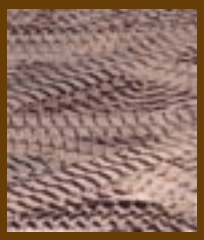
MineSafe

Western Australia



Road safety
on mine sites

Department of **Consumer and Employment Protection**
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Resources Safety

Contents

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In this issue

An article by State Mining Engineer Martin Knee about what the term 'safety culture' might mean for the mining industry leads this bumper final issue of *MineSafe* for 2006.

There are also reports on the formal activities that Resources Safety is engaged in, such as the Conference of Chief Inspectors of Mines and Mining Industry Advisory Committee.

We have articles and pictorial spreads on the Underground Mine Emergency Response Competition, held recently in Kalgoorlie, and the Mines Safety Roadshow 2006. Participants' feedback on the Roadshow is included.

Working hours and work–life balance were important discussion topics during the Roadshow. In this issue, we present information on the recently released code of practice and include a report on a talk by Professor Linda Duxbury, a work–life balance expert.

In response to requests for information, we have started a themed section on road safety on mine sites. The aim is to alert readers to the availability of information and what is happening in this field, and generate discussion topics, especially with the inclusion of selected summaries from Resources Safety's incidents database.

We continue the series on the functions of other divisions in the Department of Consumer and Employment Protection with an overview of Labour Relations. To round out the series, Resources Safety will feature in the next issue of *MineSafe*.

In the safety and health representatives section, we introduce you to Dino Busuladzic, who is based in Perth. We also cover some of the activities that happened in Safe Work Australia Week. Readers are encouraged to check out the Resources Safety website regularly to find out what's new — updates and new information are posted there first, including toolbox presentations from the Roadshow.

There is also news relating to dangerous goods safety and a review of a locally published paste and thickened tailings book that might interest readers.

Do you know if your ore contains heavy metals? In this issue we ask 'What's in your dust?' and provide information on how to reduce exposure to toxic metals.

We also report on some safety innovations and awards, as well as passing on safety alerts released by other organisations but relevant to the Western Australian scene. Specific safety advice is included in the significant incident report on a service truck tyre failure.

As 2006 draws to a close, I wish *MineSafe* readers and their families a safe and happy new year, and thank you for your interest and support throughout the year.

Alan Gooch
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Denis Brown was omitted from the list of contributors for the previous issue of *MineSafe*. We apologise for this oversight.

Cover image courtesy of Kalgoorlie Miner *(photo: Jodi Kingston)*

Safety culture

We all talk about 'safety culture' from time to time, and it is one of the buzz-words that has crept into the discussion of safety in all industries. We often give it a complex and pompous-sounding definition like:

'The safety culture of an organisation is the product of individual and group values, attitudes, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety programmes. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures.'

A simpler and certainly a more honest definition might be:

'What people at all levels in an organisation do and say when their commitment to safety is not being scrutinised'.

Organisations with good safety cultures commonly exhibit a 'collective mindfulness' or 'risk awareness' — a realisation that they may be only a heartbeat away from a major accident. They are constantly, and at all levels, asking the question, 'What is the worst thing that could happen here?'

Other organisations are less proactive in seeking out ways in which their safety management systems might fail. While risk awareness may seem intuitive, there may be in-built reasons why red flags or indicators of risk are ignored.

The first is the belief that 'it can't happen here', based on conflicting trusted, yet incorrect, information. Similarly, slowly building warning signs can be dismissed as just part of the normal routine until, finally, something gives way catastrophically — or such signs may appear only intermittently and are simply out of sight, out of mind.

In other cases, there are misunderstandings about exactly what signals a dangerous situation or what might be the cause. Even when warning signs are detected, 'groupthink', the pressure to make unanimous decisions, can override doubt.

It is a common experience of the mines inspectorate that serious and major accidents can be traced to failures in safety management systems, and investigations sometimes reveal that the systems in place are little more than sets of manuals occupying metres of shelf space and bearing little relation to what actually goes on in the workplace. They are 'virtual' safety management systems — existing in theory but not in practice.

Critical issues for the industry, particularly in the current climate of rapid expansion, staff mobility and relative inexperience among many employees, are the loss of corporate knowledge coupled with and compounded by the failure to learn from accidents and incidents — this means, in effect, that we have to learn the same lessons over and over again.

The topic of learning from accidents and incidents is a critically important one for managers and engineers. Thirty years ago we commonly attributed accidents and incidents solely to 'acts of God', human error or technical malfunction. Those familiar with the work of James Reason will be aware of his concept that an accident will only occur in a high-hazard system if several of the in-built defences are breached in succession. Near-misses, in particular, provide valuable learning opportunities, as they show how some but not all of the defences can become breached in the future. However, accident analysis also has to take account of the surrounding 'latent' management and organisation factors that we now know contribute many of the causes of major accidents.

AP Photo/Exelsior — Adrian Rogue

Varig cargo plane from Brazil parked at Mexico City's airport on 12 April 2006. Its cargo had been unevenly distributed

It is also critically important to recognise that learning can occur not just within the mining industry, but also across industrial sectors — such as aviation, chemical or energy — precisely because the latent preconditions, rooted as they are in organisational and human behaviour, are common to many sectors.

Learning also depends upon our conception of the system. Although the photograph of the donkey-cart might appear humorous to us all — and very far from the world of engineering hazards — at a very general level the system failure that it represents can, and does, happen regularly, as depicted by the aircraft in the other photograph.

'Those who cannot remember the past are condemned to repeat it.' George Santayana, 1863–1952, *The Life of Reason*, 1905.

Left to right: Bill McKay (Cwlth), Simon Ridge (SA), Sue Kruze (Cwlth), Alan Gooch (WA), Kathy Harman (Cwlth), Mike Downs (Qld), John Mitas (Vic), Martin Knee (WA), Clive Brown (WA), Rob Regan (NSW), Bill Taylor (NZ), Roger Billingham (Qld), Tim Gosling (NT), Rod Morrison (NSW), Kee Hah (NT), Greg Marshall (SA)

Chiefs meet

The 48th Conference of Chief Inspectors of Mines was held in Perth on 8-9 November 2006.

The venue and chair for this annual conference rotate through the represented States and Territories and observer countries Papua New Guinea and New Zealand. Tasmania was unable to host the conference this year due to the aftermath of the Beaconsfield incident, so Western Australia stepped in at short notice, having last hosted the conference in 2003.

The conference is important as it brings together the most senior technical officers with regulatory responsibility and accountability for mining operations in Australia to discuss issues of common concern, including the National Mines Safety Framework.

Delegates also visited Alcoa of Australia's Huntly mine and Pinjarra Refinery.

Information on the functions of this group is available at www.ga.gov.au/ccim

Underground Mine Emergency Response Competition

Mine rescuers in real life scenarios

Stories and surface photos by Peter W Lewis

The 2006 Underground Mine Emergency Response Competition held in Kalgoorlie in November saw the Barrick Lawlers team scoop five awards, including best team.

This year's competition venue was the impressive KCGM Mount Charlotte operation, which provided excellent conditions for the Barrick Lawlers team, which also won the search and rescue, team skills, firefighting and team safety awards.

The competition, the largest held in the southern hemisphere, even attracted a team from Victoria, as well as 15 mine rescue teams from across the State.

According to event organisers, The Chamber of Minerals and Energy Western Australia, the event is important in demonstrating the industry's commitment to safety and health across all Western Australian resource sites and locations.

Over some gruelling days before the competition weekend, teams worked up their fitness and skills to prepare for the backbreaking and intense series of scenarios they endured over two days.

With days starting at 4am to be on-site ready to go just after 5am, it can be exhausting just to watch.

Underground Mine Emergency Response Competition

But the competitors do their training and take the event very seriously — not only professionally, but with dedication and passion. Winning is great, but working with mates and learning something new also inspires them.

Some of these 'real-life' scenarios were based on actual serious accidents, with competitors having the benefit of reading the incident reports after the event.

One such event was based on an incident that resulted in Resources Safety issuing Significant Incident Report No. 78 Blasting Accidents.

'The fact that teams can leave this competition with incident reports that relate to scenarios that they have undertaken allows a lot of knowledge to be gained,' said competition committee chairman Mark Pannewig.

Teams were put to the test with realistic scenarios to evaluate their knowledge and skills in fire fighting, first aid, search and rescue, rope rescue, breathing apparatus skills, team skills and theory.

After two days of intense competition, all those involved prepared for a gala presentation evening held at the Miners' Hall of Fame and again wonderfully hosted by MC and local ABC personality David Kennedy.

Guest speakers included Employment Protection Minister John Bowler and special guests Scott Franklin and Jeremy Rowlings, from Stawell Gold Mine, who gave a presentation on their involvement with the blasting aspects of the recovery efforts at Beaconsfield earlier this year.

Ironically, the Beaconsfield rescue was unfolding while the 2006 Surface Mine Rescue Competition was underway in Kalgoorlie, and was in the back of competitors' minds at the time.

Diverse **competitors travel distance to learn**

There were all sorts of entrants at this year's Underground Emergency Rescue Competition, with one side travelling from Victoria for the competition.

The Victorian competitors from the Stalwell gold mine said they enjoyed the opportunity to compete. Spokesman Rob Stewart said the competition here was twice as big as those back home, and gave them an opportunity to network and share skills.

'We always learn something from the WA guys, and we've been here training in Kalgoorlie all week with Mick Nollas from Riklan Emergency Service,' Ron said.

Another team was made up of members who met for the first time earlier in the week, just before the competition, and was led by team manager Lyn Van Den Elzen. The Combined Kambalda Mine Rescue team consisted of six members from five mines — Long Victor, Otter-Juan, Blair, Daisy Milano and Leviathan.

Captained by Jason Buswell, vice captain Barry Gresham, medic Nick Chernoff and Rick Broere, Jeremy Able, and Aaron Hendy, they commenced bonding and putting themselves through some 'gut wrenching' training after meeting.

'This is a good experience for us and, since all the mines are within 30 minutes of each other, we are able to help each other out and provide mutual aid,' Lyn said.

'This is giving us the confidence to work as a team, and this is great because we wouldn't be able to compete as single mines in this type of competition.'

But they were part of the spirit of the competition and came second in the new team category and an impressive eighth overall.

This year's competition even attracted observers from Argyle diamond mine who are planning to enter a team in the 2007 competition, which is expected to be even bigger.

The visiting team from Stawell, Victoria

The Combined Kambalda Mine Rescue team. Front left to right: Barry (Baz), Jason (Buzz), Jeremy (Jezza), Nick (Wild Man). Back: Aaron (Mad Dog), Rick, Lyn (Lynnie)

Scenarios based on actual reports

Some of the 'real-life' scenarios in mine rescue competitions are based on incidents that have been the subject of incident reports from Resources Safety.

This year's first aid scenario was based on *Significant Incident Report No. 78 Blasting Accidents*, issued after a series of three accidents in the space of a few months in 1997.

The accidents resulted in one fatality and two serious injuries, and all resulted from the injured being too close to the face at the time of detonation.

The fatality and a serious injury were caused by fly rock. In the third incident, the injured person was hurled to the ground by concussion from the blast.

As the Resources Safety report points out, the cause of the death was because the entry to a face, in which a fuse had been lit, did not have a guard or warning notice and barricade to prevent access by personnel.

A second party of personnel entered the area to light the fuse, being unaware that it had already been lit.

On another occasion, a miner was lighting up 18 safety fuses individually. He had completed lighting them but, before he could retreat to a safe position, the first charge detonated.

Around the same period, a miner firing a longhole stope blast electrically with a shot exploder found he was unable to initiate the detonator from the usual firing position. He decided to resolve this problem by moving closer to the blast area and shortening his firing line.

The competition scenario was extremely realistic, even to the extent that a vehicle was partly covered in blasted rock and debris, while a pig's head was manipulated to demonstrate a shocking fatality. It demonstrated real occurrences and represented a challenge to rescuers.

Long tradition of mine rescue

Resources Safety and The Chamber of Minerals and Energy Western Australia made a special presentation to invited guests Scott Franklin and Jeremy Rowlings from Stawell Gold Mine who were involved with the rescue efforts at Beaconsfield earlier this year.

The Chamber's Nicole Roocke and DOCEP's Brian Bradley and Peter O'Loughlin

The presentation of framed ancient customs of *Occupation of the Minedries in and upon the King Majesties Fforrest of Meyndeepe within His Majesties County of Somsett,* by then-Kalgoorlie District Inspector of Mines Peter O'Loughlin, was well received.

Peter was also involved in the competition in an overall Chief Adjudicator role, while Senior District Inspector of Mines Jim Boucaut was an adjudicator in the new Emergency Response Coordinator's event.

The competition was also attended by the Department of Consumer and Employment's Director General, Brian Bradley.

The customs in the award date back to *circa* 1469, during the reign of King Edward IV, and establish the strong traditions of mine rescue.

An 18th century copy of the common version of the Mendip mining laws shows the importance placed on life, and respect for miners, even in death:

'That if any man by the meanes of this doubtful and dangerous occupacon doe by misfortune take his death as by falling the earth upon him by drowning by stifleing wth fire or otherwise as in times past many have bene the workmen of his occupacon are bound to fetch the body out of the earth and bring him to Christian burial att theire owne proper Costs and Charges although hee been threescore fathom under the earth as heretofore hath bene seene And the Coroner or any other officer att Jurye shall not have doe wth him nor them.'

It is a tradition that continues to this day.

Mount Charlotte tops

Mount Charlotte is probably one of the best venues possible for underground mine rescue competitions.

Competition committee chairman Mark Pannewig said the still-operational mine offered a range of options for the various scenarios that are played out in exacting conditions, and also had the benefit of being close to town.

'It is the oldest underground mine in the region and is unique in that it is one of the few existing mines that still has shaft access,' Mark said.

The logistics behind the biggest event of its type in the southern hemisphere involves hundreds — many behind the scenes — with adjudicators, event managers, committee organisers, 'casualties' and assistants all playing their part.

Planning began in earnest months ago with KCGM, owners of the mine, providing engineer Andrew Ross to help set up the event and staff who put in much of the infrastructure for the many scenarios.

Two of the events were held in an actual work area, effectively suspending mining, to add a real edge to the competition.

'It was one of the best we have run — we are always trying to raise the bar and this year didn't disappoint. We had a record 16 teams competing, where we normally have a maximum of 14, so putting an extra two teams through all the events was a strategic challenge,' Mark said.

The committee began organising this event just after the surface competition earlier in the year.

'We have to bed down a site and finalise the scenarios to ensure everything is safe. As a fully self-funded event, we have to attract sponsors and put in the place the logistics of the whole operation.'

The resources and costs of putting on the events would be beyond what individual companies could afford or even have access to. In fact, some of the teams were combined from different mines.

'Considering most other competitions are held on ovals with the infrastructure built around them, it's great that we can set them up in a real place on a real mine. These events are paramount in training these teams,' Mark said.

Mark, who works as an underground occupational health and safety training coordinator for Black Swan Nickel Operation, has been involved with competitions for more than a decade, initially as a competitor, then as an adjudicator before becoming involved in the running of events. He was also chairman of this year's surface competition.

He said that occupational health and safety was becoming far more professional as an industry and '... life and limb are now more valued and the approach is more professional and far more legislated.'

Honour Board

The Barrick Lawlers team took top honours at the annual Underground Mine Emergency Response Competition, winning the award for best team.

Barrick Kanowna was runner up, with third place going to Oxiana Golden Grove.

Awards

Team Skills:
Barrick Lawlers

Search and Rescue:
Barrick Lawlers

Fire Fighting:
Barrick Lawlers

Breathing Apparatus Skills:
Oxiana Golden Grove

Rope Rescue:
Barrick Plutonic

Team Safety:
Barrick Lawlers

First Aid:
Barrick Granny Smith

Overall First Aid:
Barrick Kanowna

Theory:
Oxiana Golden Grove

Individual Theory:
Mike Bowron (Oxiana Golden Grove)

Harry Steinhauser Award for Excellence in Mine Rescue:
Rodney Goldsworthy

Emergency Coordinator:
Tim Campbell (Black Swan Nickel)

Best Scenario:
Fire Fighting and Emergency Coordinator's Events

Best New Captain:
Ben Wither (Barrick Plutonic)

Best New Team:
Newmont Jundee

Best Captain:
Troy Johnson (Barrick Granny Smith)

Encouragement Award:
Mincor Operations

The top three new teams were Jundee, Kambalda and Cosmos.

Underground Mine Emergency Response Competition

Photo courtsesy of Kalgoorlie Miner *(photo: Jodi Kingston)*

Competition chairman Mark Pannewig ready to start the firefighting event

Underground Mine Emergency Response Competition

Photo by Peter W Lewis

Mick Nollas (left) of Riklan Emergency Management Systems, which sponsored the Best Captain Award won by Troy Johnson (right) of Barrick Granny Smith

Members of the Barrick Lawlers team with their Best Team Awards

Unless otherwise indicated, photos courtsesy of Mike Lovitt

Employment Protection Minister John Bowler presents Resources Safety's Peter O'Loughlin with a framed picture in recognition of his 20 year service to Goldfields mines rescue. Peter is now based in Collie

Rod Goldsworthy (left), winner of the Harry Steinhauser Award, with Colin Steinhauser

Award photos courtsesy of Goldfields Image Works

Road safety on mine sites Part 1

The introductory article by State Mining Engineer Martin Knee in this issue of *MineSafe* is a timely reminder of the importance of a proactive 'safety culture'. In the past few months, Resources Safety has received several requests for information about road safety on mine sites. Some safety and health officers are concerned that, despite the best intentions of most of the workforce and the implementation of a variety of controls to address road safety issues, some people are ignoring workplace safety requirements or forgetting hard-learned lessons.

Part 1 of this topic concentrates on fatigue and restraint use — two of the four key behavioural issues associated with crashes (speed and alcohol are the other two). Future issues of MineSafe will cover other factors that affect road safety outcomes, including:

- road design and traffic engineering;
- road user behaviour;
- vehicle standards and maintenance; and
- heavy vehicle dynamics.

The information presented is derived from a variety of sources but is not exhaustive. Instead, this themed section aims to provide discussion points for workplaces to consider when identifying and assessing the hazards associated with vehicle movements on their site.

A selection of recent road safety innovations and past projects from mine sites around the world are included for interest.

Driver fatigue

A major cause of crashes and fatalities is fatigue. A search of Resources Safety's incident database reveals a variety of reports from the past ten years indicating that the driver fell asleep. These include:

- Truck/mobile equipment collision — A truck driver fell asleep while driving his loaded truck towards the waste dump. The truck veered off the road and lodged in a windrow, damaging the steering rods.
- Truck/mobile equipment not otherwise classified — The driver of a dump truck received multiple bruising to various parts of her body and a fractured left thumb when the truck she was driving went up an embankment and then back onto the haul road after she fell asleep. She was not wearing a seat belt at the time and was thrown around the cab.
- Truck/mobile equipment collision — A haul truck collided with the windrow when the driver fell asleep while driving the truck out of the pit.
- Truck/mobile equipment not otherwise classified — The driver of the contractor's truck fell asleep while driving between the headframe and the ROM stockpile.

Various statistics are available on the risks associated with lack of sleep. For example, going without sleep for 17 hours apparently has the same effect on driving ability as a blood alcohol content (BAC) of 0.05%, and after 24 hours, the effect is equivalent to a BAC of 0.10% (*VicRoads Safer Driving Kit, 2002, Fact Sheet 13: The Hazards of Shiftwork*, available from www.vicroads.vic.gov.au/saferdriving).

Elsewhere (www.spinneypress.com.au/204_book_desc.html), it has been estimated that the risk of a crash is four times greater after missing a night of sleep — the same as driving with a BAC of 0.08%.

Particularly noteworthy for many mining operations is the observation that shift workers face a greater risk than other workers because of driving when they would normally be asleep, and getting insufficient or poor quality sleep.

Regardless of which statistics are quoted, the effects of fatigue on road safety are well known. In crashes caused by fatigue, the driver has either fallen asleep at the wheel or been so exhausted that he or she has made serious or fatal driving errors. The NOVA: Science in the News website (www.science.org.au/nova) has a wealth of information and related links under the topic 'Driver fatigue — an accident waiting to happen'.

In terms of managing fatigue at the workplace, a recommended starting point is the *Code of Practice — Working Hours 2006*, issued by the Commission for Occupational Safety and Health and its Mining Industry Advisory Committee.

The associated risk management guidelines are a useful tool when considering potential occupational safety and health hazard factors and risks, such as fatigue, from workplace working hours arrangements.

A paper presented by Peter Simpson, of BSS Corporate Psychology Services, at the Mineral Drilling Association of Australia's Inaugural Technical Symposium: Promoting Safety and Professionalism in Drilling, held in October 2004, summarises a mining case study on fatigue and its management. It states that there are no simple solutions to the issues raised in the study's survey. Also, sleeping disorders need to be considered in workplace fatigue strategies.

Although there may be a role for technological solutions to fatigue in some situations, it is important that employees are given opportunities to develop the attitudes and skills required to manage their own fatigue.

Some of the author's recommendations to improve management of these issues on site are:

- training supervisors to recognise and appropriately manage fatigued employees — and extend training to senior managers so they support efforts to manage fatigue, including employees' and supervisors' willingness to self manage;
- educating at-risk employees to improve their understanding of human sleep physiology and fatigue, and increase their capacity and willingness to protect their fitness for work;
- providing training in sleep hygiene, particularly in relation to getting to sleep and staying asleep when on night shift; and
- enabling isolated employees to work with or interact with others (e.g. relaxed radio rules between midnight and 5am to allow drivers to chat and conduct simple quiz games), as increased simulation benefits alertness levels.

Driver alert

Research started by a team at The Australian National University in 1997 has led to the development of faceLAB, information and communications technology (ICT) that can be used to track the movement of a driver's head, including head position and orientation, and which way the eyes are looking and blinking rate.

To commercialise the results, Seeing Machines Ltd (www.seeingmachines.com) was set up in 2000. In 2005, the company entered a research collaboration agreement with National ICT Australia (NICTA), which is Australia's ICT Centre of Excellence and receives Australian Government and Australian Research Council funding. The aim is to explore the use of ICT to reduce road accidents relating to driver fatigue by warning drivers before they become too drowsy.

The system was trialled successfully in the United States earlier this year, when it was installed in trucks for a large oil field services and mining company, and it will soon be installed in trucks servicing oilfields in Canada.

Seeing Machines also has a development agreement with an automotive industry supplier in Germany, with the aim of going into serial production of driver monitoring systems for heavy vehicles.

The work with the companies in Germany and North America led to the recent production release of the Driver State Sensor – Research (DSS-R), a research version of technology aimed at research organisations and fleet trials.

The product's rugged design and fully automatic operations are said to make it ideal for permanent and unsupervised installation in vehicles. The Australian mining industry will no doubt keep an eye on commercialisation of this product.

So how does the DSS-R work?

The DSS-R finds the driver's face, automatically generating a model that takes into account unique facial features. This takes less than a second.

Once modelled, the DSS-R begins real-time 3D head pose tracking and the system will find and track eyelid closure. This provides detection of driver attention and distraction.

All measurements are optimised so that natural head motion does not degrade head tracking performance.

For detecting fatigue, the DSS-R comes with two algorithms. One is a simple detection of micro-sleep events characterised by the driver closing the eyes for more than a pre-defined period. The second algorithm is a widely accepted standard called PERCLOS.

PERCLOS observes the eyelid closure signal to establish a fatigue metric that considers measurements taken over several minutes. Optional audio alarms can be raised as a result of either of these metrics.

Photos courtesy of Seeing Machines

Belt up

In an ABC interview on 15 August 2006, Ian Cameron, Chief Executive Officer of the Office of Road Safety, indicated that Australians are forgetting the importance of wearing seat belts, which is ironic given that Australia was an international leader in introducing compulsory seatbelt wearing 30 years ago, saving many thousands of lives.

It has been reported (see www.spinneypress.com.au/204_book_desc.html) that the main cause of injury and death in a crash, at any speed, is when the driver and passenger are thrown around in the vehicle. At 50 km/hr this is like falling from the top of a three-storey building. A seatbelt prevents this and greatly reduces the risk of injury and death. It also prevents people being thrown from the vehicle in a crash.

In the light of these observations, it is interesting reading reports from the past decade in Resources Safety's incident database that mention seat belts in the summary. The incidents include rollovers, loss of control and driving over an edge.

Many of the reports indicate that, at the time of the incident, the driver or operator was wearing his or her seat belt and was not injured. For example:

- Truck/mobile equipment over edge — A truck driver reversed his dump truck up a windrow on an ore dump. The bank gave way, resulting in the truck flipping over on its tray. Fortunately, the truck driver was wearing a seat belt.
- Truck/mobile equipment rollover — An elevating scraper rolled onto its side while returning to the pit from the feed preparation ore hopper. The operator was wearing his seat belt and suffered no injuries.

In a few incidents, the person received minor injuries due to the seat belt, but the consequences would probably have been more severe had a seat belt not been worn. For example:

- Truck/mobile equipment rollover — The operator of a dump truck sustained bruising from the seat belt when his vehicle toppled backwards onto the ROM pad floor while dumping. The ground beneath the back tyres of the truck collapsed when the tray of the truck was tipped.
- Light vehicle incident — A light vehicle being driven around a bend on the haul road slid on the wet road and rolled over when the driver lost control of the vehicle. The driver was wearing a seat belt and only received a minor injury to his shoulder.

In those incidents where the driver or operator was not wearing a seat belt, the outcomes were usually not as favourable. Some examples are:

- Truck/mobile equipment over edge — A truck driver received lacerations to his scalp and arm; neck and back strain; and minor shock when his truck and trailer rolled over the edge of the ROM stockpile. The side-tipping truck was being unloaded when the tip head area gave way. The truck came to rest five metres below the head level. The driver was not wearing a seat belt.
- Truck/mobile equipment not otherwise classified — The driver of a dump truck received multiple bruising to various parts of her body and a fractured left thumb when the truck she was driving went up an embankment and then back onto the haul road after she fell asleep. She was not wearing a seat belt at the time and was thrown around the cab.
- Light vehicle incident — A driller fell out of a moving vehicle injuring his head and shoulder when he attempted to close the cab door, which had opened as the vehicle was going around a corner. As he grabbed the door, it fell off its hinges pulling him out of the cab. He had not been wearing a seat belt.

It is also clear that not only should seat belts be worn, but they need to be properly adjusted and fit-for-purpose. For example:

Truck/mobile equipment not otherwise classified — A truck driver received injuries to the head, neck and shoulders when travelling on a rough section of the road on the surface waste dump. The tension in the seat belt was insufficient to restrain the driver.

Visibility project

As reported in BHP Billiton's Sustainability Report 2006 (www.sustainability.bhpbilliton.com/2006/performance), the Six Sigma Visibility Project was a joint activity between the Mount Arthur Coal operation in New South Wales and 3M, a diversified technology company. The impetus was the finding that, in the majority of near-miss incidents involving equipment and vehicles at Mount Arthur, people had reported not seeing the other vehicle. The aim was to increase the visibility of equipment, vehicles and signs at the mine. Twenty-two incidents were analysed — half occurred in the daylight and half were after dark.

Truck drivers involved in the incidents were surveyed, revealing concerns about the visibility of vehicles and signs on site. A range of road signs and vehicle markings was trialled. Drivers from all crews were interviewed to determine which performed best in terms of improved visibility and suitability for continued use.

New signage and vehicle markings have been adopted as the site standard with the expectation that the risk of vehicle collisions will be greatly reduced. The project has also enhanced operator attention on road safety.

Fatigue awareness program wins Queensland award

At the 2006 Queensland Road Safety Awards held recently (see news section at www.racq.com.au), the Premier's Award for Excellence in Road Safety was presented for an awareness initiative designed to decrease fatigue-related motor vehicle crashes among mine shift workers.

The recipient was a partnership between the Mackay Road Accident Action Group fatigue management team and the Mining Industry Road Safety Alliance, who joined forces to develop the initiative to inform mine shift workers in central Queensland about the dangers of driving while tired. The program for mining work sites includes employee and contractor education presentations and other material designed to maintain awareness on the hazards associated with driver fatigue.

The Mackay Road Accident Action Group comprises representatives of the Queensland Police Service, Queensland Transport, Main Roads, local government, Queensland Fire and Rescue Service, Queensland Ambulance and the Royal Automobile Club of Queensland (RACQ).

The Mining Industry Road Safety Alliance was formed in response to increased traffic flows on highways and road systems resulting from the expansion of mining activities in central Queensland. Queensland mining companies operating out of the region, such as Anglo Coal Australia and BHP Billiton Mitsubishi Alliance (BMA), are working with Queensland Transport and the Queensland Police Service. The aim is to address road safety initiatives to improve traffic flows and the safety of road users, including improved highway infrastructure, better coordination of wide load movements and education aimed specifically at the mining industry.

See in the dark

Mine sites have particular issues with delineating road edges after dark, especially on bends and curves. The delineating devices need to be robust and highly visible, given the propensity for them to become dust collectors and the need to be seen by both light and heavy vehicles, some with restricted vision.

Solutions to assist driver judgement on roads in poor light conditions include the use of wind-driven rotating reflectors on roadside posts and implementing regular wash-downs of reflective devices.

There is now a new type of road delineator called 'Dingo Eyes', specifically designed to enhance visual guidance at night when traditional marker performance may be limited. Basically, Dingo Eyes are poles incorporating solar-powered LEDs, which shine continuously after dark or during inclement weather, and standard reflective material. They can be uni- or bi-directional and come in a range of colours. The bright LEDs are highly effective at marking road edges and getting the attention of drivers, increasing driver alertness and awareness of potential hazards.

According to the Road and Mining Supplies website (www.roadandmining.com.au), trials on winding public roads in Norfolk, England, and Kwazulu-Natal Province, South Africa, were very successful, with significant decreases in recorded crashes.

Also, a Western Australian mine site reported that Dingo Eyes resulted in a marked improvement for operators on night shifts in sections of haul roads that were previously difficult to delineate effectively. The devices were subsequently used on haul roads that were not thought to pose problems — the improvements were sufficient to make it worthwhile installing the delineators elsewhere on site.

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Mines Safety Roadshow 2006

On the road again

In October 2006, Resources Safety travelled from the Goldfields to the Pilbara to the Southwest taking the second annual Mines Safety Roadshow to Kalgoorlie, Bunbury, Karratha, Newman, Tom Price, and Perth.

The Roadshow presented information on recent legislative changes and safety and health issues that affect the minerals industry, including the recently released code of practice on working hours.

Resources Safety staff, including the State Mining Engineer and inspectors, were joined by the WorkSafe WA Commissioner (Nina Lyhne) and industry and union representatives on the Mining Industry Advisory Committee (Nicole Roocke and Gary Wood, respectively).

The first event at Kalgoorlie was opened by Employment Protection Minister, John Bowler, and the final event in Perth was opened by the Department's Director General, Brian Bradley.

There were over 450 registrants for the full-day sessions, and over 50 nominated to attend the afternoon session only on the code of practice. In total, over 80 attended in Kalgoorlie, 95 in Bunbury, 65 in Karratha, 50 in Tom Price, 25 in Newman, and 200 in Perth. Participants represented a range of industry perspectives, including safety and health representatives, occupational health and safety professionals, supervisors and managers. About half the total audience were safety and health representatives, but the proportion varied from at least 64% in Kalgoorlie, 57% in Bunbury, 55% in Karratha, 48% in Tom Price, 61% in Newman to 35% in Perth.

Each Roadshow started at 9 am and finished by 3 pm. Fifteen minutes was allowed for morning tea and 45 minutes for lunch. These times were shortened as necessary to keep the program on schedule as much as possible.

The topics covered were:

- Overview of duty of care
- Hot topic 1: Provision of personal protective equipment to labour hire workers
- Investigations
  - Role of Resources Safety inspectors
  - Role of Safety and Health Representatives
  - Round-table discussions of investigation scenarios
- Hazard identification and reporting
  - Importance of reporting accident and incident data
  - Approaches to hazard identification
  - Round-table discussion on reducing the risk of strains and sprains
  - Hazards associated with machinery and plant
  - Round-table discussion on reducing the risks associated with machinery
- Hot topic 2: Likely impact of the *Dangerous Goods Safety Act 2004* on the mining industry
- Working hours code of practice
  - Main features of code and how to use it
  - Tripartite perspective of code
  - Using risk management guidelines to workshop working hours scenarios
- Access to Resources Safety information.

Consistent themes of the Roadshow were the importance of effective communication and the role of safety and health representatives.

About 55% of participants took up the offer to complete a survey form at the end of the day's sessions.

- Of those who responded, 83% strongly agreed or agreed that the *Investigations* session increased their knowledge and understanding of occupation safety and health issues in mining and exploration.

For the *Hazard identification and reporting* session, it was 82%. Eighty-one per cent strongly agreed or agreed that *Hot topic 1 on the provision of PPE for labour hire workers* increased their knowledge and understanding, and for *Hot topic 2 on the Dangerous Goods safety legislation*, the figure was almost 88%. Almost 93% strongly agreed or agreed that the *Working hours code of practice* session increased their knowledge and understanding of working hours as an occupational safety and health issue.

- About 87% of respondents strongly agreed or agreed that the round-table discussions were useful.
- About 39% of respondents thought that the 'showbag' of Resources Safety publications and other resource material was excellent, and 57% said it was good, giving a total of 96% well satisfied with the handouts.
- About 96% of Kalgoorlie participants found the venue to be satisfactory, with a similar figure for Bunbury. In Karratha and Tom Price, the figure was 92%. In Newman, all respondents thought the venue was satisfactory. In Perth, almost 93% were satisfied with the venue.
- Almost 70% said that their expectations were met, and 28% indicated that they were partially met. Only one person wasn't sure.
- A common comment was a request for employers, managers and supervisors to attend the Roadshow or safety and health representatives training, or both, so they become more aware of what a representative can do and support their representatives and recognise their importance in achieving good safety and health outcomes in the workplace.
- Participants also appreciated the opportunities for round-table discussions and to meet other people in industry, as well as meet Resources Safety representatives.

Mines Safety Roadshow 2006

Some people indicated a desire for more round-table discussions and exercises.

- One detailed comment included a suggestion for safety and health representatives to invite supervisors and general managers or alternates in an effort to educate the higher management levels. The respondent indicated that people must sit an exam to get a shift boss's ticket in Western Australia, but asked at what time is the occupational safety and health information updated for these people throughout their career other than through their own safety and health representatives.
- The programs presented in the first few venues identified timing constraints that were addressed in subsequent presentations. It is interesting to note that different topics produced extended question times at different venues, so timing had to be flexible to accommodate the varying needs of the audiences.
- Numerous topics were suggested for future Roadshows, MineSafe articles and other Resources Safety publications. These will be addressed over the coming year or so, and are broadly grouped as follows:
  - Legislative issues
  - Standards
  - What can go wrong
  - Fatigue management and working hours
  - Role of safety and health representatives (SHRs)
  - Information sources
  - Inspectorate notices
  - Consultation and communication
  - Safety practices
  - Safety and health innovations
  - Plant and machinery
  - Drugs and alcohol
  - Road safety
  - Dangerous goods
  - Specific safety topics such as food in mining, confined spaces, mining techniques and ground control, working alone, safety case and construction in mining
  - Specific health topics such as bullying, asbestos, noise and heat stress.

Kalgoorlie

Bunbury

Bunbury

Kalgoorlie

Karratha

Karratha

Perth

Tom Price

Newman

About **Labour Relations**

Wageline

Labour Relations is a division within the Department of Consumer and Employment Protection. The major focus of the division is promoting fairer, safer and more productive workplaces. This is achieved by undertaking a range of activities such as:

- providing information and advice through the Wageline call centre;
- investigating alleged breaches of State industrial relations laws;
- proposing changes to State industrial relations legislation;
- providing education services and seminars;
- coordinating public sector labour relations; and
- making submissions to the Western Australian Industrial Relations Commission and the Australian Fair Pay Commission in relation to award and minimum wage entitlements.

Work Choices, the federal legislation introduced early in 2006, regulates industrial relations for constitutional corporations. State industrial relations legislation continues to operate for non-constitutional corporations. It is estimated that there are about 400,000 employees still covered by the State system. There are still, however, grey areas in the definition of a constitutional corporation, and these will gradually be determined by legal processes.

Wageline provides employment information to private sector employers and employees on employment matters. Some interesting facts:

- Wageline receives about 8,000 calls each month.
- The majority of calls are clients wanting information on wages.
- Callers also enquire about issues such as apprenticeships and traineeships, annual leave and sick leave, parental leave and hours of work and overtime.
- Wageline provides award summaries of the major State awards and these can be emailed, faxed or posted to clients on request.

The compliance area of Labour Relations investigates alleged breaches of State laws, awards and agreements. About 1,000 complaints are investigated each year and about $1million in underpaid wages is recovered. The division also investigates alleged breaches of the children in employment laws under the *Children and Community Services Act 2004*.

This year the Government made changes to the minimum conditions of employment in State industrial relations legislation. Amendments to the *Long Service Act 1958* enhanced long service leave provisions, and amendments to the *Minimum Conditions of Employment Act 1993* dealt with reasonable hours of work and improved conditions for unpaid carer's leave and parental leave.

One of the major issues facing all businesses is staff shortages. Recognising that staff retention and attraction can be improved through providing flexible working arrangements, Labour Relations hosted the Work Life Balance Conference in February 2006 and the Linda Duxbury Seminar in November 2006. Both events demonstrated the imperative for businesses to respond to work life issues to attract and retain skilled staff, and discussed practical strategies to achieve this end. These seminars were well attended by private and public sector employers and employees. Other education services include employer and employee seminars, individual consultancy services and award or agreement comparisons.

The telephone number for Wageline is 1300 655 266 or you can visit the Labour Relations website at www.docep.wa.gov.au

Bowler urges **focus on workplace safety**

Employment Protection Minister John Bowler used the National Safe Work Australia Week held in late October 2006 to urge West Australians to focus on the importance of developing a culture of safety at work.

National Safe Work Australia Week aimed to encourage people to update their knowledge about workplace safety and make their workplace as safe as possible.

'Workplace safety is not just about employers and workers and the State Government supports initiatives that continuously promote safety as we strive for fairer, safer and more productive workplaces,' Mr Bowler said.

'Workers and their families should not have to experience the pain and suffering due to work place injuries. Safety in the workplace must be the number one priority of industry and small business.'

As part of the National Safety at Work Week, information on the latest safety initiatives were shared during the Work Safe 2006 Forum in Perth.

The Minister said it was only by working together, talking about safety and then putting ideas into action that workplaces could reach their safety goals.

During Safe Work Australia Week, people networked and exchanged work safety information, ideas and initiatives with a wide range of industries and businesses. They were also able to learn from what others had put in place to reduce the chance of injury in the workplace.

'Workplace safety is all about people looking out for their mates,' Mr Bowler said.

Ask an inspector

Mine managers should ensure they receive comprehensive details of all relevant safety and health information provided by designers, manufacturers and suppliers of plant, according to mines inspector Dino Busuladzic.

Dino is the Senior Mechanical Inspector and oversees the machinery section of Resources Safety throughout Western Australia.

'There is a duty of care for suppliers, manufacturers, designers, importers and installers under the Mines Safety and Inspection Act, and they should be more proactive in warning about incorrect use of plant and provide relevant information on correct usage,' Dino said.

'In our regulations, manufacturers, suppliers et cetera must identify all hazards and specify any known problems. When we investigate incidents we rely on feedback from suppliers as well as the mine manager to determine the cause.'

He said as an inspector he would like to see the mine manager source more information from suppliers and the sharing of knowledge with other mines when there are issues with the quality of products or problems.

'While everybody is trying to save money, the costs of incidents can be huge — a multiple of any money saved by shortcuts — and we are concerned some suppliers are getting away with inadequate safety standards.'

Dino believes it is important for mines to liaise with suppliers even for small incidents, and all information of this kind should be shared with other mines and safety alerts issued.

He said while minor incidents were more frequent, the attention usually only focussed on the big incidents, and the small things were generally ignored.

'The small things can lead to bigger incidents. By acting on small incidents we can often prevent larger ones, and that may involve bringing in the manufacturers at the early stages of investigation for input.'

Dino has been in the industry for more than 15 years and holds a Masters degree in Mechanical Engineering from The University of Western Australia. He has worked as a designer and site engineer, mainly in the mining construction industry, working through Queensland, the Northern Territory and Western Australia.

'I think my industry experience has given me a good background as an inspector, and I am aware of the problems faced in the different stages of construction and the commissioning of plant,' he said.

'Part of my role is to ensure all plant complies with Australian Standards, codes of practice and our regulations so it can be operated safely and without incident.'

Dino's top safety tips

1. Small incidents can become big incidents, so investigate thoroughly and try to get to the bottom of things so you understand the nature of incidents and the reasons they occur.
2. Try to share information with other mines, suppliers and manufacturers as this could prevent the same incidents in other mines. It is better to learn from others' experience, rather than your own.
3. For new equipment and plant, ensure adequate training of operators and also people in management — some equipment is pushed over the limits to increase productivity and sometimes managers overlook the safe operational limits of plant.
4. Make sure equipment is used for the purpose for which it was designed and, if any changes are made, ensure the original designer or manufacturer is consulted and their opinion considered.
5. Try to strictly follow all regulations to ensure you are operating on the safe side.

Did you know?

- In 2005-06, 973 safety and health representatives from the mining industry received introductory training, out of 3,331 trained from all industries — that's over 29% of the total.
- At the beginning of December 2006, there were about 1,800 elected safety and health representatives in the mining industry.

Work Safety Award

winners leading the way

Ausclad Group of Companies, PW & CJ Bradford and Royal Perth Hospital – Sir George Bedbrook Spinal Unit are the winners of the three award categories of the prestigious 2006 Work Safety Awards WA.

The companies will now compete in the national Safe Work Australia Awards.

Ausclad, category 1 winner for best workplace safety and health management system, supplies engineering solutions including fabrication, construction and maintenance services across a range of industries.

The company has an excellent safety management system in place, resulting in a 39 per cent reduction in lost time injury and disease over the past year.

The Sir George Bedbrook Spinal Unit won category 2 for the best solution to an identified workplace safety or health issue.

Caring for patients with spinal injuries, the unit was unable to comply with the hospital's no-lift policy when turning spinal patients, who were lifted vertically and turned by four staff.

Management and staff developed the Aeroplane Pillow, which allows two staff to turn patients without lifting, significantly reducing the risk of manual handling injuries to staff.

Category 3 is for the best workplace safety and health practices in small business, and was won by PW & CJ Bradford.

Peter Bradford is a farmer and volunteer firefighter who recognised that lifting and positioning heavy water-filled hoses into water tanks on vehicles was putting firefighters at risk of manual handling injuries and exposing them to the hazards of working at height.

In response, he developed a standpipe that allows mobile tanks to be filled with water from overhead, eliminating both the handling of heavy hoses and the risks associated with working at heights.

WorkSafe WA Commissioner Nina Lyhne said the three winners were terrific examples of the many excellent workplace innovations and occupational safety and health systems being developed in Western Australia.

'Awards such as these are all about encouraging best practice in safety and health, and the three winners are leading the way by making a significant contribution to reducing the injury toll in workplaces.'

Safe Work Australia Week a success

The Work Safe 2006 Forum held in October attracted more than 600 delegates, largely occupational safety and health representatives, who attended to update their skills and knowledge and to network with others who share an interest in safety.

Delegates were told that in Western Australia, we are still averaging around 19,000 injuries per year that are serious enough for people to need time off work.

On average, every 25 minutes a Western Australian is injured at work, and every 16 days on average a Western Australian dies from injuries sustained while earning a living.

The forum was part of activities held during Safe Work Australia Week, which proved to be a great success, with widespread participation aimed at raising awareness of occupational safety and health throughout the community.

Minister for Employment Protection John Bowler opened the forum and said that workplace safety was all about people looking out for their mates.

WorkSafe WA Commissioner Nina Lyhne made a presentation on *WorkSafe challenges and choices — is what we are doing working?*, following an overview of the history of workplace safety by Commission for Occupational Safety and Health chair Tony Cooke.

'Terrific work has been done over the past 18 years or so in WA to reduce the tragic toll of workplace illness and injury, and events like Safe Work Australia Week can only contribute to this and further reduce injuries and illness,' Ms Lyhne said.

Mr Cooke talked of changes since the pre-Robens days when the duty of care was observed in the breach and it was common to sue for negligence rather than preventing the injury, to a modern culture of behavioural change in workplace safety.

Delegates had a choice of two sessions from skilled practitioners in the areas of *PINS – What they are and how they work*, *Bullying – developing strategies and changing the workplace culture*, *Work life balance and working hours*, *OSH risk assessment*, *Incident investigation – techniques and tips*, and *Returning injured workers to work*.

During the week, companies were encouraged to undertake safety-related activities in their own workplaces. More than 70 companies registered their Safe Work Australia Week activities on the WorkSafe website.

They took part in activities such as morning teas and breakfasts to meet and greet safety and health representatives, training sessions on safety issues, workplace competitions and e-mailing of safety tips to staff.

What's in **your dust?**

'Hazardous substances' is the term currently used to describe a variety of materials that can damage our health and well-being. This term is used by occupational safety and health professionals to describe any of the following agents:

- substances used directly in work activities, like adhesives, solvents and cleaning agents;
- substances generated by work activities, fumes from welding or evolving from process reactions;
- biological agents including all micro-organisms and their toxins and allergens; and
- naturally occurring substances, especially dusts from ores like silica and toxic metals such as mercury, arsenic and lead.

Some ores contain toxic metals that are also referred to as 'heavy metals'. The most common found in Western Australia are arsenic, lead, mercury and vanadium.

Toxic metals cause a variety of health effects. Exposure to high concentrations can cause serious health effects immediately. However, delayed disease can occur in people who have been exposed to low levels for a long time because the body will accumulate or store the metal for extended periods, sometimes for decades, in susceptible organs such as kidneys, liver, nerve tissue and bones.

It is the duty of the employer to protect employees from being exposed to hazardous substances including toxic metals. Therefore, whenever an operator starts mining a new ore body, it is necessary to determine if toxic metals are present in the ore. This can easily be done by undertaking an analysis of the ore using techniques such as inductively coupled plasma (ICP) analysis or vapour generation to quantify concentrations of all materials present in the ore. If the ore mineralogy changes, repeat analysis may be required.

Following identification, a risk assessment should then determine if employees could potentially be exposed to any toxic metals in dust or fumes. For example, will any of the processes employed at the site concentrate the arsenic, lead, mercury or vanadium? Commonly, very low concentrations of heavy metals can concentrate in one part of the refining process. If so, the risk assessment should determine what opportunities there are for employees to come into contact with dusts or vapours being released. For example, will mercury vapour be generated following roasting and refining of pyrite ores containing gold and silver? Elemental mercury can also concentrate in gold electrowinning circuits. Arsenic dust and fumes are commonly emitted from refining and smelting metals from ores containing copper, lead and tin.

Best management practice for reducing exposure to toxic metals incorporates a policy with functioning procedures that ensure:

- no smoking or eating in exposure risk areas;
- specific washing and clothes changing protocols before eating or leaving site;
- on-site laundering to prevent taking the toxic metals home to the family;
- regular airborne contaminant and exposure monitoring to measure risk and efficiency of controls; and
- baseline and routine biological monitoring followed up with specific health surveillance based on the real exposures.

More detail on managing toxic metal exposure is available from the *National Code of Practice for the Control of Workplace Hazardous Substances*. This document has recently been reviewed for replacement by the *Draft National Code of Practice for the Control of Workplace Hazardous Chemicals*, which was released for public comment at the end of September 2006, and is available from the Australian Safety and Compensation Council website at www.ascc.gov.au/ascc/AboutUs/PublicComment/OpenComment

Mercury became infamous for its role in the so-called mad hatters' disease, where felt-workers used mercury to shape hats. As the name suggests, long-time exposures to unsafe levels of mercury cause disturbance of the nervous system. An early sign is mild tremors but health effects can progress to severe and aggressive personality changes. It can also cause kidney damage.

Most heavy metals can cause diseases of the central nervous system and kidneys, but lead has also been known to cause anaemia, infertility in men and abnormalities in developing babies when pregnant women are exposed.

Cinnabar (mercury sulphide) ore from Nevada

Native mercury on rock from California

Galena (lead sulphide) — provenance not given

Photos courtsesy of Dave Dyet, www.dyet.com/mineral

Nick is a safe driver

Nick Kramer, who works for Coogee Chemicals, is the 2006 DOCEP Resources Safety Dangerous Goods Safe Driver of the Year.

Nick has been in the industry for the past 33 years and has clocked more than 3.5 million kilometres without any significant accidents, a great track record that has seen him travel the length and breadth of this huge state.

After training as a mechanic with Volvo, Nick started with Gascoyne Traders on the tools before getting behind the wheel, and finally heading to Kalgoorlie where he spent about 20 years.

Over the years he has worked for such companies as Brambles, Bells, Wesfarmers and Boral transporting a range of dangerous goods from liquid cyanide, fertilisers and lime to sulphuric, nitric and hydrochloric acid, caustic, ammonium nitrate and even packaged explosives.

While Nick said he was honoured to receive the award, he said there were thousands of guys out there just as good.

'I think to be successful in this industry you need to have a bit of diesel in your blood, you have to like the lifestyle, enjoy working long hours and be customer focussed,' he said.

He said these days he enjoyed training up the young fellows new to the industry and helping them along.

'You have to tell them that if they have any questions they have to ask, it's the only way to learn.'

He said these days the industry training was more professional and the laws were getting better.

In a coup for Coogee Chemicals, his colleague at the company Dennis Treasure was runner-up in the Dangerous Goods Safe Driver category.

Nick recently received his award in front of more than 200 people who attended the 2006 Western Australian Road Transport Industry Awards at the Parmelia Hilton in Perth.

Rewarding excellence in the Western Australian road transport industry, the awards recognise the personal achievement of individuals and promote best practice within the industry.

The event is organised by Transport Forum, the state's peak road transport industry for private freight operators, formed in 2000 following a merger between the Road Transport Training Council and the West Australian Road Transport Association. These organisations have represented the requirements of members for more than 75 years.

Transport Forum is affiliated with the Australian Trucking Association and is the Western Australian branch of the Australian Road Transport Industrial Organisation. Transport Forum regularly consults with community members, industry organisations and government agencies.

Nick Kramer (at left) receives his award from Peter Drygala, Director Dangerous Goods Safety with Resources Safety

Changes to Dangerous Goods Safety Act

One of the 'hot topics' at the recent Mines Safety Roadshow was a session by Resources Safety's Rhonda Jogia on what changes to the *Dangerous Goods Safety Act 2004* mean for the mining industry.

Responses to the public comment period will be placed on the Resources Safety website early in the new year, while it is expected that the proclamation of the new dangerous goods legislation will occur during the first half of 2007.

Current regulations hail back to the 1960s and the legislative reforms aim to incorporate national concerns about security and terrorism.

The new legislation will see a shift from telling people and businesses what to do to a performance-based risk management approach for dangerous goods safety.

Under the changes, responsibility for managing dangerous goods safety will rest with the risk generator.

The new regulations will cover security risk substances (SRS), including some forms of ammonium nitrate (as per national guidelines), and a cradle-to-grave approach to the import, manufacture, storage, transport, sale and use of explosives and ammonium nitrate.

Legislative changes will result in new security clearance requirements for all explosives and SRS licence holders, introduction of a security card for all people with unsupervised access to explosives and SRS, new regulations to cover major hazard facilities and provisions for explosives management plans and shotfiring plans.

Review of paste and thickened tailings guide

The first edition of *Paste and Thickened Tailings — A Guide*, published by the Australian Centre for Geomechanics in 2002, played an important role in helping academics and practitioners establish common terminology and understanding in this rapidly advancing field.

Launched earlier this year, the second edition, edited by RJ Jewell and AB Fourie of the Australian Centre for Geomechanics, includes new chapters on slurry chemistry and reagents, and a substantially expanded case studies chapter.

The following review of *Paste and Thickened Tailings – A Guide (Second Edition)* has been provided by Dr Robert Cooke, a director of Paterson & Cooke Consulting Engineers Pty Ltd, South Africa.

The revised publication comprises twelve chapters, each written by internationally recognised experts, covering all aspects of paste and thickened tailings from preparation through to surface and underground disposal and mine closure. The editors note that the guide is not a design manual. Rather, it is intended to provide guidance and advice for professionals considering implementing a paste and thickened tailings system.

The chapter on sustainability notes that it is important to examine full life-cycle costs before selecting a tailings disposal system. Apart from reduced operating and closure costs, paste and thickened tailings systems may also offer non-monetary benefits in terms of improved public perception regarding environmental and social issues. Increasingly, for many operations, production is limited by water availability.

A good appreciation of rheological concepts is important in understanding the key processes related to paste and thickened tailings systems — tailings dewatering, transport and disposal. The rheology chapter provides a detailed overview of these concepts and includes the suggestion that tailings disposal systems be designed to meet the rheology required for the selected disposal method.

The chapter on material characterisation notes that some tailings properties change during the preparation, transport and disposal processes — most significant of these is the change in the tailings mixture rheology. Guidelines for relevant measurements for characterising the tailings for each of these processes are presented. The author warns that beach slope angles determined from laboratory flume tests should be treated with caution as there is no accepted method yet for predicting deposition slopes from laboratory tests. The chapter concludes with a useful checklist of material properties that should be measured for the thickened tailings projects.

It may be the least accessible chapter in the guide, but the slurry chemistry chapter deals with issues that are critical to implementing successful systems for tailings containing clay minerals. The authors describe how the colloidal properties of the clay suspensions influence the tailings rheology and behaviour during sedimentation dewatering. It is likely that future significant advances in paste and thickened tailings will depend on a proper understanding of slurry chemistry.

The chapter on reagents provides an interesting history of the development of flocculants and coagulants. Dr Cooke notes that he was pleased to finally learn the difference between the terms flocculant and flocculent! Reagents are a significant cost for many paste and thickened tailings systems. The authors' overview assists designers and operators to optimise reagent selection and dosage by providing a good understanding of flocculation and coagulation mechanisms and the factors that affect reagent performance.

The chapter on thickening and filtration provides an excellent overview of the thickener types and the methodologies used for sizing

thickeners. They note that sizing paste thickeners is largely based on experience with similar installations. The various types of filters used to produce paste are described with the relative advantages and disadvantages of each type. Useful indicative costs are provided for thickeners and filters.

The transport chapter discusses the flow behaviour of paste and thickened tailings in pipelines. The relative advantages and limitations of centrifugal and positive displacement pumps are reviewed, and the author notes that life-cycle costs must be evaluated when selecting the pump type. Transport of paste by truck and conveyor is discussed, although these modes are not widely used for surface tailings disposal. The chapter concludes with a review of aspects to consider when undertaking an economic evaluation or comparison of transport systems.

A balanced assessment of the advantages and disadvantages of surface disposal of paste or thickened tailings compared with conventional tailings is presented in the above ground disposal chapter. The author notes that although the concept of high density tailings disposal technology was first implemented over 30 years ago, the adoption of the technology for surface has been slow. This is ascribed to the lack of reliable methods for producing

Continued on page 22...

...from page 21

and transporting tailings. With the recent advances in these areas, it is expected that implementation rate of paste and thickened tailings systems will accelerate. The chapter details considerations for design, operation and management.

The mine backfill chapter discusses the interdependence of backfill composition, underground benefits and legal compliance. This is illustrated by considering the benefits of underground paste disposal for base metal, coal, gold and platinum mines. The author reviews underground rock mechanics requirements, environmental requirements and considerations for ensuring successful paste transport. Examples of two underground paste disposal projects are presented to illustrate the application of underground paste backfill technology.

The closure chapter notes that although all mining operations have a finite life, the mining operation remnants (including the tailings storage facility) have an almost infinite life. The mining company, in consultation with local communities and authorities, must develop a suitable final closure design that meets the requirements of all stakeholders. The chapter deals with safety, stability, aesthetics, acid mine drainage, financial issues, reclamation and rehabilitation.

The guide concludes with twelve excellent case studies for surface disposal of paste and thickened tailings. The studies cover a broad range of systems illustrating the applicability of the technology for different applications. This chapter will be extremely valuable for anyone contemplating a paste and thickened tailings system. However, the value of the case studies could be enhanced by more consistent reporting of key parameters, such as rheology and beach slope, and identification of key lessons learnt from the system, such as what did not work and how the system was improved.

In summary, Dr Cooke believes the guide makes an extremely valuable contribution to the advancement of paste and thickened tailings technology. It will be a key reference for all professionals in the field.

For further information or to obtain a copy of *Paste and Thickened Tailings — A Guide (Second Edition)*, please contact Josephine Ruddle at the Australian Centre for Geomechanics (acg@acg.uwa.edu.au)

Working hours **code of practice**

While the new *Code of Practice — Working Hours 2006* applies to all workplaces, its application to the mining industry was the focus of the afternoon session at the Mines Safety Roadshow 2006.

'The issue of working hours has progressed significantly in recent times and the evidence is that it is an occupational health and safety issue,' said WorkSafe WA Commissioner Nina Lyhne.

Nearly a quarter of Australian employees work more than 50 hours a week, with higher-than-average working hours and overtime patterns in Western Australia, largely in the mining, transport, storage and construction industries.

Dealing with working hours in an occupational safety and health framework presents issues such as:

- reduction in sleep and risk of fatigue;
- repetitive movements, frequent manual handling and physically demanding work;
- high concentration or mentally demanding work; and
- exposure to hazards.

There is no doubt that fatigue affects performance, alertness and judgement.

The code sits under the legislative framework and, while strict compliance with it is not mandatory, it does have significant status and sets the minimum standards.

Companies will need to adopt a risk control model for use by workplaces or industries, to identify hazards and their factors, and levels of risk and risk assessment and control.

State Mining Engineer Martin Knee said that the code could be used as evidence in court, to demonstrate practicable methods of compliance.

'If you do what the code says then you have a cast-iron defence against charges that you have not met your duty of care regarding working hours. As an employer it is illegal to expose employees to a hazard, such as those that may arise from fatigue, so this is a very helpful document.'

The Chamber of Minerals and Energy Western Australia representative Nicole Rooke said there was a need to gain an understanding of factors affecting fatigue.

'We need to look at factors as a composite and not treat them individually, like type of work, length of hours and conditions, while working in a continuous improvement process.'

She said the Chamber had been involved in the code's development and encouraged companies to adopt it.

Gary Wood, representing UnionsWA, said the code would allow a review into what is happening on sites so controls could be put in. He expressed concern about fly in – fly out workers who had to travel long distances at the completion of long shifts, challenging industry for a cultural change.

WorkSafe WA Commissioner Nina Lyhne said there was a need to manage the risk of workers working more than 38 hours per week, and controls needed to be put in place. She reiterated that the code of practice had significant status in law.

Addressing work–life balance

MineSafe's Peter W Lewis finds that in times of almost full employment, the challenge for employers is to attract, retain and motivate a diverse group of employees away from the clutches of micro-managers and control freaks.

He recently attended a half-day seminar entitled 'Standing still is not an option: address work life balance to attract and retain employees' sponsored by the Labour Relations Division of the Department of Consumer and Employment Protection, the Work Life Balance – Creating Family Friendly Workplaces Advisory Committee of the Health Department of Western Australia and The University of Western Australia Business School.

The seminar was presented by Professor Linda Duxbury of the Carleton University, Canada, who spoke to Western Australian public sector employees and employers about the imperative for work life balance for attracting and retaining employees and maintaining productive workplaces in the face of looming labour and skill shortages.

Peter files this report.

According to international speaker Professor Linda Duxbury, in times of labour shortage there is the need for employers to provide a work–life balance to not only attract workers, but to keep them as well.

Speaking at The University of Western Australia, Duxbury gave a whirlwind and energetic — and at times humorous — insight into the Canadian way of work–life balance, and a statistical analysis of workplace demographics.

And the stats are not good!

It seems that in 2001, 60 per cent of workers were overloaded compared to 35 per cent a decade earlier, work outcomes have declined and employee mental health has worsened.

Why the increase in work–life conflict? Well, the demographics of the workforce are changing, there is a demise in the traditional family unit, more people are requiring care from fewer caregivers and, through all the downsizing and restructuring, people have been eliminated but not the work.

She said with technology increasing work expectations, most Canadians were not coping effectively, but they were just trying to do it all and work harder.

Unfortunately Australia's claim to fame is as a global leader in workloads, and Western Australia is probably the worst, with unpaid overtime and burn-out common.

Western Australia already has one of the oldest workforces in Australia and faces a clash of the expectations of the different generations, with baby boomers and generations X and Y all looking at the workplace differently.

As Duxbury says, 'Younger people are turning down promotions and saying "why would I want that job, and more stress? I have no intention of being like you!" and the average age of young people coming into the workforce is now 25.'

She says the baby boomers have become like 'boiled frogs', slowly letting the workloads increase over the past 15 years, while the youngsters are saying 'hang on — the water is too hot'.

If employers cannot offer them the correct balance, Australia risks losing its youth — you just can't keep offering them more money. Globally, we are entering a sellers' market for labour at a time when birth rates are declining.

In other words, for generations X and Y, work–life balance is an issue, and employers must address this. Gen Ys want a challenge and fun and money is number seven on their list, Xers want money and career development, while the boomers have been there, done that and started looking at the organisation in terms of what's in it for them.

Professor Linda Duxbury

For the next several decades in both Canada and Australia, for every two employees who are eligible to retire we have less than one employee to take their place, so competition for skilled workers will be particularly fierce.

Early retirement is also an issue with many opting out of the system at 55 — Duxbury says the retirement age of 65 was issued when life expectancy was 61, so retention of older workers was also important.

Duxbury recommends employers stop focussing on the costs associated with addressing work–life conflict and look at the costs of not dealing with it. There is a need to look at workloads, managers, culture, accountability and managing change.

The data indicate that work environments and work–life conflict are making people sick and the only way to reduce health care costs is to focus on work environment issues.

She says supporting employees will be a high priority for organisations that wish to thrive, and not just survive. Encouraging employees to have a work–life balance is a necessity for health and staff retention.

Further information and links are available from Labour Relations' website, entered via www.docep.wa.gov.au

What's with the generations?

The birth years for the generations born after World War II are variously designated, but the following periods seem to be the most popular. There is overlap between the 'tail' of baby boomers and first members of the generation X cohort, with vigorous discussion of the defining dates in some circles.

Baby boomers – born 1946 to 1964
Generation X – born 1963 to 1978
Generation Y – born 1979 to 1999

MIAC's first anniversary

The seventh meeting of the Mining Industry Advisory Committee (MIAC) held on 16 October 2006 marked the first year of the Committee's operation.

MIAC was established in 2005 under section 14A of the *Occupational Safety and Health Act 1984* (OSH Act) as a statutory advisory body on matters relating to occupational safety and health in the mining industry. The inaugural meeting was held in October 2005, with subsequent meetings held on the third Monday of every second month.

The functions of the MIAC are set out in section 14A of the OSH Act and include:

- advising and making recommendations to the Minister and the Commission for Occupational Safety and Health (the Commission) on occupational safety and health laws and matters concerning the mining industry;
- liaising with the Commission to coordinate activities and to maintain parallel standards;
- preparing or recommending the adoption of codes of practice, guidance material, standards and specifications; and
- providing advice on education and training matters in the mining industry.

Composition of MIAC

The tripartite membership of the committee is determined by the Minister or Ministers responsible for the administration of the OSH Act and the *Mines Safety and Inspection Act 1994* (MSI Act). The chairperson of MIAC is determined under section 14A of the OSH Act and is a member of the Commission.

Currently, the appointed members are:

- **Brian Bradley** (Chair)
  Director General, Department of Consumer and Employment Protection
- **Nicole Roocke**
  The Chamber of Minerals and Energy Western Australia
- **Rob Watson**
  The Chamber of Minerals and Energy Western Australia
- **Henry Rozmianiec**
  UnionsWA
- **Gary Wood**
  UnionsWA
- **Martin Knee**
  State Mining Engineer, Resources Safety Division , Department of Consumer and Employment Protection
- **Kathryn Heiler**
  Expert member
- **Dr Peter Lilly**
  Expert member

Achievements since 2005 inception

- MIAC endorsed the retention of the Safety and Health Representatives Working Group as its subcommittee, a group that operated under the previous advisory board.
- During 2006 MIAC endorsed a 'welcome pack' developed by the Safety and Health Representatives Working Group for newly elected and re-elected safety and health representatives and their mine managers.
- In liaison with the Commission, MIAC recommended for approval by the Minister two codes of practice, for which endorsement was received:
  - *Code of Practice — Working Hours 2006*; and
  - Welding Technology Institute of Australia – Technical Note No. 7, 2004 Health and Safety in Welding Code of Practice.
- MIAC commenced work on a code of practice on consultation after the Commission considered a recommendation for its development.
- Resources Safety guidelines endorsed by MIAC:
  - *Noise Control in Mines*;
  - *Accident and Incident Reporting*; and
  - *General Duty of Care in Western Australian Mines*.
- Revised guidance notes of the Commission endorsed by MIAC:
  - *Formal Consultative Processes at the Workplace: Safety and Health Representatives, Safety and Health Committees and Resolution of Safety and Health Issues, including Consultation on PINs*; and
  - *Gas Welding Safety Flashback Arresters*.

Plans for 2007

- MIAC to consider and advise the Commission and the Minister on the recommendations arising from a scheduled review of Parts 3 and 4 of the MSI Act.
- MIAC to consider and advise the Minister and the Commission on the recommendations arising from the Resources Safety Feasibility Study that will report via the Government's Mines Safety Improvement Group to the Minister for State Development.
- Progress minor clarifying amendments to the MSI Act.
- Progress drafting a code of practice on consultation.
- Seek ministerial approval for a code of practice on *Prevention and Management of Violence, Aggression and Bullying at Work*, and publish a guideline on *Dealing with Bullying at Work*, both based on Commission publications.
- Oversee implementation of the welcome pack by the Safety and Health Representatives Working Group.
- Monitor developments under the auspices of the National Mine Safety Framework and provide input where appropriate.

Confirmed MIAC minutes are available from the 'Mining' section of Resources Safety's website at www.docep.wa.gov.au/ResourcesSafety

Oil-filled circuit breaker failure

Queensland's Department of Natural Resources, Mines and Water has issued *Safety Alert No. 149* after a high voltage circuit breaker failed, resulting in an electrician receiving burns when sprayed with high temperature oil.

The electrician was attempting to operate an 11 kV oil-filled circuit breaker (OCB) that had tripped out on an earth leakage fault. The metal tank failed and high temperature oil sprayed onto the victim, burning his right forearm and causing minor heat trauma to the right side of his face. The method used by the victim to close the circuit breaker — standing to one side — greatly reduced the probability of more serious injury.

Hot oil also ignited drawings on top of a drawing cabinet in front of the switchboard, as well as spare air-conditioning unit filters stored at the rear of the switchboard.

For the full alert, go www.nrm.qld.gov.au/mines/safety_alert149.pdf

Recommendations

The recommendations that would generally apply to this type of electrical switchgear in this situation include:

- ensure OCBs are adequately rated and regularly maintained;
- follow manufacturer's maintenance procedures;
- consider older electrical equipment may require increased maintenance;
- ensure there are procedures in place covering action to be taken after trips on high voltage circuits, and in the event of an emergency;
- identify what arc flash personal protective equipment is required;
- do not store flammable materials in or around equipment;
- ensure the switch room doors are readily accessible and include provision for quick egress;
- to reduce risk to acceptable levels, it may be necessary to move the operator away from the circuit breaker cabinet, and use remote open and close facilities or another mechanism.

Two similar incidents that occurred recently in the Western Australian mining industry are currently being investigated by Resources Safety.

Code of Practice

WORKING HOURS 2006

(including working hours risk management guidelines)

The working hours code of practice may be downloaded from the Resources safety website at www.docep.wa.gov.au/ResourcesSafety or hardcopies are available for purchase from WorkSafe (contact Dave Dewar on telephone 9327 8775 or email ddewar@docep.wa.gov.au).

New technology

for emergency response monitoring

In 1903, Bernhard Dräger designed a closed-circuit breathing apparatus, which was used for many years in European and American fire fighting departments. The Dräger breathing devices and other safety equipment produced by the German company grew so popular in the mine rescue business that underground rescue workers were eventually referred to as 'Drägermen' — visit www33.brinkster.com/iiiii/gasmask/page.html for more interesting information about the evolution of gas masks.

Over a century later, Dräger Safety continues to supply emergency response equipment.

The DrägerMan Merlin has just arrived in Australia, although the telemetry system is already being used in Europe. This innovative product was profiled at the 2006 Goldfields Mining Expo. It allows the status of up to 12 emergency response personnel to be monitored simultaneously and external to the incident being attended.

Draeger Safety Pacific Pty Ltd demonstrated the new technology, which is a fully automatic, electronic entry control system incorporating a control board, the DrägerMan Bodyguard II (a warning and monitoring device used with compressed air and closed-circuit breathing apparatus), and a portable radio unit.

The control board is a battery-operated self-contained unit with built-in radio transmitter and antenna. It is moulded with carrying handles for maximum portability and can also be mounted onto the fire tender. The board is robust and especially designed to withstand the demands of fire service daily wear and tear.

The breathing apparatus and radio are combined with a pressure gauge, temperature monitoring, whistle warning unit and distress unit in a single instrument. The wearer receives constant status updates, and the unit provides automatic status updates and manual communication with the base.

The radio frequency used by the system has now been granted by the relevant authorities. Apparently, Australian fire fighting organisations are already looking at installing the system.

More information is available at www.draeger-safety.com.au

Craig's Mining Service

In the previous issue of MineSafe, the web address given for Craigs Mining Service was incomplete. It is www.craigsmining.com.au

Training for new technologies

The new oil-filled 'Sealed Integrated Braking System' (SIBS) that featured in September's issue of MineSafe is providing apprentices with an opportunity to be trained in new technology.

Safe Effect Technologies, which developed the brakes specifically for mining vehicles, has donated a unit to the Curtin Vocational Training and Education Centre (VTEC) to ensure students are qualified installers.

The brake units are fitted to the rear wheels of Toyota Land Cruisers and replace the normal braking system.

The VTEC automotive apprentices will be trained to install the units, which are becoming popular with mine site vehicles. The brakes are well suited to off-road mining work where dust, dirt, water and corrosive elements all have an impact on braking performance.

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Significant incident report

All bulletins and significant incident reports are available online at www.docep.wa.gov.au/ResourcesSafety in the mining section

Significant Incident Report No. 140
Released 11 November 2006

Service truck tyre failure

Incident

Recently, a fitter in a park-up area escaped with minor injuries when a service truck tyre burst two to three metres away. The fitter noticed smoke coming from a wheel and had alighted from the service truck to investigate what he suspected to be a dragging brake. Believing the S-cam brake was jammed, he hit it with a hammer. He stepped back to reassess the situation, knowing the tyre was hot and the S-cam was not jammed. The tyre on the truck then burst, with the resulting air-blast lifting rocks and grit off the ground, striking him. Fortunately, he only sustained abrasion injuries. The injuries could have been worse had the fitter been closer or not wearing correct personal protective equipment (PPE).

Causes

- On investigation it was found that the truck was driven with the park brake at least partially applied and the brakes were out of adjustment.
- Also, there was a lack of adequate knowledge by site personnel of the risks associated with being close to overheated truck tyres and the potential for a sudden release of energy.

Recommendations

To prevent situations similar to the above, management must ensure that:

- brakes are regularly tested and maintained within manufactures recommended tolerances;
- tyre inspections are carried out daily by competent employees to identify and monitor defects and wear;
- tyre rotation and discard criteria are developed in accordance with manufacturer's recommendations;
- employees are made aware of the potential for tyre rupture due to wear, spillage, overheating and poor operating techniques — this should be addressed in operator training;
- an exclusion zone of at least 300 m is established for a 24-hour period if it is suspected that a tyre may rupture; and
- employees wear appropriate PPE, especially when equipment is operating in their vicinity.

Information relating to similar incidents is given in *Significant Incident Report Nos 122 and 130*. The Resources Safety publication Tyre Safety, Fires and Explosions — Guideline contains guidance on avoiding or minimising hazards associated with tyres.

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What's new on the web

To find out what's new on the Resources Safety website, add www.docep.wa.gov.au/ResourcesSafety to your list of favourites and keep an eye on the billboards at the right-hand side of the homepage. The billboards link directly to significant new material and are a quick guide to what's been added recently. If you experience problems using the site or have any ideas to improve its navigability or content, please contact 9222 3229 or ResourcesSafety@docep.wa.gov.au — your input is welcome.

www.docep.wa.gov.au/ResourcesSafety

Department of **Consumer and Employment Protection**
Government of **Western Australia**

Resources Safety

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