injury that subsequently resulted in his death after he was struck by a torque wrench. This occurred when he was manually torquing up a suspension cylinder retaining bolt on a Caterpillar 785B Haul Truck. The apprentice was using a 1/2" drive 250 pound-foot tension wrench fitted to a Caterpillar model 6V6080 manually operated torque multiplier.

The torque multiplier has a detachable reaction arm that is used to anchor the torque multiplier to a suitable point to prevent it from counter rotating when torque is applied to it; in this instance, via the tension wrench. The original torque reaction tube is 358 mm in length, 47 mm in outside diameter and 40 mm in internal diameter. At the

time of the incident, the tube had been extended by means of inserting a hexagonal 30 mm x 1752 mm steel crowbar inside the original torque reaction tube and resting it on top of the front bumper bar of the truck.

At the time of the accident, the apprentice fitter was standing on a steel bench and was applying torque to the tension wrench through the torque multiplier using an upward pulling action from knee level to waist height. Very soon after attaining the desired tension the apprentice fitter lost control of the torque wrench, which spun around and struck him on the head.

Contributory factors

- A job safety analysis (JSA) completed prior to the accident did not identify the hazards associated with applying torque using a torque multiplier.
- The torque multiplier reaction arm was extended with the use of a spring steel crowbar.
- No reference was made to the workshop manual or torque multiplier safety instructions regarding the possible hazards prior to the accident.
- The instructions for the safe use of the torque multiplier were not included with the tool as supplied by the manufacturer, nor were they available on site at the time of the accident.
- The instructions for the safe use of the torque multiplier were not adhered to.
- Upon dismantling and inspection of the torque multiplier, it was evident that the internal locking mechanism had failed.
- The torque multiplier was not maintained or included on a preventative maintenance schedule.

Recommendations

- A comprehensive JSA should be conducted incorporating reference to the tool manufacturer's operating instructions and warnings.
- The tool operating instructions and warnings should accompany the tooling as supplied by the manufacturer.
- Non-genuine or additional torque reaction tubes should never be used without consultation or approval from the original tool manufacturer, as they can become a hidden source of stored energy.
- The JSA should include a requirement for additional personal protective equipment (PPE) such as a hard hat and gloves to be worn where practicable.
- Mine management and equipment manufacturers and suppliers should review the requirement for the use of manually operated tooling and consider replacing it with electrical or pneumatic tooling and equipment in all maintenance functions.
- Tooling such as torque multipliers, tension wrenches and associated equipment that are subjected to high loads and frequent use should be placed on a register and be maintained as per the manufacturer's recommendations. In the absence of manufacturer's recommendation, an internal program should be developed for such equipment to be inspected and maintained.

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Alcoa 'caving' solution wins

national safety award

Innovative thinking by workers at Alcoa's Kwinana Alumina Refinery — who even called in a caving expert in their quest to solve a long-running workplace problem — has won Alcoa a major national safety and health award.

For over 40 years, maintenance workers at the Kwinana alumina refinery powerhouse faced the difficult task of lifting and moving equipment in and out of boiler drums with a roof height of just one metre.

After a number of sprains and strains to workers, Alcoa set up a dedicated working group with medical, maintenance and engineering expertise to look for new ways to do this work.

Led by Alcoa Powerhouse Supervisor Dave Jolly and Maintenance Coordinator Phil Swift, the group scoured the world looking for new technologies, only to find that nobody at any of the refineries they contacted had found a workable solution.



Photo courtesy Alcoa World Alumina Australia

Peter Adamson's caving expertise helped solve an Alcoa maintenance problem

Unwilling to give up, they decided to call in Western Australian caving expert Peter Adamson to see what insights he could offer. Working with him, the team went on to develop a simple but remarkably effective cable and pulley system to move equipment around inside the drums.

It has now been adopted at several locations around the world, and has significantly reduced the ergonomic risk to people doing essential maintenance work in these confined spaces.

The group's innovation was rewarded on 14 May 2005 when Alcoa took out the Mineral Council of Australia's top award — the 2005 National Safety and Health Innovation Award — at the MCA national awards ceremony held in New South Wales.

The national awards are designed to foster the development of innovative solutions to everyday safety and health issues.

Recognising OSH innovation



Photo courtesy Alcoa World Alumina Australia

Alcoa's Kwinana Alumina Refinery — winner of the 2005 National Mining Industry Safety and Health Innovation Award

The Chamber of Minerals and Energy Western Australia Occupational Safety and Health Innovation Awards aim to recognise creative and practical solutions to safety and health problems, and promote their application across the Western Australian minerals and resources industry.

Entry is open to any Western Australian minerals and resource company or site (e.g. metalliferous, coal, quarries, exploration, oil and gas), including contractor companies associated with the Western Australian industry. There is no limit

to the number of entries that may be submitted.

The deadline for this year's entries was 15 July and the awards will be presented on 14 September 2005.

An Innovation Awards kit is available at www.cmewa.com for further information.

Entries receiving awards or commendations are eligible to enter the following year's National Mining Industry Safety and Health Innovation Awards conducted by the Minerals Council of Australia.