Resources Safety matters

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Government of **Western Australia**
Department of **Mines and Petroleum**
Resources Safety

ALARP ATTRACTS A CROWD AT INDUSTRY FORUM

FOCUS ON EFFECTIVE SUPERVISION IN MINING OPERATIONS

FLYING WITH LITHIUM BATTERIES – WHAT'S THE PROBLEM?

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As we turn to face the challenges that await us in 2015, it is also time to consider the events and experiences of 2014 that will have a lasting impact. The resources sector in particular experienced some significant milestones during the past year that we will build upon as we strive forward.

Firstly, a number of major construction projects transitioned into the commissioning and production stage of their development. This change has altered the various risk profiles and employment demographics found on these sites, offering us unique safety management challenges.

The financial climate has also changed substantially, with commodity prices for iron ore, oil, gas and coal experiencing negative generational adjustments. We will all need to keep a watchful eye on any resultant operational changes to ensure that the focus on a strong safety culture is not lost as companies seek to tighten their belts.

In a recent conversation with a key stakeholder, it was stated that during such periods of change the impacts on safety become evident after a period of three to four months as cost savings are identified and implemented at the expense of safety. This means that any change of management processes require a very high level of diligence to prevent unforeseen adverse effects. The first half of the year will be a critical time as these adjustments consolidate.

The safety inspectorates will continue to engage proactively with the industry, and seek to address issues that are a reality in the workplace, in a manner that benefits all.

The development of a new legislative framework will be a major advance for the Western Australian resources sector, a process during which we are committed to a wide range of meaningful engagements with our stakeholders. This will be guided by the Ministerial Advisory Panel (MAP) and is expected to include a further two Regulation Impact Statements (RISs).

The outcome of the initial Consultation RIS, which will define the adopted legislative model, is expected to be finalised early in the next few months.


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Unfortunately, 2015 started with a work-related fatality at Woodie Woodie manganese mine.

As the new year gets underway, I remind everyone to take care – the decisions you make and actions you take can have far-reaching and unintended consequences.

Simon Ridge
Executive Director Resources Safety
16 February 2015

LOOKING AFTER THE NEXT GENERATION

In January 2014, Michael Wolter joined the Resources Safety Division of the Department of Mines and Petroleum as a Graduate Officer in the field of dangerous goods safety. Here he writes about his time in the Graduate Program.

GRADUATES AT THE DEPARTMENT

As well as experienced staff, some State Government departments recruit graduates for their respective graduate programs. The Department of Mines and Petroleum's Graduate Program provides a structured career path over 18 months, focussing on training and activities that accelerate personal and professional development.

The program comprises six three-month rotations between participating divisions. External organisations may be included if the opportunity arises where placement is beneficial to both parties. Participants are presented with fantastic opportunities to learn and develop their skills in new and challenging environments.

In 2014, collaboration between Resources Safety and BHP Billiton Iron Ore allowed me to spend one of the three-month rotations gaining highly relevant industry experience.

At BHP Billiton Iron Ore, I joined the Integrated Operations Mines team and worked with the Drill and Blast Department to further my practical understanding of dangerous goods safety, particularly explosives. I spent time in the Perth office as well as on site. Activities ranged from hands-on time with a blast crew to attending forums with drill and blast supervisors and superintendents.

While with the blast crew on site, I observed the delivery of security risk substances, spent time with mobile processing unit (MPU) operators, primed and loaded holes, and saw how explosives and security risk substances are handled and managed on a daily basis.

I also participated in an audit of mining operations at the Jimblebar, Eastern Ridge, Mt Whaleback, Yandi and Mining Area C mines, using the BHP Billiton Iron Ore's blasting compliance document, which incorporates information from applicable Australian Standards and regulations. This document provides a central resource for workers on the ground to ensure they comply with legislation and follow safe practice.

I would like to thank BHP Billiton Iron Ore, in particular Patsy Mitchell (Manager Drill and Blast) and Derek Wilson (Officer Governance), for facilitating this opportunity and providing guidance over the three months. This rotation has highlighted the benefits of cooperative relationships between industry and the regulator, and having open lines of communication. It has given me a greater appreciation of industry's perspective.

By working together, we can ensure compliance with regulations, and most importantly, a safe working environment for all personnel. I am looking forward to a second industry placement in 2015.

To find out more about graduate opportunities in the Western Australian Public Sector, visit **www.gettingajob.dpc.wa.gov.au/GraduateOpportunities**

Samantha Pollock visiting Fremantle Port's Kwinana Port Operation

The Jim Torlach Scholarship honours the memory of James (Jim) Milne Torlach (1938-2006), who made an outstanding contribution to the improvement of safety and health in the mining industry in Western Australia. Funded by the Mining and Resources Training Association (MARCSTA), the scholarship pays the recipient's course fees while they complete a Bachelor of Science (Health, Safety and Environment) at Curtin University.

SAMANTHA LENDS AN ANALYTICAL EYE

Samantha Pollock, the 2012 Jim Torlach Scholar, spent the 2012-13 summer break with Resources Safety gaining on-the-job experience as part of the scholarship program. Her story can be found in the May 2013 issue of *Resources Safety Matters* magazine.

As part of her coursework, she recently completed a project that aimed to help mines inspectors in the Pilbara Team improve the safety performance of mining operations in the northwest by identifying the key messages learnt from notifiable incidents reported over a one-year period

Initially, Samantha analysed all notifiable incident reports submitted to Resources Safety for 2013. She then undertook a more detailed analysis of potentially serious occurrences (including near misses), the most commonly reported incident category.

Note: Identifying information was removed from the reports provided to Samantha.

Her analysis found that incidents associated with construction activities accounted for over half the reports that involved potentially serious occurrences. There was a peak in these incidents during March 2013, a smaller peak in July, and from there a gradual decrease in the monthly number to the end of the year.

Mobile equipment was involved in 80 per cent of the potentially serious occurrences, with light vehicles being the most common, followed by trucks, haul trucks and cranes. Unintended interaction with other equipment was the most commonly reported outcome, followed by equipment damage and loss of control. In particular, manoeuvring and reversing were issues, as was the failure to follow established procedures.

Samantha's report identified driving as the task most frequently involved in the potentially serious occurrences. She noted that this is consistent with international statistics, which identify work-related driving as a common cause of injury. She also noted that Resources Safety has previously released toolbox presentations and published articles regarding road safety on mine sites, identifying potential factors contributing to incidents and highlighting the influence of organisational factors.

Samantha made a number of recommendations in her report, including the need for:

- company-specific driving management strategies to identify relevant hazards and the most effective controls
- industry reporting of "near misses" to be improved so that identifying and focusing on high frequency categories is easier
- Resources Safety's traffic management audit to include an assessment of driver behaviours, in combination with organisational features
- continued efforts by everyone to raise awareness of driving and traffic management issues on mining operations, including sharing lessons learned.

She also suggested increasing the data sample size over a longer period to establish whether the March peak in reporting frequency is an annual feature and, if so, whether there are opportunities to address the contributing causes.

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Mobile autonomous mining working group with delegates from the international ISO 17757 committee

WA HOSTS INTERNATIONAL STANDARDS MEETING

Dr Dan Roley chairs the International Organisation of Standardisation (ISO) Technical Committee 127 developing global safety standards for earth-moving machinery. Following a proposal presented at its London meeting in early 2014, the Committee accepted an invitation from the Department of Mines and Petroleum to hold its next meeting in Perth.

The three-day meeting in September 2014 was hosted by the Department and Chamber of Minerals and Energy WA, and attended by Committee members from across the globe.

The first day was set aside for a workshop to discuss Western Australia's draft guidance for the safe implementation and operation of autonomous mining systems in Western Australia, and share information on the intent and content of ISO draft standard 17757. The guidance documents were developed by the Mobile Autonomous Mining Working Group, which was established in early 2014 and comprises representatives from equipment manufacturers, mining companies and technology experts, as well as the regulator, Resources Safety.

"The technical committee develops commercial and safety standards for machines used in earth-moving, mining, and general construction," Dr Roley said. "We continually develop new standards and revise current standards to address new types of machines, new applications and new technology.

"The ISO standards are developed with cooperation between machine users, health and safety organisations, and manufacturers to achieve the common goal of developing machines that can be used safely."

"The workshop offered a good opportunity to have input from Australian experts as we develop these global safety standards," Dr Roley said.

The Department's Director Mines Safety Andrew Chaplyn said that sharing information at the workshop had benefited both parties.

"Our State is the first jurisdiction in the world to develop safety guidance covering autonomous equipment in the mining industry," Mr Chaplyn said. "Western Australia is at the forefront in the use of this technology, so it makes sense that we provide input into the development of the ISO standards from a regulator and operator's perspective.

"With ISO holding its technical committee meeting here in Perth, we were able to liaise with international experts in the field and review the guidance to ensure the best safety outcomes for the industry in WA."

Significantly, the local working group provided input into the ISO draft standard that led to the Committee changing its focus to autonomous mining systems, rather than simply machines, and incorporating substantial sections of Western Australia's draft guidance. Dr Roley commented that he found the working group's contribution invaluable due to its collaborative approach and broad representation.

Mines and Petroleum Minister Bill Marmion said that he was honoured to see an international organisation like ISO in Western Australia listening to our regulators and industry.

"For more than 65 years, ISO has been developing safety standards that apply to industries around the world," Mr Marmion said.

"The decision to hold the event in Perth is evidence of Western Australia's globally recognised expertise in automation in the resources industry."

VIDEOS LIFT OFF FOLLOWING LAUNCH

The ability to correctly identify potential hazards in the workplace is critical in reducing the severity and frequency of workplace accidents and incidents. If hazards are not recognised or understood, supervisors and workers will not be taking appropriate actions to eliminate them or reduce the risks.

It was with this in mind that the Department of Mines and Petroleum released the first three titles in its Know Your Hazards video series. Developed for the Western Australian resources industry, the short educational videos help explain the principles behind some common hazards encountered in the resources industry that have injured or killed people.

The first three videos are grouped under the theme *Raising the issue* and focus on key areas of concern when rigging, dogging and lifting. They cover the concepts of centre of gravity, friction and tensile strength. These are issues that have led to fatalities, serious accidents and near misses in recent years.

Mines and Petroleum Minister Bill Marmion launched the videos on 8 October 2014 at The CUT Mine, the world-class underground mining training facility at the Central Institute of Technology. Mr Marmion said that it was crucial to raise issues about often-unrecognised mine site hazards.

"This is about saving lives, and what could be more important?" he said.

The first public screening of the videos was as part of the 2014 Mines Safety Roadshow, in conjunction with a presentation to support the understanding of concepts.

The videos may be shared or downloaded and distributed for educational purposes. They are available at **www.dmp.wa.gov.au/20908.aspx**, as is the accompanying toolbox presentation.

HOW MANY HITS?

Statistics from **vimeo.com** as at 16 February 2015

Topic	No. of plays
Centre of gravity	2,677
Friction	1,316
Tensile strength	1,027

THE CUT MINE – DID YOU KNOW?

About 1,000 prospective miners have trained in The CUT Mine since it opened in a massive service tunnel under Aberdeen Street, Northbridge, in 2009.

Trainees are exposed to virtual blasting, drilling, dewatering and simulated emergency drills including the use of a refuge chamber.

A mine training centre based on The CUT Mine has been built in New Delhi, India.

Visit **www.central.wa.edu.au to** find out more about this facility.

Bill Marmion, Simon Ridge and Andrew Chaplyn with Central Institute of Technology students and staff

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MIAC
MINING INDUSTRY ADVISORY COMMITTEE

MIAC UPDATE

The Mining Industry Advisory Committee (MIAC) has met once since the last issue of *Resources Safety Matters*. Some matters considered at the October 2014 meeting were:

- **Working at height in underground mines – Guideline**

  MIAC endorsed the draft guideline subject to minor amendments. The publication was two years in development and covers a range of issues faced by those working at height in the underground environment. Its primary aim is to raise awareness of situations that might not be encountered when working at height on the surface. The guideline is not intended to be a training manual on how to work at height or use fall protection systems, nor is it a summary of the relevant Australian Standards.

- **Effective safety and health supervision in Western Australian mining operations – Guideline**

  Following extensive industry consultation, including Mines Safety Roadshow workshops and two periods of public comment, the draft guideline was submitted to MIAC for endorsement. The guideline focuses on frontline supervision rather than statutory appointments or daily management requirements.

  The importance of such guidance is demonstrated by the Department of Mines and Petroleum's review of mining fatalities for 2000 to 2012. Over this period, workers within the first two years on a job were at greater risk of a fatal accident, and even more so when the supervisor had less than three years' experience in the role.

  The guideline was endorsed.

- **Other discussions**
  - possible under-reporting of working hours in the exploration sector
  - media article dealing with diesel emissions in underground mines
  - Ebola virus in the mining industry
  - clarification of rigging requirements on mine sites
  - guidance for principal hazard management plans
  - commuting and working long shifts.

Visit **www.dmp.wa.gov.au/14390.aspx** to view the minutes of MIAC meetings.

WHAT IS MIAC?

MIAC is a body established to advise the Minister for Mines and Petroleum and the Department on matters relating to occupational safety and health in the mining and exploration sectors.

The committee is a tripartite body as its members are drawn from industry, the unions and Government. It also has expert members who have been chosen for their practical expertise and experience in mining or exploration.

Visit **www.dmp.wa.gov.au/14390.aspx** for detailed information about MIAC, including its statutory functions and confirmed minutes from meetings.

Queries

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SAFETY REGULATION SYSTEM – LOOKING FORWARD

Resources Safety has adopted a new vision for the online Safety Regulation System (SRS) to reinvigorate the process for its development and firmly establish it as an integral part and enabler of the Reform and Development at Resources Safety (RADARS) strategy.

WHAT'S THE NEW VISION FOR SRS?

> *SRS is the core system used by all staff and external stakeholders enabling them to conduct their business of improving safety outcomes.*

SRS is an evolving overarching system that already works across a wide span of activities broadly involving three elements:

- replacement of legacy systems
- development of entirely new systems
- redevelopment and enhancement of existing systems.

HOW WILL THIS BE ACHIEVED?

Resources Safety has devoted considerable resources to the SRS development program to support the new vision.

A full-time project manager has been appointed to better coordinate delivery of the system by ensuring the application development life cycle leverages the most relevant and current technology and programming techniques.

Within Resources Safety, there is now a project coordinator with overall responsibility for SRS development, and additional resources have been committed to working groups. This includes two staff assigned full time to dangerous goods projects and the equivalent of four staff for mining projects, including expertise from the mines inspectorate, business improvement and training. This will ensure:

- objectives are identified and understood
- the system design meets these objectives
- the system is properly tested and implemented.

Under this new governance structure, new systems are being "built once and built right", which is more efficient.

More importantly, value-adding opportunities are being recognised, such as:

- automation of manual processes
- increased ease of use through improvements to screen designs
- inclusion of system self-checks
- improved process efficiencies while reducing paper-based transactions
- support for legislative requirements and policies
- the capacity to use and analyse data to drive safety initiatives, business management and service improvement.

WHAT'S COMING?

Mining and petroleum companies are familiar with the functionality already rolled out, such as online incident and accident reporting, safety levy assessment, submission of project management and radiation management plans, and online renewals for dangerous goods security cards.

In 2015, many new modules will be implemented and there will be a step change in the role of SRS.

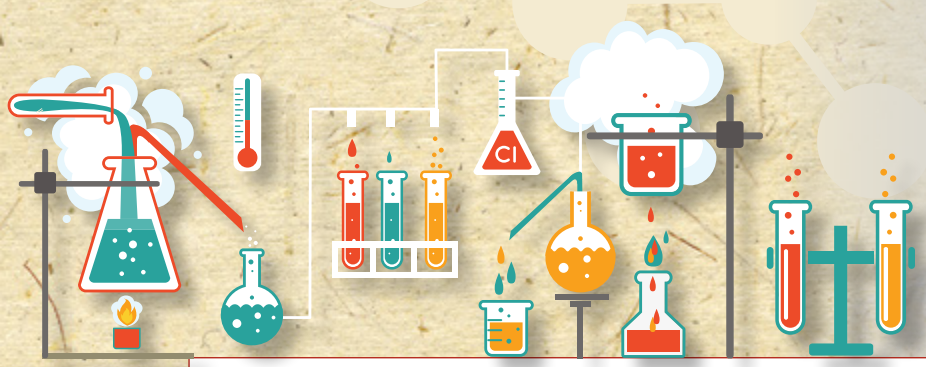
For dangerous goods, this will include the management of new licences for dangerous goods drivers, shot firers, explosives drivers and dangerous goods sites. Together, the licensing elements will largely replace the existing HAZMAN licensing system and should lead to significant improvements in business efficiency, service timeliness and effectiveness.

For the mining area, new modules will include:

- notification of appointments
- Dropbox submission
- mines records
- safety and health representatives
- online contamination data lodgement
- notification of operations
- audits and notices.

The development program for 2015-16 is being finalised but should also include the petroleum safety area.

Affected industry stakeholders will be kept fully informed as modules and new functionalities are rolled out, and training will be provided as required.



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OCCUPATIONAL HEALTH STALWART RETIRES

Resources Safety's Principal Health Advisor Mike Rowe retired from the Department of Mines and Petroleum in late 2014 after more than 40 years of government service.

Mike started working for the Government Chemical Laboratories in 1971 as a food chemist.

"It was a great place to work because of the range of experience," Mike said. "This included food chemistry, forensic science, environmental monitoring, pesticide analysis and occupational health work.

"At first, the occupational health work mainly involved analysing samples, but soon included going out and collecting samples, undertaking assessments and preparing reports for the Department of Occupational Health, Safety and Welfare (now known as WorkSafe)."

Within a few years, Mike had also started assisting the Mining Operations Division.

"This involved investigating accidents and incidents," he said. "By the mid-1980s, field work extended to up to two weeks at a time undertaking occupational health inspections."

When the Government Chemical Laboratories were restructured and renamed the Chemistry Centre, Mike was named as Chief of Health Chemistry.

"A further restructure in 1992 combined a number of laboratories," he said. "Fortunately, my mine site experience allowed me to transfer to the Mining Operations Division in 1992 as the Principal Occupational Hygienist."

Constant change has been a feature of Mike Rowe's career.

"A big advantage of being in a large department is that every three or four years I seemed to change direction and have new challenges," he said. "Nevertheless, occupational health remained a focal role."

Simon Ridge, Executive Director Resources Safety, said that Mike had committed his career to improving occupational health and safety in Western Australia.

"It has truly been an extraordinary career that has covered so many different aspects of safety — from radiation safety and asbestos management, to process safety and managing safety databases," Simon said.

"I doubt there is anyone that has more expertise across such a wide range of safety areas."

Mike said that the diversity of the work was one of the main reasons that kept him in the public sector.

"The diversity of work and expertise at the department are second to none," he said. "Over the years, I dealt with every division and the thing I noticed is that if you had a problem, you could always find someone in the department to help you out.

"There's a huge talent pool in Resources Safety. I think the range of experience and skills is something that's probably unique to the Department among agencies in WA."

SAFETY PRIORITIES FOR 2015

Leadership and accountability

Areas of concern

- Risk management practices
- Process safety management
- Continuous improvement
- OSH representative involvement

Management of change

Areas of concern

- Engineering management
- ALARP principles
- Technical competence
- Safety in design

Lessons learned

Areas of concern

- Incident and/or accident investigations
- Corrective action closure
- Emergency management preparedness
- Competency and training

DANGEROUS GOODS AND PETROLEUM SAFETY

SAFETY PRIORITIES FOR 2015

At the beginning of a new year, we all have the opportunity to reflect on the year that was and plan for what lies ahead in the coming year. Planning for safety is no different than any other program in the business planning cycle.

The Department of Mines and Petroleum, including the Resource Safety Division, must also organise its activities. The regulator considers the plans and opportunities for the industries it regulates to determine the safety priorities for stakeholder engagement.

Resource Safety interacts with many companies in Western Australia. My observation is that a significant number of those companies believe that safety is more than just a process. Personal accountability from the top down makes a significant difference to safety outcomes.

The application of the safety case regime and safety management system elements provides an excellent framework for maintaining and improving safety performance. Importantly, the first element in a safety management system is usually leadership and accountability, which is a focus for the safety regulator in the coming year.

In terms of process safety, Resources Safety is interested in management's association with key safety elements and how managers both demonstrate and take personal accountability for safety outcomes.

In 2014, the Six Pillars of Dangerous Goods Transport information sessions were well attended and the feedback was very positive. This program will continue in 2015 to inform and educate those in the transport industry regarding the key issues for dangerous goods safety.

Some significant ammonia and chlorine leaks affected the Western Australian public in 2014. There was also the ammonium nitrate explosion of a transport vehicle in central Queensland. Significant as these incidents were, under different circumstances, the outcomes could have been worse and the safety regulator is working with industry to raise awareness of the issues to prevent a recurrence. A review is underway of these and other dangerous goods incidents both locally and nationally in 2014 so the learnings can be shared.

Ross Stidolph
Director Dangerous Goods and Petroleum Safety
and *Chief Dangerous Goods Officer*

MINES SAFETY

The Department of Mines and Petroleum publishes an annual digest covering safety performance in the Western Australian mineral industry. The 2013-14 report is now available. I have taken the liberty of reproducing the introduction here because it sets the scene for what we need to be thinking about in the coming year.

The loss of five lives in work-related accidents in 2013-14 is in stark contrast to the outcome for Western Australian mining operations in 2012-13, which was the State's first year on record with no fatalities — and almost 24 months between fatal accidents. Everyone involved in mining must commit to making a difference if the aspirational goal of "zero harm" is to become an imbedded reality and not achieved only occasionally.

For the first time, the names of the people who lost their lives are included in this report to pay respect and acknowledge their place in the mining workforce.

In early 2014, the Department of Mines and Petroleum released a report that analysed 52 mining fatalities between 2000 and 2012. The report highlighted trends and clusters that appear significant, and reinforced key areas of focus for the regulator and industry to drive safer outcomes for the minerals sector:

- improving hazard awareness and control selection
- promoting the adoption of appropriate risk management strategies
- supporting effective leadership and positive cultural change.

Although Western Australia has an enviable safety record compared to some jurisdictions, there is a commitment across the board for everyone to go home safe from work. However, the safety performance indicators are showing few or no signs of improvement. While there was a decrease in the number of serious injuries, the number of notifiable incidents, which includes potentially serious incidents or "near misses", remains unacceptably high. But for millimetres or seconds, some could have resulted in more serious consequences or even fatalities.

The challenge for everyone is how to achieve the next step-change in safety performance.

As mining operations continue to take more responsibility for the safety of their own workforces, and strive to be resilient, there needs to be a concerted effort to move away from administrative controls, which rely on worker's judgement for implementation, to more effective controls using elimination, substitution and engineering methods.

The suitability of training and inductions, assessments of competency, and appropriateness of risk management tools applied to work tasks should also be reviewed in consultation with the workforce to identify potential improvements. The average employment levels remained above 100,000, with many operations transitioning from the construction to production phase in 2013-14. It is hoped that the increasing experience of the workforce, together with the strategies outlined above, will translate into improved safety outcomes for the Western Australian minerals sector.

Andrew Chaplyn
Director Mines Safety and *State Mining Engineer*

2015

APRIL

17 — **ALARP INDUSTRY FORUM***
17 April, Perth

www.dmp.wa.gov.au/events

MAY

01 — **SURFACE MINE EMERGENCY RESPONSE COMPETITION**
1-3 May, Kalgoorlie

www.cmewa.com

JUNE

26 — **EXPLORATION INDUSTRY FORUM***
26 June, Perth

www.dmp.wa.gov.au/events

JULY

17 — **EXPLORATION INFORMATION SESSION**
17 July

www.dmp.wa.gov.au/events

24 — **TRUCK AND TRAILER SHOW**
24-26 July, Perth

www.perthtruckshow.com.au

AUGUST

12 — **THE AUSIMM NEW LEADERS' CONFERENCE 2015**
12-13 August

newleaders2015.ausimm.com.au

NOVEMBER

06 — **UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION**
6-8 November, Kalgoorlie

www.cmewa.com

13 — **CRITICAL RISKS INDUSTRY FORUM***
13 November, Perth

www.dmp.wa.gov.au/events

27 — **THE MERC 2015**
27-28 November, Perth

Any teams or sponsors wishing to get involved can send an email to enquiries@themerc.com.au or have a look at the website www.themerc.com.au

OCTOBER

01 — **SAFE WORK AUSTRALIA MONTH**
All of October

01 — **SIX PILLARS OF DANGEROUS GOODS TRANSPORT***
1, 2 and 5 October, Perth

www.dmp.wa.gov.au/events

13 — **2015 MINES SAFETY ROADSHOW***

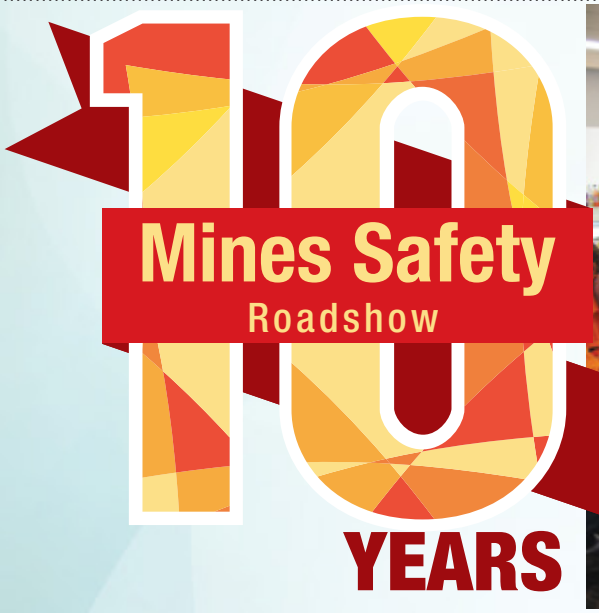
13 October, Geraldton
15 October, Bunbury
20 October, Port Hedland
21 October, Karratha
22 October, Newman
27 October, Kalgoorlie
29 October, Mandurah
30 October, Perth

www.dmp.wa.gov.au/events

** Provisional – to be confirmed*

The events listed are either presented by Resources Safety or involve Resources Safety staff.

Latest event information at www.dmp.wa.gov.au/events or use the QR link.

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A DECADE OF MINES SAFETY ROADSHOWS

A lot can happen in ten years. Back in 2005 there were about 45,000 people working in the State's mining industry. The minerals and energy sector was worth about AUD39 billion and iron ore had just overtaken crude oil and natural gas condensate as Western Australia's most valuable commodity.

A decade later and there are more than 100,000 people working in the industry. The minerals and energy sector is now worth more than AUD121 billion, and iron ore has increased its dominance as the State's most valuable commodity.

Just as these indicators have grown, so too has the Department of Mines and Petroleum's Mines Safety Roadshow.

"Certainly the popularity of the roadshows has grown significantly over the past decade," Mines Safety Director Andrew Chaplyn said.

"In 2014, the roadshows criss-crossed the State during the month of October, which is Safe Work Australia Month, and featured the highest attendance figures yet."

More than 760 registrations were received in 2014 compared to 340 for the first Roadshow back in 2005. Audiences typically comprise safety and health representatives, supervisors, managers and others responsible for safety and health in the minerals industry.

But it's not just the number of registrations that has increased. The Roadshow travels to eight locations across the State including Geraldton, Bunbury, Kalgoorlie, Newman, Karratha, Port Hedland, Perth and, new this year, Mandurah.

Mandurah was added to the itinerary to allow a growing number of participants to attend. Companies based south of Perth were able to send multiple attendees because of the convenient location and less onerous travel requirements.

Andrew said that the event was designed around a simple question – what can we do to help improve safety in Western Australia's mining industry?

"The first roadshow was held in 2005 and, while the event may have grown significantly in the ten years since, the key question remains the same," Andrew said. "It will always be relevant because safety evolves."

"Whether we are looking at safety from an industry perspective, or safety from a regulator's perspective, there will always be improvements we can make.

"It is our passion to improve mining safety that drives us as an inspectorate, and the Mines Safety Roadshow really allow us to highlight important, topical issues that can affect industry outcomes."

In 2014, each roadshow event kicked off with a recorded welcome from Mines and Petroleum Minister Bill Marmion.


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The opening address acknowledged not only the Department's but also the participant's commitment to safety, as well as positive cultural change.

This year's Roadshow also included special screenings of the new series of hazard awareness videos.

A large part of the success of the Roadshow series is the interaction with the audience. Presentations are followed by workshops and participants are encouraged to engage in activities.

Following the videos on centre of gravity, friction and tensile strength, participants were asked to bend a piece of wire until it broke and count the number of cycles before failure. They were then asked to do it again, but this time with a wire with a very small nick in it. The number of cycles to failure was usually much lower.

The activity demonstrated that any damage sustained while using lifting gear could shorten the equipment's safe working life significantly, and might set up a hazardous scenario for other workers.

The roadshows also focused on Resources Safety's three priority areas for mining.

"Our priorities are improving hazard awareness and control selection; promoting the adoption of appropriate risk management strategies and supporting effective leadership and positive cultural change," Andrew said. "Our interactive sessions explored risk assessment on the job, the isolation of hazardous energies, and highlighted the availability of audits for mobile equipment on mines."

Inspectors were encouraged by the level of sharing during groups activities. Participants spoke of their experiences and consequential actions, contributing to the learnings of the day.

All attendees were asked to provide feedback and 80 per cent completed the survey. Overall the participants agreed that the sessions increased their knowledge and understanding of the topics. The majority felt encouraged to contribute to the discussions and 96 per cent said that they would probably attend the 2015 Mines Safety Roadshow.

When asked for suggestions for future roadshow topics, participants suggested that the 2015 program should comprise the standard state-of-the-State introduction followed by a focus on safety leadership and positive cultural change. These are also priorities for Resources Safety, having been identified for their importance to the next step-change in safety performance.

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SIX PILLARS SUPPORTING SAFE TRANSPORT OF DANGEROUS GOODS

Last October was Safe Work Australia Month 2014, an ideal time for the Department of Mines and Petroleum to launch its Six Pillars of Dangerous Goods Transport campaign. Industry information sessions were aimed at raising awareness of the correct (i.e. safe) way to handle and transport dangerous goods. The target audience was small companies and general freight hauliers transporting dangerous goods.

Dangerous Goods and Petroleum Safety Director Ross Stidolph said that the Six Pillars campaign provides important information around the "six pillars" of transporting dangerous goods – documentation, placarding, restraint, segregation, packaging and vehicle. Training is highlighted as the way to achieve competency.

"In the sessions, Dangerous Goods Officers provided useful guidance regarding these six pillars. They also looked at the roles and responsibilities of the safety regulator and transporter," Ross said.

Held over lunch in the industrial areas of Kwinana, Cloverdale and Wanneroo, the inaugural event attracted 145 registrants.

The midday session also presented the opportunity for transporters to engage with Dangerous Goods Officers and ask questions on how to transport safely.

"It was great to see such engaged audiences. The presentations were followed by question and answer sessions, during which several technical queries were addressed," Principal Dangerous Goods Officer Peter Xanthis said. "The technical discussions continued into the lunch break, which was pleasing.

"It has been encouraging to witness industry and government working together during the year to overcome some of our dangerous goods challenges," Peter said.

General industry information sessions are scheduled for October 2015. In the meantime, if you are interested in exploring the possibility of Six Pillars being presented at your company, please contact dgsb@dmp.wa.gov.au to discuss opportunities.

ALARP ATTRACTS A CROWD AT INDUSTRY FORUM

The term "as low as reasonably practicable", or its acronym ALARP, is often used in safety circles. But what does it actually mean for major hazard and petroleum facilities?

The answer to this question was the focus of the inaugural industry forum hosted by the Department of Mines and Petroleum's new Critical Risks Group in the Resources Safety Division.

Dangerous Goods and Petroleum Safety Director Ross Stidolph said that the event, held on 14 November 2014, was aimed at providing operators with an overview of the requirements to ensure risks are driven to as low as reasonably practicable.

"The forum also represented an initial conversation around what the regulator's expectations are," Ross said. "It is apparent that the oil and gas industry is undergoing generational change and is being refreshed by newer — and younger — individuals. In the context of understanding of process safety, it is important to not only understand how thing are done but also why they have evolved this way.

"Importantly, during the forum we looked at how to demonstrate and document this process to the standards expected by the Department of Mines and Petroleum. A better understanding of the ALARP process will help industry improve safety and the ongoing mitigation of risk.

"With a better understanding of what is considered to be 'reasonably practicable', the submission of safety cases and safety reports should be more efficient and effective for both industry and the regulator.

"The program finished with a reminder that people and systems are an integral part of facilities — and should not be overlooked in the risk management process."

Two industry professionals, with over 20 years of experience each, were invited to speak.

Graham Bower-White, Technical Director at TSRHorizons, has an extensive knowledge of the application of Australian safety case regulations. His presentation addressed what is reasonably practicable, as well as a two-step process for demonstrating that risks are ALARP.

Melanie Freeman specialises in the subjects of safety culture and culture change, adjusting to fly-in fly-out (FIFO) work arrangements, mental health and wellbeing at work. She spoke about human safety and risk management, and how to consider the people and systems.

The response was positive with registrations exceeding expectations. More than 140 people registered, representing a range of industry perspectives. All those who completed the event survey indicated that they would probably participate if a similar industry forum was held in 2015.

Participants were able to network and meet members of Resources Safety's new Critical Risk Teams over morning tea.

"Holding industry forums such as this will be an important focus for our Critical Risks Group as we continue to work with industry to highlight safety issues," Ross said.

"The value of raising awareness of ALARP issues with operators will help expedite the safety case and safety report approvals process by eliminating or minimising errors, and the need to review and rework information."

Toolbox presentations from the industry forum are available at www.dmp.wa.gov.au/21100.aspx

Resources Safety presenters Mr Barry Healy and Drs Su Ho and Neil Woodward with IM4DC participants
Photo courtesy The University of WA

SHARING SAFETY LEADERSHIP SKILLS

The Department of Mines and Petroleum's Resources Safety Division has shared its expertise with international visitors as a part of a short course on occupational health and safety leadership. Organised by the International Mining for Development Centre (IM4DC), it featured participants from 11 nations, including Fiji, Mongolia, Zambia and Peru.

The course ran between 17 November and 12 December 2014, and provided an overview of occupational health and safety management in the resources industry.

Resources Safety Division Executive Director Simon Ridge said that, as a global leader in the mining industry, it is important that Western Australia shares its knowledge across the world.

"Western Australia's mining industry is recognised not only for how it is operated, but also how it is regulated," Mr Ridge said.

"The State has some of the largest and most diverse mineral provinces in the world — we have almost 1,000 sites producing more than 50 mineral commodities.

"As regulators, this requires us to be knowledgeable across the range of safety risks these operations present."

Mr Ridge said that knowledge sharing was vital to ensure regulators have the depth of understanding required to do their jobs.

"I know Resources Safety is always seeking knowledge from other jurisdictions — not only here in Australia, but across the world," he said.

"When it comes to improving safety in the mining industry, sharing our collective knowledge and experiences can be one of the most powerful tools we have.

"It also allows us to learn from the experiences of others. This is particularly important for developing nations to ensure a safe, sustainable mining industry that benefits their communities."

The goal of the IM4DC short course is to develop the leadership skills of participants. It is expected they will then have the leadership skills to take a senior role in overseeing occupational health and safety in their home country's mining industry.

The Department was also involved in the program in 2013, and Mr Ridge said that the presentation by Resources Safety had been well received by participants, which was why the course organisers had been keen to include the Division in the 2014 program.

"I think they found it extremely valuable to hear about how the Department works with our stakeholders, particularly our emphasis on raising awareness of safety issues and seeking compliance, rather than relying solely on enforcement strategies," Mr Ridge said.

"The Resources Safety presentations really highlights the holistic approach to safety that is needed to achieve best practice safety standards."

SAFETY LEGISLATION REFORM – STATUS REPORT

The Department of Mines and Petroleum is working on the drafting of the *Work Health and Safety (Mines) Bill* and regulations.

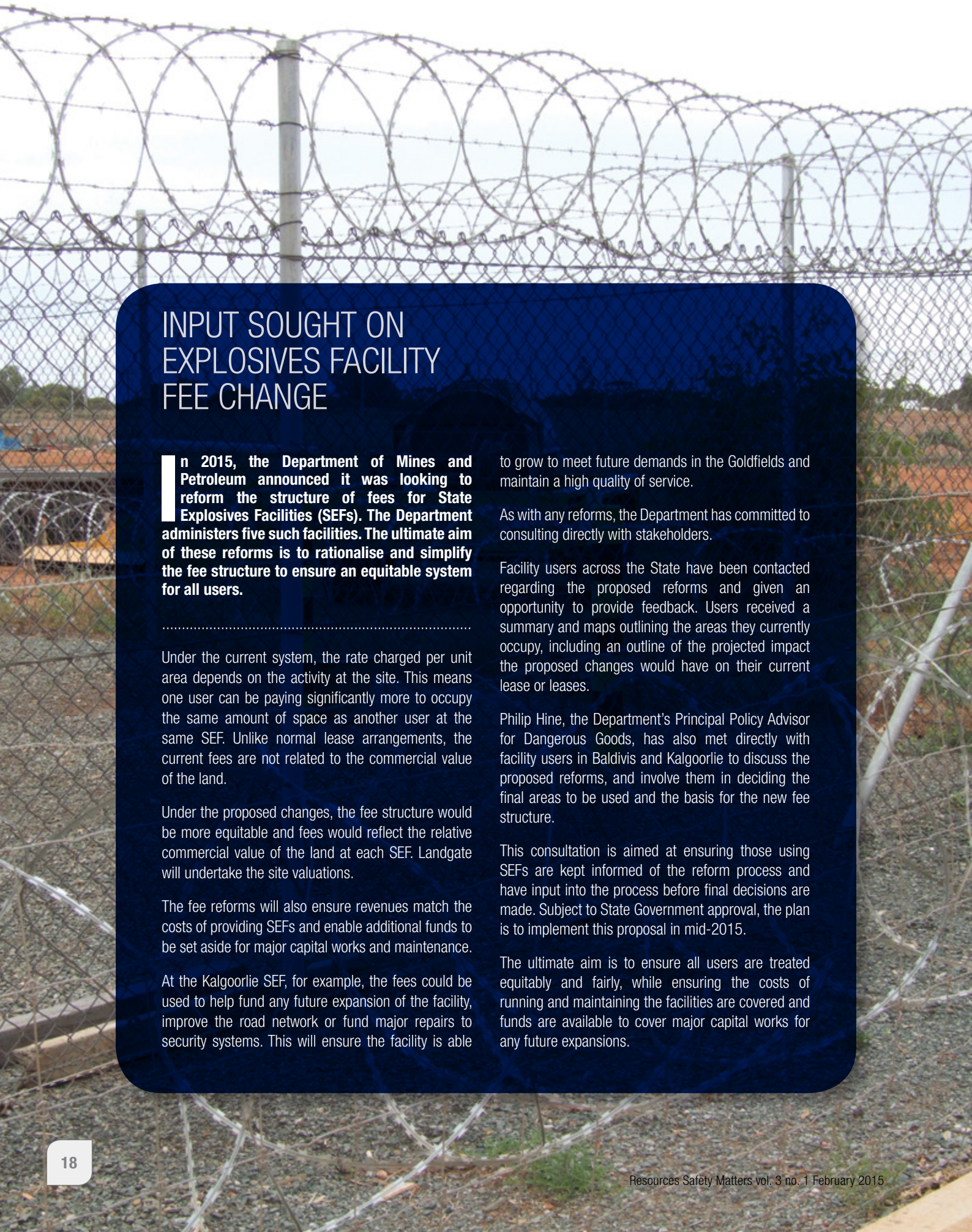
On 23 October 2014, WorkSafe tabled its *Work Health and Safety Bill 2014* (known as the Green Bill) in Parliament for public comment. Submissions closed on 30 January 2015. Further information on the Green Bill is available on the Department of Commerce website at **www.commerce.wa.gov.au/worksafe/work-health-and-safety-bill-2014**

To ensure consistency in the development of the Work Health and Safety regulations for mines and general industry, a Resources Safety officer will work part-time with WorkSafe throughout 2015, and a WorkSafe representative will be invited to attend meetings of the Ministerial Advisory Panel on Safety Legislation Reform, hosted by the Department of Mines and Petroleum.

The Department of Mines and Petroleum is finalising the Regulatory Impact Statement (RIS) consultation process to identify the preferred option for consolidating the safety legislation for mines, petroleum and major hazard facilities.

Marsden Jacob Associates was selected under a public tender to independently manage the consultation process. The Consultation RIS paper was released for comment on 31 October 2014. A stakeholder forum was held on 26 November 2014 to provide stakeholders with an opportunity to discuss the five proposed options. Written submissions closed on 19 December 2014.

Feedback from the Consultation RIS is being collated and incorporated into a Decision RIS. It is anticipated that the Minister for Mines and Petroleum will decide on the preferred option by 31 March 2015.



INPUT SOUGHT ON EXPLOSIVES FACILITY FEE CHANGE

In 2015, the Department of Mines and Petroleum announced it was looking to reform the structure of fees for State Explosives Facilities (SEFs). The Department administers five such facilities. The ultimate aim of these reforms is to rationalise and simplify the fee structure to ensure an equitable system for all users.

Under the current system, the rate charged per unit area depends on the activity at the site. This means one user can be paying significantly more to occupy the same amount of space as another user at the same SEF. Unlike normal lease arrangements, the current fees are not related to the commercial value of the land.

Under the proposed changes, the fee structure would be more equitable and fees would reflect the relative commercial value of the land at each SEF. Landgate will undertake the site valuations.

The fee reforms will also ensure revenues match the costs of providing SEFs and enable additional funds to be set aside for major capital works and maintenance.

At the Kalgoorlie SEF, for example, the fees could be used to help fund any future expansion of the facility, improve the road network or fund major repairs to security systems. This will ensure the facility is able to grow to meet future demands in the Goldfields and maintain a high quality of service.

As with any reforms, the Department has committed to consulting directly with stakeholders.

Facility users across the State have been contacted regarding the proposed reforms and given an opportunity to provide feedback. Users received a summary and maps outlining the areas they currently occupy, including an outline of the projected impact the proposed changes would have on their current lease or leases.

Philip Hine, the Department's Principal Policy Advisor for Dangerous Goods, has also met directly with facility users in Baldivis and Kalgoorlie to discuss the proposed reforms, and involve them in deciding the final areas to be used and the basis for the new fee structure.

This consultation is aimed at ensuring those using SEFs are kept informed of the reform process and have input into the process before final decisions are made. Subject to State Government approval, the plan is to implement this proposal in mid-2015.

The ultimate aim is to ensure all users are treated equitably and fairly, while ensuring the costs of running and maintaining the facilities are covered and funds are available to cover major capital works for any future expansions.

PERSONAL EXPLOSIVES LICENCE HOLDERS ENCOURAGED TO RENEW SECURITY CARDS ON TIME

Holders of personal explosives licences, such as shotfirers, drivers and fireworks operators, who no longer have a valid dangerous goods security card will have their licence suspended, rather than cancelled, until their security card is renewed.

Simon Ridge, Executive Director Resources Safety, said that this approach was made possible following legislative amendments in 2014.

"Until this amendment was introduced, licences were automatically cancelled when they expired," Mr Ridge said. "This meant that licence holders were required to go through the whole licencing process again, as well as regaining their security clearance. This was expensive and time-consuming.

"Under the amended regulations, licences are now suspended until the licence holder has a current security card."

Mr Ridge said that more than 18,500 dangerous goods security cards have been issued by the Department of Mines and Petroleum since 2009.

"The cards must be renewed every five years, so there will be a large number coming up for renewal over the next few years," Mr Ridge said.

Notifications to renew security cards are issued at least two months before they are due to expire and can be renewed through the Department's on-line renewal system, which can be accessed through the dangerous goods licensing section at www.dmp.wa.gov.au/ResourcesSafety

Mr Ridge said that the Department was notifying those with expired security cards regarding the implications of having their licence suspended.

"For example, a shotfirer would not be allowed unsupervised access to explosives, and therefore could not independently store or transport explosives", Mr Ridge said. "However, they may be able to continue shotfiring work as long as they are supervised by a security card holder."

For more information, please contact Resources Safety on 08 9358 8002 or rsdcustomerservices@dmp.wa.gov.au

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MEMO TO MINE SURVEYORS – STOP PLOTTING!

Under sections 87 and 88 of the *Mines Safety and Inspection Act 1994*, Registered Managers are required to submit mine plans to the State Mining Engineer.

However, on 17 September 2014, the State Mining Engineer issued a General Exemption such that Resources Safety no longer requires hardcopy mine plans. Instead, mine plans should be submitted electronically as PDF files.

This is good news for survey professionals, who will spend less time and incur fewer expenses on plotting, signing and posting hardcopies.

Where to find the General Exemption

Visit the legislation and policy section at www.dmp.wa.gov.au/ResourcesSafety

DEPARTMENT ACTS ON STATUTORY REVIEW

The State Government is continuing its safety reform program following the 2014 statutory review of the *Dangerous Goods Safety Act 2004*, commissioned by Mines and Petroleum Minister Bill Marmion. The review focused on a contemporary assessment of the extent to which the objectives and purposes of the Act have been met since it was proclaimed in 2008.

The review was carried out in the context of an existing program of regulatory reform that aims to align a range of safety legislation in Western Australia with national model workplace health and safety legislation. It also took into account the Reform and Development at Resources Safety (RADARS) strategy, which is aimed at improving operational effectiveness and efficiency.

A program of consultation with industry, government and other stakeholders was conducted across several months. Individual licence holders were also invited to take part in a short online survey.

"The review paints an important picture for the future of dangerous goods legislation in this State," Mr Marmion said. "This was a comprehensive process that captured a wide range of views from industry, government agencies and individual licence holders.

"Following the consultation, the review made 16 recommendations and the Department of Mines and Petroleum has prepared a detailed implementation plan."

Mr Marmion said that the reforms will modernise and consolidate dangerous goods legislation in Western Australia and have his full support.

"Under the current Act, there are six sets of dangerous goods safety regulations," Mr Marmion said. "As a part of the review, we would look to progressively consolidate these into one set of regulations.

"This gives us an opportunity to modernise and streamline our legislation, while still ensuring it meets the needs of regulators and operators in Western Australia."

The review into dangerous goods legislation comes as the State Government implements other safety reforms across the State's resources industry.

"These reforms will ensure Western Australia is at the forefront of safety," Mr Marmion said.

Implementation of the review's recommendations has started and will continue over the next two to three years.

THE CHANGING ROLE OF MINES INSPECTORS

On 3 December 2014, the *Mines Safety and Inspection Amendment Bill 2014* received Royal Assent after being passed by the Western Australian Parliament.

The Bill amends the *Mines Safety and Inspection Act 1994* and *Coal Industry Superannuation Act 1989* to:

- improve regulatory services provided by the Department of Mines and Petroleum
- modernise the qualification requirements for mines inspectors
- remove obsolete provisions.

The amendments are essentially administrative and do not adversely affect the day-to-day operations of tenement holders. The key aspects of occupational health and safety regulation are retained within the legislation and are not affected by the amendments.

There are three main changes.

1. *A First Class Mine Manager's Certificate of Competency is no longer an eligibility requirement for appointment as a District Inspector of Mines*

   The management of mines, and occupational health and safety in particular, is no longer the sole purview of the mining engineer. This being the case, the District Inspector of Mines position needed to be opened up to include a wider range of qualifications. The removal of the requirement for a District Inspector of Mines to hold a First Class Mine Manager's Certificate of Competency will enable experienced inspectors qualified in disciplines other than mining engineering to receive reports and notifications mandated by legislation.

2. *Removal of the Employee's and Assistant Inspectors categories in the Mines Safety and Inspection Act 1994 and Employee's Inspectors category in the Coal Industry Superannuation Act 1989*

   The abolition of the roles of Employee's and Assistant Inspectors removes the need for elections but does not detract from regulatory services delivered in the State as there are currently no Employee's or Assistant Inspectors in the mines inspectorate. The role historically undertaken by an Employee's Inspector — liaising with workers — is now substantially undertaken by elected safety and health representatives, of which there are currently more than 2,000 across the Western Australian minerals sector.

3. *Deletion of redundant savings and transitional provisions of the Schedule 1 to the Mines Safety and Inspection Act 1994 that related to transition arrangements for repealed Acts*

   The provisions were redundant and served no purpose.

HELP IS AT HAND

There is no simple solution to mental health problems, which can be complex with a range of contributing factors and varying opportunities for intervention. Despite this, mental health professionals agree that prevention is better than cure, and early intervention is better than crisis management.

What is available to help someone developing a mental health problem or suffering a mental health crisis? And what about those concerned about a developing or escalating situation, such as family, friends and workmates? What can they do, especially if the person works away from home?

Many companies have arrangements with employee assistance providers (EAPs) to help people deal with mental health issues. There are also organisations such as Lifeline WA, Beyond Blue, the Samaritans Crisis Line and Association of Relatives and Friends of the Mentally Ill (ARAFMI) that provide support and information.

For EAPs and mental health services to be effective, someone needs to recognise that there is an issue and approach the EAP or organisation for support. Seeking help can be difficult for those experiencing mental health problems. It can also be challenging for those affected by the situation and in a position to assist, who typically are not mental health professionals and have difficulty deciding if and when to seek help.

One approach is to provide mental health first aid training. Just as for conventional first aid training, participants are taught how to recognise early warning signs and symptoms, and how to react appropriately until professional treatment is received or the situation resolves. At the 2011 Mines Safety Roadshow workshop on mental health, the over-riding sentiment expressed by participants was that timely and effective communication is essential.

Another approach is to consider how a company's policies and practices might affect mental wellbeing. A company may have a sound mental health plan but its implementation could be more effective. For example, what information is provided to workers and how it is delivered? Are supervisors trained to deal with mental health problems? What formal and informal support networks are accessible in a time of need (which could be outside office hours)?

Inductions are typically focused on rules and regulations, and the challenge is to start the ongoing conversation about mental wellbeing and its importance to a safe and healthy workplace. Mental health issues can affect a person's capacity to function, which not only has implications for them as an individual but also, in the workplace, their fitness for work.

At the end of the day, dealing with mental health and wellbeing in the workplace is not only about a company's systems and processes. People need to genuinely care about their workmates, be aware of the warning signs, ask "R U OK?", and seek help if something is not right.

MINDHEALTHCONNECT

For a directory of information and services for mental health, including MindHealthConnect, which is supported by the Australian Government, visit **www.australia.gov.au/topics/health-and-safety/mental-health**

ADIS TO OFFER 24/7 SUPPORT TO RESOURCES INDUSTRY

The use of alcohol and other drugs has been identified as a way some people try to cope with work-related stress. To provide support for those working away from home who are dealing with this stress, the Drug and Alcohol Office is implementing a State-wide, 24/7 telephone support, information and referral service through the Alcohol and Drug Information Services (ADIS).

Targeted consultations are underway with industry and other stakeholders to ensure the support service is specifically tailored to those working away from home (e.g. FIFO, DIDO), their families and employers. The service should assist those concerned about their own or others' alcohol and other drug use, and mental health and wellbeing.

It is expected that the support service will be officially launched in May 2015. To find out more, contact Sabrina Davies, Senior Project Officer (**sabrina.davies@health.wa.gov.au**, 08 9471 0484).

For information and support with alcohol and other drug-related issues, contact ADIS:

Telephone: 08 9442 5000
Country toll free (landlines): 1800 198 024
Email: **adis@health.wa.gov.au**

NEW GUIDE TO WORKING SAFELY AT HEIGHT UNDERGROUND

Underground workers sometimes work in or near openings, each with its own unique characteristics and risks. They may also need to work at height during activities such as rise development, working in ladderways or servicing plant.

The design of each underground mining level varies and typically there is no visible horizon for orientation. Together with limited visibility, workspace constraints, challenging ground conditions and barriers to effective ventilation in rises, it can be difficult to apply standard operating procedures for working at height. These circumstances also mean that working at height underground can be more than simply addressing the risk of falling.

Apart from the potential exposure to falls and falling objects (e.g. loose rock, equipment, tools, materials) when working at height, an additional risk to those workers using work platforms underground is that they can be injured if caught between a rising platform and backs (i.e. roof or upper part) or sidewall of the drive.

After extensive industry consultation, the Department of Mines and Petroleum has produced a guideline to assist employers and mine operators to:

- identify the risks associated with working at height in underground mines
- develop and implement a safe system of work to minimise those risks.

Chapter 2 summarises the risk management process. It describes the type of information to be collected and considered when assessing and addressing the risks associated with working at height in an underground environment.

Chapters 3 to 8 describe some common working-at-height scenarios and control measures to consider when working in an underground mine.

Chapter 9 describes measures to mitigate the consequences should a fall happen.

People must be competent in the tasks they are assigned so they can perform them safely. Training and the management and supervision of workers are considered in Chapters 10 and 11, respectively.

Chapter 12 describes the emergency response that should be in place if there is an incident.

Appendix 1 lists legislative provisions relevant to working at height in underground mines in Western Australia.

Appendices 2 to 4 include information on relevant Australian Standards and other guidance, and an overview of the hierarchy of control as applied to working at height in underground mines.

Contact **RSDComms@dmp.wa.gov.au** to order the guideline.

QUEENSLAND FATAL ACCIDENT FROM FALLING INTO AN ORE PASS

Mines Safety Alert 309, issued by the Queensland Department of Natural Resources and Mines on 16 September 2014, reports on the circumstances of a fatal accident in an underground metalliferous mine when a worker fell into an ore pass. He was in a three-man team tasked with replacing a ventilation fan near the ore pass. His colleagues raised the alarm when he did not return from hanging the barricade.

Details are available at **mines.industry.qld.gov.au** in the mining safety and health section.

What is an ore pass?

An ore pass is a vertical or near vertical passage connecting different levels underground and is used to funnel ore from one level to another.

AMMONIUM NITRATE ON THE ROAD – MINIMISING THE EXPLOSION RISK

Each year, about 2.5 million tonnes of ammonium nitrate is transported by road from Australian manufacturing plants and ports to mine sites for conversion into bulk explosives. This type of ammonium nitrate is classified as UN 1942 – AMMONIUM NITRATE. It is mostly produced as a low-density porous prill for conversion into ammonium nitrate fuel oil explosive (ANFO). However, some product is a granulated high-density material for conversion into UN 3375 – AMMONIUM NITRATE EMULSION or SUSPENSION or GEL, intermediate for blasting explosives.

EXPLOSION HAZARD OF AMMONIUM NITRATE

Ammonium nitrate will not burn, but can increase the intensity of an external fire. The only credible accident scenario that is capable of resulting in an explosion of ammonium nitrate is one causing a large vehicle fire capable of melting the ammonium nitrate.

Once molten, ammonium nitrate becomes explosion sensitive. An explosion can result when:

- molten ammonium nitrate is contaminated with any organic substances (e.g. diesel fuel); molten plastics, aluminium or magnesium; and a large range of incompatible substances
- molten ammonium nitrate is confined so decomposition gases (formed in the melt above 210°C) cannot escape freely and the gas pressure builds — the decomposition chemistry changes leading to a rapid increase in temperature and the evolution of toxic nitrogen dioxide gas
- a shock is applied to molten ammonium nitrate by an energetic missile (e.g. shrapnel from an exploding fuel tank).

AUSTRALIA'S SAFETY RECORD

Vehicles transporting ammonium nitrate use public roads. What is the potential for an explosion and what safety controls are implemented to minimise the risk?

Given the enormous quantities and distances involved, Australia has a relatively good safety record for ammonium nitrate transport, despite explosions in 1972 and 2014, both in Queensland.

Fire incidents not leading to explosions are more common than those causing explosions. For example, on 12 September 2004 near Glenden, Queensland, a truck loaded with bulk prill was allowed to burn out overnight without an explosion. In Western Australia on 22 May 2013, a ute collided with a truck carrying 72 tonnes of ammonium nitrate near Wubin. The truck overturned and there was a fire. Diesel spilled from the vehicle fuel tanks but there was no explosion. Unfortunately, the truck driver and a passenger in the ute were killed in the crash.

SAFETY MEASURES TO PREVENT A VEHICLE FIRE

It is most important to prevent fires.

Traffic collisions or single-vehicle crashes can result in fires so any issues contributing to traffic accidents need to be addressed. This requires close attention to the roadworthiness of the vehicles, especially tyres and brakes, as well as driver's health and fitness and measures to avoid driver fatigue.

Poor maintenance of the vehicle can also lead to fires. Typically, wheel fires are caused by seized bearings, "dragging" brakes and overheating tyres. Electrical faults also lead to fires.

The risks of fires can be further minimised by not fitting fuel tanks under the trays of vehicles and avoiding the use of combustible construction materials in the trailer.

Transporters need to review their safety management systems and those of their subcontractors to ensure the fire risk is minimised and they comply with the requirements of the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG7.3).

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SAFETY MEASURES TO MINIMISE THE ADVERSE CONSEQUENCE OF A FIRE

If a fire does start, it is important to control and extinguish it quickly, if possible.

Transporters need to provide the driver with the capacity to effectively fight small vehicle fires by:

- providing fire extinguishers that are fit for purpose and meet the minimum requirements of Table 12.1 of ADG7.3, which requires at least one 30B dry powder extinguisher for each trailer maintained in accordance with AS 1851 *Maintenance of fire protection systems and equipment*.
- ensuring the driver has been trained in the use of the fire extinguishers provided and the emergency response procedures for ammonium nitrate
- providing an eye-wash kit, chemically resistant gloves, electric torch and three breakdown warning signs
- ensuring the required emergency information (i.e. emergency procedure guide for a vehicle fire and separate guide to address spills and fires involving ammonium nitrate) is carried inside a special emergency information holder, as prescribed in Chapter 11 of ADG7.3.

The driver needs to understand the need to evacuate to a safe distance if there is a fire that cannot be controlled with a fire extinguisher. If the fire involves only the trailer, and it is safe to do so, the driver should unhitch the trailer and drive the prime mover to safety.

Transporters need to review and practise their emergency response. Good communication between transporter, driver and emergency services is the key to a fast and effective response.

FIGHT OR FLIGHT? RECOMMENDATIONS FOR EMERGENCY SERVICES

Emergency services have a difficult decision to make when there is a fire involving ammonium nitrate — do they fight the fire or withdraw to a safe distance from a potential explosion?

The lag time between the start of a fire and subsequent explosion is highly variable and gives no guidance to fire fighters — the explosion behaviour of ammonium nitrate in fires is unpredictable.

If fire fighters have plenty of water and the fire is small then a fire fighting response should be successful. If bulk bags are contained in shipping containers, it is important to open the containers to provide less confinement and easier access for the cooling water to be applied.

If the fire is large and involves molten ammonium nitrate, then the prudent action is for all fire fighters and the public to withdraw to a safe place and expect an explosion. This is especially true if nitrogen dioxide gas is given off — the orange-red colour of the gas is a sure sign that the decomposition of ammonium nitrate has entered a more dangerous phase.

A useful emergency procedure guide is *Guide 50 – Ammonium Nitrate* of *SAA/SNZ HB 76:2010 – Dangerous Goods – Initial Emergency Response Guide*. It recommends that molten ammonium nitrate should be dealt with like an explosive with a mass explosion hazard by cross referencing to *Guide 02 – Explosive Substances*, which requires an evacuation distance of at least 1,600 metres from the burning vehicle. While such a large distance is desirable, for remote and rural locations of low population density an evacuation distance of at least 800 metres should be adequate. This shorter distance will eliminate any blast overpressure dangers and greatly reduce (but not eliminate) the risk posed by shrapnel.

AUSTRALIAN TRANSPORT INCIDENTS INVOLVING UN 1942 AMMONIUM NITRATE

Taroom explosion, 30 August 1972

An electrical fire is thought to have started in the cabin of the prime mover of a semi-trailer loaded with 18.5 tonnes of UN 1942 in 80 pound polythene bags. The vehicle was on a road north of Taroom in outback Queensland. The fire burned for 30 to 60 minutes before a powerful explosion killed the driver and two farmhands, who were watching the fire from close range. The vehicle was totally demolished.

Source: Article by Geoff Downes in SAFEX Newsletter No. 50, 3rd Qtr 2014

Angellala Creek explosion, 5 September 2014

A type 1 road train combination vehicle loaded with 52.8 tonnes of UN 1942 in 44 bulk bags (1.2 tonne flexible IBCs) drove off the bridge at Angellala Creek, in outback Queensland. The vehicle crashed into the dry creek bed, injuring the driver and causing a fire. The crash site is about 30 km south of Charleville on the Mitchell Highway.

Two other truck drivers, police and fire crews were tending to the injured driver when there was an explosion. Everyone was beginning to move away from the burning vehicle when there was a second, much larger explosion about 80 minutes after the crash.

All eight people at the scene were injured, with four receiving serious injuries. The road train, two fire trucks and the road bridge were destroyed. A crater about 12 metres by 6 metres in area and 5 metres deep was formed in sandy loam.

Sources: Queensland Department of Natural Resources and Mines, Explosives Safety Alert 86, released 9 October 2014; additional information from Queensland Explosives Inspectorate

OVERSEAS TRANSPORT INCIDENTS INVOLVING UN 1942 AMMONIUM NITRATE

There have been many overseas explosions where emergency services personnel were killed fighting an ammonium nitrate fire in both storage and transport scenarios. The most notable example was the death of 12 first responders during the explosion at the West Fertilizer Company storage facility in Texas on 17 April 2013.

A search of overseas explosions of road vehicle reveals other accidents.

- 7 July 1997 — An explosion in Xinguara, Brazil, killed 17 people. Hot wheel bearings had caused a fire on a vehicle carrying 24 tonnes of ammonium nitrate. A petrol tanker attempted to pass the burning vehicle and its petrol compartment ruptured. The petrol tanker then caught fire, resulting in the explosion of the ammonium nitrate.
- 9 March 2004 — There was an explosion in Barracas, Spain, about half an hour after a traffic accident caused a fire in a truck with 25 tonnes of ammonium nitrate. Two people were killed and five injured.
- 24 May 2004 — An explosion in the village of Mihailesti, Romania, killed at least 18 people. A truck carrying 20 tonnes of ammonium nitrate caught fire after it crashed, burning for nearly one hour before the explosion. The casualties included seven firefighters and a TV crew.

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FLYING WITH LITHIUM BATTERIES – WHAT'S THE PROBLEM?

What time is it? 2.00 pm and my shift is finished … What time is the flight? 4.00 pm … What do I have to do? … Get the vehicle back, don't forget to clean it, head back to the donger and throw my stuff in a bag … Should be enough time … Need to be at the airstrip for 3.30 pm to check my bag in. Should have time for a shower and change … Must remember to throw the camera batteries and charger into my bag and pick up my tablet so I've got something to do on the plane.

Does the above routine seem familiar? Lots to do to meet a flight deadline? Well, consider this …

In April 2014, a passenger checked in four bags for a Fiji Airways flight from Melbourne to Fiji. The aircraft was a standard commercial airliner. The passenger's normal occupation was as an operator of remotely piloted aircraft (RPA). The passenger stated during check-in that there were no batteries in his checked bags.

At about 10.30 pm, the aircraft was at Melbourne Airport and passengers' bags were being loaded. The cabin crew members were on board preparing the aircraft and the first officer was in the cockpit conducting pre-flight checks. The captain was conducting an external inspection of the aircraft. A ground engineer observed smoke emanating from the aft cargo hold, alerted the captain, and notified the airport rescue and firefighting service. The captain saw thick white smoke billowing from the hold and immediately called the first officer to advise him. The captain then directed the first officer to activate the aft cargo hold fire suppression system, shut down the auxiliary power unit and order an evacuation of the aircraft.

The attending fire crew determined that the source of the smoke was a smouldering case. They removed it to a safe location and cooled it with a fine water spray. The fire crew and police subsequently inspected all four of the bags checked in by the passenger and found 19 intact lithium-ion batteries and an additional six to eight that had been destroyed by the fire.

The initial investigation revealed that an electrical short circuit involving lithium batteries caused the fire. The case contained several batteries and an RPA controller. An RPA was also found in one of the passenger's other checked-in bags. Had the batteries caught fire after the plane had taken off, the consequences could have been dire.

This incident highlights the hazards associated with transporting lithium batteries and the need to individually protect batteries to prevent short circuits and minimise the risk of overheating and fire.

If you must take lithium batteries on your flight, please:

- put them in your hand baggage
- consider insulating the terminals or at least make sure they're isolated from each other
- don't pack them in with other metal objects, such as keys and coins
- check that recently charged batteries are cool before you pack them.

SODIUM CYANIDE ON THE ROAD – HOW CONTROLLING TOXICITY HAZARDS LOWERS THE RISK

The annual world production of sodium cyanide is about 500,000 tonnes, of which Australia contributes about 160,000 tonnes from two plants — one in Gladstone, Queensland, and a local plant in Kwinana. Globally, about 80 per cent of cyanide production goes into making organic polymers such as nitrile, nylon, acrylic plastics and synthetic rubbers. In Australia, however, nearly all sodium cyanide is used by the gold-mining industry. The sodium cyanide is transported as either a solid or in a 30% solution.

There is an understandable unease among some members of the public who live close to roads and rail routes used for cyanide transport. People know that the potential toxicity hazards are significant but are often unaware that the safety controls in place mean the actual risk to people is low, and certainly no higher than for many other dangerous goods.

UNDERSTANDING CYANIDE

Solid sodium cyanide is a white solid that melts at 563°C. It is produced as pillow-shaped briquettes weighing 20 to 30 grams each, which are less sensitive to moisture and generate little dust. Solid sodium cyanide must be kept away from water and should be protected from high humidity to avoid the generation of toxic hydrogen cyanide gas. Sodium cyanide is not flammable or explosive, but must be segregated from acids and oxidising agents.

Sodium cyanide solution has the added challenge that hydrogen cyanide gas is produced unless the pH is kept highly alkaline at all times. The solution therefore contains 0.5% caustic soda and 3.5% sodium carbonate to keep the pH at 13 during transport. Spillages can evolve hydrogen cyanide gas if the solution lands on acidic soils or is diluted in water.

Although cyanide is not mutagenic, teratogenic or carcinogenic, people sometimes focus more on supposed public health concerns, rather than its high acute toxicity. Severe cyanide poisoning can be lethal, but a poisoned person or animal can completely recover from sub-lethal doses. Also, cyanide does not persist long in the environment and does not accumulate in the body.

AUSTRALIA'S SAFETY RECORD

Australia has an excellent safety record for sodium cyanide transport. The number of incidents for solid and solution transport is very small compared to the large number of journeys over long distances by road and rail.

Over the last 25 years, there have been only three loss-of-containment incidents, and only one of those resulted in harm from the toxic nature of cyanide.

To maintain their excellent safety record, those transporting sodium cyanide are diligent and apply a range of robust controls to prevent exposure.

MANDATED SAFETY MEASURES TO PREVENT TOXIC EXPOSURES

The transport of dangerous goods in Australia is regulated by nationally uniform regulations. In Western Australia, the Department of Mines and Petroleum administers the Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007, which require compliance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG7.3).

ADG7.3 is maintained by the States and Territories under the leadership of the National Transport Commission, and is regularly updated to keep it harmonised with international transport codes. ADG7.3 contains mandatory requirements covering matters such as:

- design, construction and approval of appropriate packaging, containers and tanks
- consignment procedures
- labelling of packages
- placarding of vehicles

- stowage, constraint and segregation of loads
- transport documents
- emergency procedure guides and safety equipment.

EMERGENCY RESPONSE CONSIDERATIONS

A fast and effective emergency response is especially important for cyanide. Exposed solid cyanide needs to be recovered before rain sets in. A spilled solution has to be contained and neutralised before it can flow into water courses. The transport of cyanide requires recovery equipment, neutralizing agents and the capacity to efficiently respond to emergencies such as roll-overs and derailments. This can only happen with trained responders and regular emergency response exercises.

In a spillage scenario, any emergency responders in the immediate vicinity of the spillage site require personal protective equipment including breathing protection. Responders set up a small exclusion zone around the spill site to exclude members of the public until the spill has been cleaned up or neutralised.

In Western Australia, there are additional environmental protection conditions under *Environmental Ministerial Statement 700*. One condition is the presence and regular review of a transport management plan, which includes procedures for safe transportation, careful selection of approved transport routes, effective communication with vehicles, the location of neutralising agents, annual emergency exercises with the Department of Fire and Emergency Services, and external and internal audits of the plan.

VOLUNTARY SAFETY MEASURES

Many controls are mandated by legislation but the application of the voluntary International Cyanide Management Code (ICMC) is equally important. Produced under the auspices of the United Nations Environment Programme and the International Council on Metals and the Environment, the code covers both production plants and management of the transport supply chains to help them maintain high levels of safety. It aims to prevent spills such as the Baia Mare incident in January 2000 at a Romanian gold mine, which led to the death of aquatic life in the rivers of Romania, Hungary and Yugoslavia.

Accreditation to ICMC is a voluntary commitment shared with leading gold mining companies to ensure maintenance of the highest standards of safety and environmental protection during the processing, transport, handling, storage and disposal of cyanide. The ICMC website at www.cyanidecode.org/about-cyanide-code/faq contains comprehensive third-party audit summary reports of all accredited companies. It also has information about cyanide, including its chemistry, toxicology and effects on the environment and wildlife.

AUSTRALIAN LOSS-OF-CONTAINMENT INCIDENTS INVOLVING SODIUM CYANIDE

In February 2002, between 3,000 and 6,000 L of dilute cyanide solution was released from a sparge tank in the Tanami Desert, Northern Territory, when the tank's input and output valves were not locked according to procedure. A large number of birds and a dingo died after drinking the dilute cyanide solution spilled at the road side.

The other two loss-of-containment incidents involved solid sodium cyanide in composite intermediate bulk containers (CIBCs) that were damaged by high-energy impacts in traffic accidents.

In July 1992, a freight train carrying 120 tonnes of sodium cyanide was derailed during a collision with a semitrailer at a level crossing near Condobolin, New South Wales. Forty tonnes of sodium cyanide was spilled.

In February 2007, a triple road train was involved in an accident on the Stuart Highway north of Tennant Creek in the Northern Territory. Two of the three shipping containers tipped over and briquettes of sodium cyanide fell into a non-flowing water course.

CONTAINMENT SYSTEMS FOR SODIUM CYANIDE

The transport containment chosen is critical for sodium cyanide safety and must comply with ADG7.3. The prescribed standards for containment are high, as expected for a toxic dangerous good of Packing Group I. Australia uses the three containment systems, which are described below in the order of technological emergence.

Composite intermediate bulk containers (CIBCs) for UN 1689 SODIUM CYANIDE, SOLID

CIBCs are the main containment systems used to transport sodium cyanide to ports and by ship. Each CIBC contains about 800 to 1,200 kg of briquettes. Typically, the briquettes are deposited in a woven polypropylene bag within a heat-sealed polyethylene bag. The double bag is then placed inside a wooden outer box with lid and integral pallet base, which is strapped horizontally and vertically. The CIBC is then placed inside a steel freight container, which typically holds 20 CIBCs.

CIBCs of sodium cyanide briquettes in freight container

Portable tanks or isotainers for UN 3414 SODIUM CYANIDE SOLUTION

Many mine sites prefer the manufacturer to provide a 30% solution rather than solid cyanide. However, this is only economical within a limited radius from the manufacturing plant because of transport costs.

The isotainers have a capacity of 18 kilolitres and are internationally approved tanks that are twist-locked onto road or rail platforms. They are heavy duty, 6 mm-thick steel pressure vessels that are impact and roll-over resistant and are protected within a substantial box end-frame. There are no loading or unloading connections at the bottom of the container and this prevents accidental leakage.

Any hydrogen cyanide vapour above the solution is fully contained and unable to vent, except through a special safety valve. The valve only vents under extreme pressure caused by extreme fire impingement on the tank, which is unlikely.

Isotainer for 30% sodium cyanide solution

Sparge tanks for UN 1689 SODIUM CYANIDE, SOLID

Increasingly, CIBC transport to mine sites is being replaced by heavy duty solid-to-liquid tanks, called sparge tanks. These tanks have superior security and safety features during both transport and handling operations on the mine site. Sparging is the remotely controlled dissolving of the solid cyanide in water in a closed system of dissolving tanks interconnected by pipes.

Not only does a sparging avoid the need to dispose of cyanide-contaminated CIBC packaging, but it removes the mine worker from exposure to cyanide and avoids the need for manual handling of solid cyanide, which involves a cumbersome protective suit and breathing apparatus in a potentially hot and stressful environment.

Sparge tanks are the safest method of sodium cyanide transport because:

- transporting a solid is inherently less hazardous than a solution
- they are more impact-resistant than CIBC in freight containers
- each tank carries 20 tonnes of dry sodium cyanide compared to only 6 tonnes of sodium cyanide dissolved in 18,000 litres in an isotainer — the larger payload reduces the transport risk because of the reduced journey distance for a given amount of cyanide.

Road vehicle with sparge tank for solid sodium cyanide

Photos courtesy Orica

FOCUS ON EFFECTIVE SUPERVISION IN MINING OPERATIONS

How can we recognise when supervision is effective from a safety perspective? It is probably easier to list the signs suggesting there may be problems related to supervision, such as:

- poor or decreasing productivity
- high staff turnover
- low team morale
- poor housekeeping
- increasing rates of absenteeism
- lack of understanding of supervisor's role
- inconsistency in overall understanding and application of safe work practices.

Effective supervision sets and maintains high standards of performance and the physical aspects of the work environment. It is critical to achieving and maintaining the desired safety culture. This can only be achieved through a multi-tiered, team approach where each level of the organisation plays a part in implementing the overall safe systems of work. Supervisors depend on direction and support from middle and senior management, as well as the involvement of the workers and contractors they direct.

When supervision is inadequate, it can lead to:

- an increase in unwanted events
- a lack of improvement or deterioration in safety performance indicators.

A Department of Mines and Petroleum review of mining fatality reports from 2000 to 2012 for Western Australia showed that workers within the first two years on a job were at highest risk of a fatal accident, particularly where the supervisor had less than three years in the role. In many of the fatal incidents, work was being undertaken largely unsupervised or outside the scope of established procedures. These findings are consistent with the outcomes of Departmental investigations of serious incidents.

To help identify and address the issues involved, the Department consulted extensively with industry through Mines Safety Roadshow workshops and sought industry input into draft guidance. The result is the guideline on effective safety and health supervision in Western Australian mining operations, which provides a quick reference for those involved in frontline supervision — whether as a supervisor or someone with responsibility for supervision.

Chapter 2 discusses the organisational elements and resourcing considerations that support effective supervision.

Chapter 3 discusses the desirable competencies of an effective frontline supervisor.

Chapter 4 describes management and supervisory aspects.

Appendices 1 to 3 show examples of the risk-based approach to safety management, and list the actions and interactions that influence management and supervision practices in an organisation.

Appendix 4 identifies useful resources.

Since its release in mid-December 2014, almost 5,000 hardcopies of the guideline have been distributed or ordered. The PDF can be downloaded from the mines safety publications section at www.dmp.wa.gov.au/ResourcesSafety and hardcopies requested by sending contact details to RSDComms@dmp.wa.gov.au

APPEA'S SAFE SUPERVISOR COMPETENCE PROGRAM

Developing supervisors is paramount in influencing a positive safety culture. Supervisors are critical in imparting safety messages, attitudes and values to the workforce, as well as delivering consistency in safety expectations. However, supervisors are often selected based on technical skills and experience, rather than their ability to manage people, and "soft" skills are perhaps the hardest to learn.

The Safe Supervisor Competence Program (SSCP) was established to develop and implement a standard of competency for offshore oil and gas construction supervisors. It also ensures a consistency in language and approach to leadership across the oil and gas industry.

Managed by the Australian Petroleum Production & Exploration Association, the program provides a direct link between the training environment and workplace through practical hands-on and behavioural-based learning. Participants need to demonstrate the industry-established behaviours required to be a highly effective frontline supervisor.

An Industry Advisory Group and Independent Reviewer ensure the training remains relevant and robust.

Find out more at **www.safesupervisor.com.au**

STAY ALERT

The safety alerts described below are reproduced in full at the back of this magazine, and can be downloaded from the publications section at www.dmp.wa.gov.au/ResourcesSafety

UNCONTROLLED ROTATION OF ROTARY KILN DRYER

Mines Safety Significant Incident Report No. 207 was issued following an incident at a mine when three workers narrowly escaped serious injuries as the rotary kiln dryer they were working in unexpectedly rotated 180 degrees.

The report emphasises the importance of maintaining safe systems of work for tasks carried out in, or in the vicinity of, rotary kiln dryers and similar plant that can rotate.

COMPONENT EJECTED FROM ACCUMULATOR

A component ejected from a suspension hydraulic accumulator being worked on by a fitter broke a bystander's arm.

Mines Safety Significant Incident Report No. 208 highlights the need to ensure that pressure vessels, such as accumulators, are handled and managed appropriately.

POTENTIAL SIGNAL TUBE DETONATOR EXPLOSION

During a recent charge-up operation, a mobile processing unit (MPU) moving along a row of drill holes became entangled with the downline lead of the signal tube detonator for one of the holes. The downline lead stretched until it snapped. Fortunately, the detonator did not initiate.

Mines Safety Significant Incident Report No. 209 reminds mine operators of the importance of maintaining safe work practices for all charge-up tasks.

FATAL ACCIDENT – ELECTRICIAN CRUSHED BY LIFT CAR

Mines Safety Significant Incident Report No. 210 was issued following a fatal accident on a mine site. An electrician received fatal injuries when he was crushed between a lift car and the lift shaft structure and then fell to the bottom of the lift shaft.

The risks associated with maintenance or troubleshooting on lifts and hoists are not new or unique to mining. This safety alert focuses on hazards that maintenance workers can be exposed to. It emphasises the need to risk assess each step of a job and implement appropriate controls.

FREIGHT TRUCK DRIVER INJURED IN FALL FROM TRAILER

The incident reported in *Mines Safety Significant Incident Report No. 211* took place during the delivery of rolls of poly pipe to a mine. A strap binding a pack of poly pipe rolls together was cut, allowing the rolls to separate and slide off the trailer. The driver was dragged along and sustained a compound leg fracture.

The importance of maintaining safe work procedures for handling large, heavy or awkward items of freight is emphasised.

FALL FROM HEIGHT AT MOBILE SCREENING PLANT

The incident reported in *Mines Safety Significant Incident Report No. 212* took place during an inspection of the headchute of a mobile screening plant. Fortunately, the supervisor was not injured when he fell more than six metres to the ground.

The safety alert emphasises the requirement for plant designers and mine operators to identify hazards associated with the plant and to ensure controls are in place to protect workers from those hazards as far as practicable.

FATAL ACCIDENT – MAINTENANCE WORKER PINNED BY BULLDOZER BELLY PLATE

Mines Safety Significant Incident Report No. 213 was issued following a fatal accident on a mine site. A maintenance worker was fatally injured when a bulldozer belly plate fell and pinned him to the ground.

This safety alert focuses on hazards that maintenance workers can be exposed to. It emphasises the need for safe systems of work and safe work instructions when dealing with plant that has been damaged or modified, or where hazards could be masked.

220 VOLT OUTLETS IN LIGHT VEHICLES

Some light vehicles used on mining operations have a 220 volt three-pin socket outlet installed in the rear luggage compartment. If outlets are not provided with residual current device (RCD) protection and faulty electrical equipment is plugged into the outlet, electric shock to the equipment operator or bystanders may result.

Mines Safety Bulletin No. 115 reminds mine operators that, where 220 volt three-pin socket outlets are not protected with an RCD, they must not be used for the connection of portable, mobile or moveable electrical equipment while on a mining operation.

MEWPS USED WITHIN OR ADJACENT TO STRUCTURES WITH RESTRICTED ACCESS

Over the past year and a half, incidents involving the use of mobile elevated work platforms (MEWPs) within or adjacent to structures with restricted access have been reported. These include workers being trapped or injured, and equipment being damaged.

Mines Safety Bulletin No. 116 reminds mine operators of the importance of doing risk assessments for work being done using MEWPs. A number of measures are recommended, including:

- supervisors conducting a risk assessment before a task is started
- operators holding a current high risk work licence for operating the MEWP and being assessed as competent for the type of MEWP to be used
- spotters establishing suitable communications with the MEWP operator and other work parties in the vicinity
- maintainers maintaining each MEWP to the manufacturer's standards so it operates as expected.

PREVENTING ELECTRIC SHOCKS DURING WELDING

Mines Safety Bulletin No. 117 was issued following continuing reports of electric shock incidents during welding on Western Australian mining operations.

The bulletin emphasises the importance of workers being competent in the tasks they undertake, and understanding the welding electrical circuit to maintain a safe current path. Recommendations are made for maintaining safe work procedures and practices, and for the testing and maintenance of welding electrical circuits.

WORKING ALONE WITH CORROSIVE SUBSTANCES – POTENTIAL LOSS OF COMMUNICATIONS

Mines Safety Bulletin No. 118 was issued to emphasise the importance of maintaining communication with people working alone, especially those working with or near corrosive substances.

The bulletin stresses the need for mine managers and supervisors to evaluate the risks associated with a person working alone and to implement control measures to minimise those risks, including minimising the time that a potentially injured person remains unattended.

PROMOTING PUBLIC SAFETY MESSAGES

To address some public safety issues that are occasionally raised with the Department of Mines and Petroleum, Resources Safety has developed a pamphlet series to promote community awareness of three important topics.

The pamphlets have been distributed to a variety of outlets including local government offices, Community Resource Centres, regional police stations, Mining Registrars, prospecting groups, and boating and camping suppliers.

Contact **RSDComms@dmp.wa.gov.au** to order copies.

PROSPECTING IN REMOTE AREAS – STAY IN TOUCH AND STAY ALIVE!

The Western Australian environment is diverse and often harsh with extremes of weather and terrain, and long travelling distances. Prospectors need to be well prepared whether setting off on a day trip or for weeks away. If something goes wrong, help can take longer to arrive and finding people in trouble can be difficult. The pamphlet emphasises the importance of planning and making use of appropriate communication and location devices.

OLD MINE WORKINGS – STAY OUT AND STAY ALIVE!

Abandoned mine workings are a serious hazard to any recreational activity, particularly if using bicycles, motorbikes or motor vehicles. The pamphlet provides information on why people should stay out of abandoned mine workings.

ABANDONED AND UNWANTED EXPLOSIVES AND FLARES – DON'T TOUCH AND STAY ALIVE!

Abandoned and unwanted explosives can pose a safety and security risk to everyone. The pamphlet explains how to deal with these items, as well as the proper way to dispose of unwanted marine distress flares.

DROWNING HAZARDS IN OPEN EXCAVATIONS

The Queensland Department of Natural Resources and Mines issued *Mines Safety Bulletin 140* because of concern about people drowning at Queensland mines and quarries from swimming, jumping or falling into excavations containing water. Fatalities included trespassers intent on swimming in water-filled excavations and people jumping off benches into water with no knowledge of its depth.

The bulletin discusses contributing factors and suggests ways to combat this problem. It is available at **mines.industry.qld.gov.au**

DON'T CUT CORNERS – USE THE RIGHT TOOL

Despite years of hand injury awareness and training programs, workers on resource sites are still being injured while doing simple tasks like opening boxes or cutting cable ties.

This might not sound important, but apart from cutting skin and muscle, injuries can also include severed tendons and blood loss. Potential outcomes include infection, scarring and temporary or permanent reductions in hand function. The consequences can be serious and long term.

Convenience is often the first factor in getting a job done. "I need to cut/open this. What can I use that's handy? There's a … *[insert implement/weapon of your choice]*. That'll do the job."

The Department of Mines and Petroleum continues to receive reports of personal injuries because people are using devices not suited for the job. Often they have not thought about the sudden release of tension when a binding is cut.

Older style box cutters might sound like an appropriate tool but can be dangerous if body parts are not kept out of the "line of fire" when cutting.

Remember the saying "A stitch in time saves nine", meaning that timely effort can prevent more work later (and perhaps stitches in hand wounds!)?

Take the time to obtain a suitable tool such as pliers, "parrot" safety cutter or safety knife, and pay attention while cutting.

CRANE OPERATORS WARNED ABOUT SIDE SLOPES

Non-slewing mobile cranes (or pick-and-carry type cranes) are commonly used for lifting and moving loads on Western Australian mine sites. Over the past 12 months, some of these cranes have overturned due to instability while lifting or tramming with loads. A major contributing factor in these incidents has been the failure to consider side slope stability while operating the crane.

In 2007, Terex, a mobile crane manufacturer issued an information bulletin, *Operating on Side Slopes*, for mobile crane operation.

Given the number of incidents involving mobile pick-and-carry cranes did not reduce, detailed de-rating notes were released in May 2014 to be used in conjunction with the information bulletin issued by the original equipment manufacturer (OEM). The OEM's bulletin and notes are available at www.dmp.wa.gov.au/ProductSafetyAlerts

Mobile pick-and-carry cranes are primarily designed to be used on firm, flat, level ground, usually to within 0.57 degrees (1% gradient), and any deviation from this gradient limit requires the rated capacity to be reduced accordingly. Crane stability is particularly vulnerable to side slopes. As described in Australian Standard AS 2550.5, tramming with suspended loads should be carefully planned and assessed by competent people.

The main problem arises when these cranes are operated on sideways sloping ground or where the ground is uneven because of features such as surface depressions, potholes, speed bumps, protruding rocks and cambered road surfaces — all of which can cause the crane to overturn when tramming with a load. The deviation caused by the side slope does not need to be large to have a significant impact on the crane's stability, and may be difficult to detect. An obstruction or dip in the ground of just 20 mm for one forward road wheel is equivalent to a 1% side gradient.

For this reason, precautions to take when lifting or tramming with a load include those listed below.

- Remember, the crane's load indicator will **not** automatically de-rate the rated capacity.
- Ensure the tyres and inflation pressures are of the correct type and amount as recommended by the OEM.
- Load swing greatly reduces stability and puts side load on the boom. To limit this, attach a tagline to all loads to be trammed. Dogging and spotter personnel must maintain their awareness of the potential for crush injuries if the crane does topple sideways.
- Use the OEM's de-rating chart when tramming on a side slope of greater than 1%.

  A suggested rule-of-thumb for de-rating is:

  - if the boom angle is less than 45 degrees, reduce the rated capacity by 50% of the load chart value.
  - if the boom angle is more than 45 degrees, reduce the rated capacity by 60% of the load chart value.

The risk is greater if the crane needs to articulate while tramming, and instability is more likely at higher boom angles. The undulating terrain at mining operations means that any tramming operation should be routinely de-rated and the speed reduced (see OEM load charts). Recommended practices are listed below.

- Use the **minimum** boom length and angle practical to keep the boom tip as close to the ground as possible.
- Keep the load as close as possible to the ground.
- When tramming up or down a ramp, keep the load on the uphill side of the crane, especially when articulating. Remember, the working radius will increase if the load is suspended in the downhill position. In some instances this may require reversing down a ramp.
- Use the **minimum** articulation angle practical. Remember, the crane will side tilt and hence the hook will move towards the direction of articulation while steering.

RELEVANT AUSTRALIAN STANDARDS

- AS 1418.5 *Cranes, hoists and winches – Mobile cranes*
- AS 2550.1 *Cranes, hoists and winches – Safe use – General requirements*
- AS 2550.5 *Cranes, hoists and winches – Safe use – Mobile cranes*

EXAMPLES OF CRANE TIP-OVER INCIDENTS

www.dmp.wa.gov.au/8004.aspx

Safety alert

Mines Safety Bulletin No. 102 *Addressing the potential for mobile (pick-and-carry) cranes to topple sideways*, issued 21 December 2012

Incident reports – summaries for industry awareness

13 June 2010

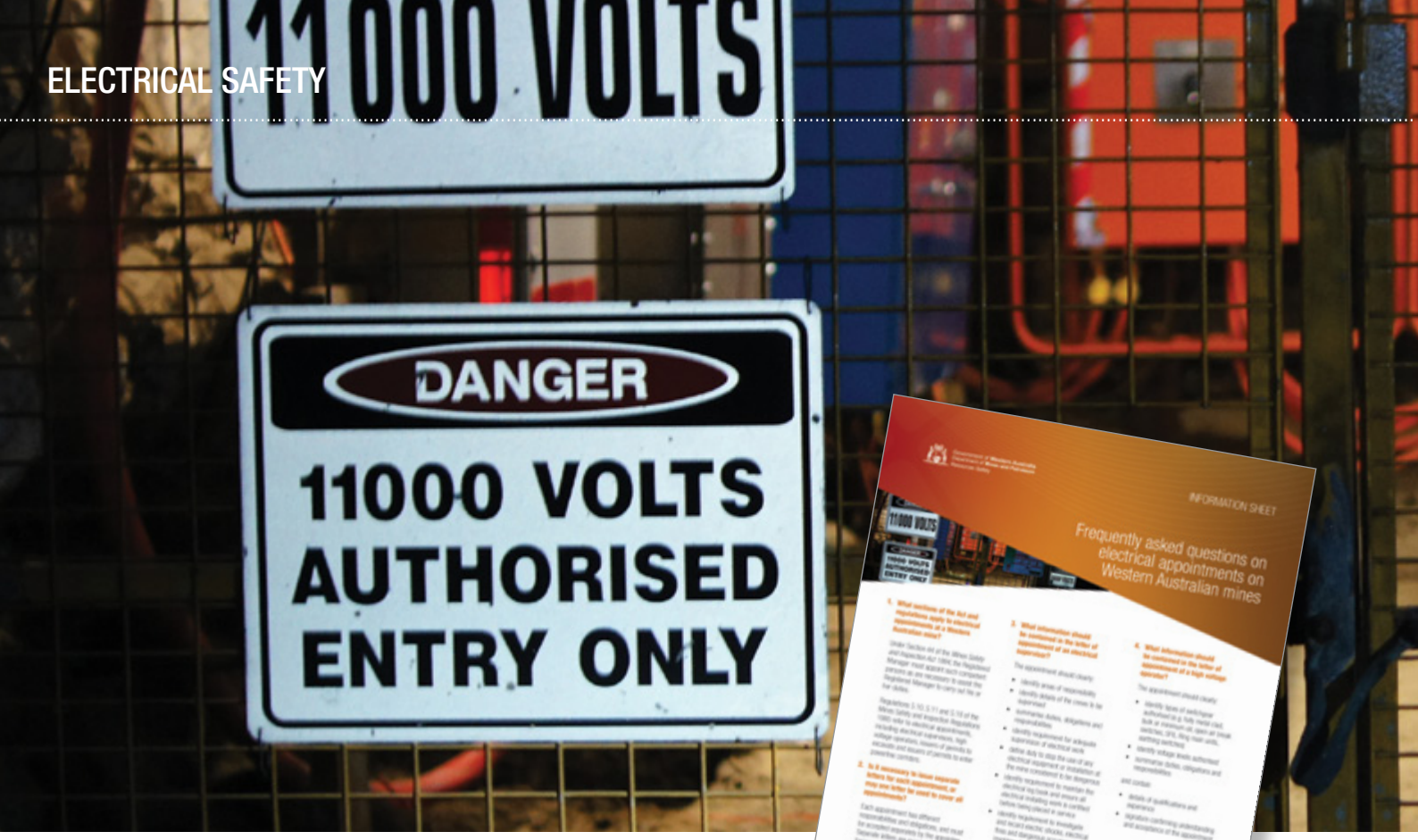
A crane lifting and moving a 7 tonne load was articulating to the right on ground that was on a slight decline. The crane alarm activated, indicating it had reached 90%. When the operator corrected (by articulating in the other direction) the load's centre of gravity kept the load moving right. The load sat on the ground slowly and was subsequently followed by the crane, which fell over onto its right side. The crew was uninjured and the crane had minimal damage.

19 December 2012

The operator of a rough terrain crane had finished installing power poles in the power line corridor. The crane was reversing and turning up a steep track at the overland conveyor to the ore production facility. The rear right wheel dropped into an unguarded grade control hole, 2 m from the edge of the track. The crane tipped on to its side down the 1.5 metre embankment.

The crane driver, who was not wearing a seatbelt at the time, was projected into the roof window of the cab and was concussed and bruised. He was assessed by onsite medics and taken to the regional medical centre for further observation for neck and spinal injuries.

The driver had limited vision and was not assisted by a spotter, though the offer was made. Time pressures due to helicopter power line stringing work had seen the crew work longer shifts in very hot conditions, without 10 hour breaks between shifts. On this day the water bottles had not been delivered and the crew were tired and dehydrated. The crane driver did not want the dogman, who he felt was suffering the ill effects of heat, to walk down the hill to assist. The track was not an established construction work area, but rather an existing grade control track that had been expanded.



SAVE LIVES – PAY ATTENTION TO ELECTRICAL RISKS

Electrical risks include death, electric shock or other injury caused directly or indirectly by electricity. The most common electrical risks are:

- electric shock causing injury or death
- arcing, explosion or fire causing burns
- electric shock from step and touch potential
- generation of toxic gases from electrical equipment causing illness or death
- fire resulting from an electrical fault.

An electric shock can be received by direct or indirect contact with an energised electrical circuit, by tracking through or across a medium, or by arcing. An indirect contact is where a conductive part that is not normally "live" becomes energised due to a fault (e.g. metal toaster body, fence).

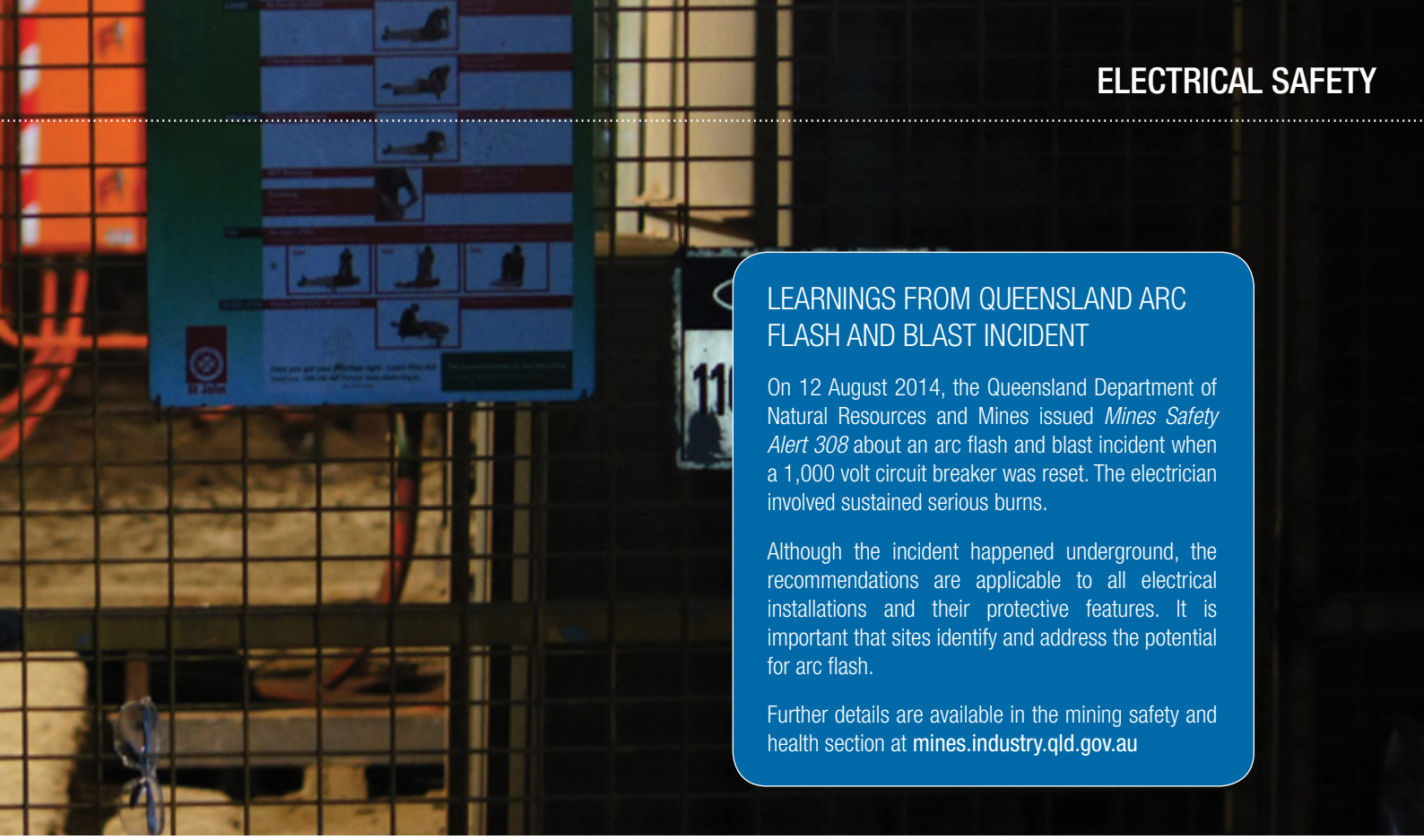
Even the briefest contact with electricity at 50 volts for alternating current (AC) or 120 volts for direct current (DC) can have serious consequences. Electric shocks can cause contact burns and damage internal organs.

Electric shocks from faulty electrical equipment can also lead to related injuries, including falls from ladders, scaffolds or other elevated work platforms. Other injuries or illnesses include muscle spasms, palpitations, nausea, vomiting, collapse and unconsciousness.

Workers using electricity might not be the only ones at risk — faulty electrical equipment and poor electrical installations can lead to fires that have the potential to result in death or injury to others.

Electrical supervisors play an important role within a mining operation. They are not only responsible to the manager of the mine for electrical safety but also for meeting electrical regulatory obligations to both the Resources Safety Division in the Department of Mines and Petroleum and Energy*Safety* in the Department of Commerce.

The electrical supervisor must provide effective supervision to ensure that electrical work is performed correctly and in accordance with current legislation. Consequently, an electrical supervisor should be in a position to understand and be able to apply applicable Acts, regulations and standards as well as relevant codes of practice, guidelines, industry agreements and company standards that may apply.



LEARNINGS FROM QUEENSLAND ARC FLASH AND BLAST INCIDENT

On 12 August 2014, the Queensland Department of Natural Resources and Mines issued *Mines Safety Alert 308* about an arc flash and blast incident when a 1,000 volt circuit breaker was reset. The electrician involved sustained serious burns.

Although the incident happened underground, the recommendations are applicable to all electrical installations and their protective features. It is important that sites identify and address the potential for arc flash.

Further details are available in the mining safety and health section at **mines.industry.qld.gov.au**

HIGH VOLTAGE SWITCH DANGER FOR MINE SITES

The type of high voltage (HV) switches at the centre of the Morley Galleria explosion that killed two people can be found on some mine sites in Western Australia.

State Mining Engineer Andrew Chaplyn said that mine sites are required to review HV switchgear on site.

"If mine sites have any Long and Crawford oil-insulated combined-fuse switches installed, they must ensure there are warning signs on all switches about the need for complete isolation from supply before performing any repair, fault finding, maintenance or fuse replacement," Mr Chaplyn said.

"This isolation must remain effective until all work is completed and all lids and covers are replaced."

Mr Chaplyn said that mine sites also need to advise an Electrical Inspector from the Department of Mines and Petroleum if any of these switches are installed onsite and any programs to replace them.

"These switches could have been in service for up to 40 years and are either approaching or past their safe service life," he said.

On 13 February 2015, Energy*Safety* imposed new safety precautions for HV oil-insulated combined-fuse switches produced by Long and Crawford.

The Energy*Safety* Inspector's Order requires the switch to be completely disconnected from the electricity supply before any person may open the switch's lid.

"The inherent danger of these switches was tragically highlighted by the accident at the Morley Galleria, which claimed the lives of two young men and severely injured two others," Mr Chaplyn said. "This is why we are reminding industry about the Energy*Safety* Order regarding the dangers of working with these switches."

Energy*Safety* Director Ken Bowron said that the type of switch involved allows the three fuses to be changed while the incoming electricity supply at the base of the tank remains energised.

"It is unsafe to perform work on any item of electrical equipment while it remains energised, especially high voltage equipment," Mr Bowron said.

"We are looking into all aspects of these switches as part of the investigation process following the Morley Galleria accident and the Order we have issued is made in light of evidence we have to date."

The State Mining Engineer has issued notices to registered mine managers in Western Australia, and the Department will publicise any future findings or orders from the Energy*Safety* investigation that have implications for the resources industry.

FAQS ON ELECTRICAL SUPERVISION AT WESTERN AUSTRALIAN MINING OPERATIONS

1. What legislation applies to electrical installations on mining operations?

Electrical installations on mining operations in Western Australia must meet the requirements of the:

- *Electricity Act 1945*
- Electricity Regulations 1947
- Electricity (Licensing) Regulations 1991
- *Mines Safety and Inspection Act 1994* (MSIA)
- Mines Safety and Inspection Regulations 1995 (MSIR)

2. Must an electrical supervisor be appointed to a mining operation?

Yes. An electrical supervisor must be appointed to a mine site in accordance with MSIR r. 5.10.

Electrical supervisors play an important role within a mining operation. They are not only responsible to the manager of the mine for electrical safety but are also responsible for meeting electrical regulatory obligations to both the Resources Safety Division in the Department of Mines and Petroleum and Energy*Safety* in the Department of Commerce.

Consequently, an electrical supervisor should be in a position to understand and be able to apply relevant legislation and standards as well as codes of practice, guidelines, industry agreements and company standards that may apply.

3. Does more than one electrical supervisor need to be appointed for a large mining operation?

Regulation 5.10(1) of the MSIR requires the principal employer at, and the manager of, a mine to appoint, in writing, sufficient electrical supervisors to:

- ensure the efficient supervision of the installation, maintenance and testing of electrical equipment in the area of their responsibility
- be responsible to the manager for the electrical equipment at the mine.

Note: Manager is defined in the MSIA as the Registered Manager.

Sufficient electrical supervisors must be appointed based on the area of their responsibility that can be practicably or reasonably managed. The appointments should also consider periods of absence from site for annual and long-service leave, training, sickness, temporary transfer and other reasons.

4. Does the electrical supervisor need to be an employee?

No. The supervisor does not have to be a direct employee. A contractor can be appointed as the electrical supervisor.

5. Does the electrical supervisor need to remain on site?

No. The supervisor does not need to be on site full time, provided visits are made with sufficient regularity to ensure compliance with MSIR r. 5.11.

6. Are statutory records required to be maintained?

Yes. The manager must ensure the following statutory positions are recorded in the mine record book:

- the appointment of an electrical supervisor or revocation of any such appointment including the electrical supervisor's area of responsibility [MSIR r. 5.10]
- the appointment of high voltage operators for the isolation of any high voltage equipment at the mine for access, maintenance or repair purposes [MSIR r. 5.18(1)].

To help meet the requirements of MSIR r. 5.10(1), it is recommended that the manager and electrical supervisor meet at least monthly so that:

- any electrical issues that might affect the safe operation and maintenance of electrical equipment at the mine can be discussed
- the manager can sign the electrical log book.

7. What are the duties of an electrical supervisor?

The electrical supervisor's duties are detailed in MSIR r. 5.11 and include those listed below.

- Ensuring all work carried out in relation to electrical equipment and installations in their area of responsibility is adequately supervised. This includes electrical staff, contractors and labour hire employees.
- Ensuring electrical equipment or installations in their area of responsibility are installed and tested in accordance with the MSIR and maintained in a safe working condition.

- Ensuring electrical installations and equipment are in accordance with Australian Standard AS/NZS 3000 *Electrical installations* (also known as the Australian/New Zealand Wiring Rules).
- Stopping the installation or use of any electrical equipment in their area of responsibility considered to be dangerous, and reporting to the manager any situation that may affect the safe use of electricity or contravene the MSIR.
- Ensuring the electrical nominee or electrical contractor has reviewed and inspected uncertified installations, and signed the electrical log book entries on a regular basis.
- Investigating, recording in the electrical log book and reporting to the manager
  - any electrical shock or burn received by a person
  - any fire suspected to be caused by electricity
  - any dangerous occurrence involving electricity that could have caused injury to a person.

8. Is an electrical supervisor the same as a nominee?

No. Appointing an electrical supervisor is not the same as nominating someone for an In-House Electrical Installing Work Licence. These are separate appointments made under different legislation:

- the supervisor is appointed in accordance with MSIR r. 5.10
- the nominee is appointed in accordance with Electricity (Licensing) Regulations 1991 r. 37.

Note: It may be useful and convenient for both appointments to be held by the same electrical supervisor.

9. What are the duties of an electrical supervisor with regards to maintenance of electrical equipment?

The electrical supervisor's duties for maintaining electrical equipment are detailed in MSIR r. 5.27 and include those listed below.

- Ensuring maintenance systems are in place in their area of responsibility so that electrical equipment and installations are maintained in a safe working order. Electrical supervisors must continually monitor the maintenance system to ensure it remains up-to-date.
- Where electrical contractors carry out installing work on site, ensuring the work is certified by submitting a preliminary or completion notice to Energy*Safety* if a letter of exemption from submission of notices has not been granted [Electricity (Licensing) Regulations 1991 rr. 51, 52].
- The contractor must also enter the work in Section 1 of the area electrical log book and have it certified by the nominee [MSIR r. 5.14].
- Ensuring each entry made in the electrical log book contains all details required by the Electricity (Licensing) Regulations 1991, including the name(s) of electrical worker(s), the contractor(s) that preformed the work, and the date on which the work was completed.
- Ensuring the in-house licence nominee or electrical contractor certifies all entries in the electrical log book relating to new installations, alterations and additions to existing installations, including when electrical installation works are removed or made redundant.
- Ensuring that all electrical installing work is inspected and tested in accordance with MSIR r. 5.3.

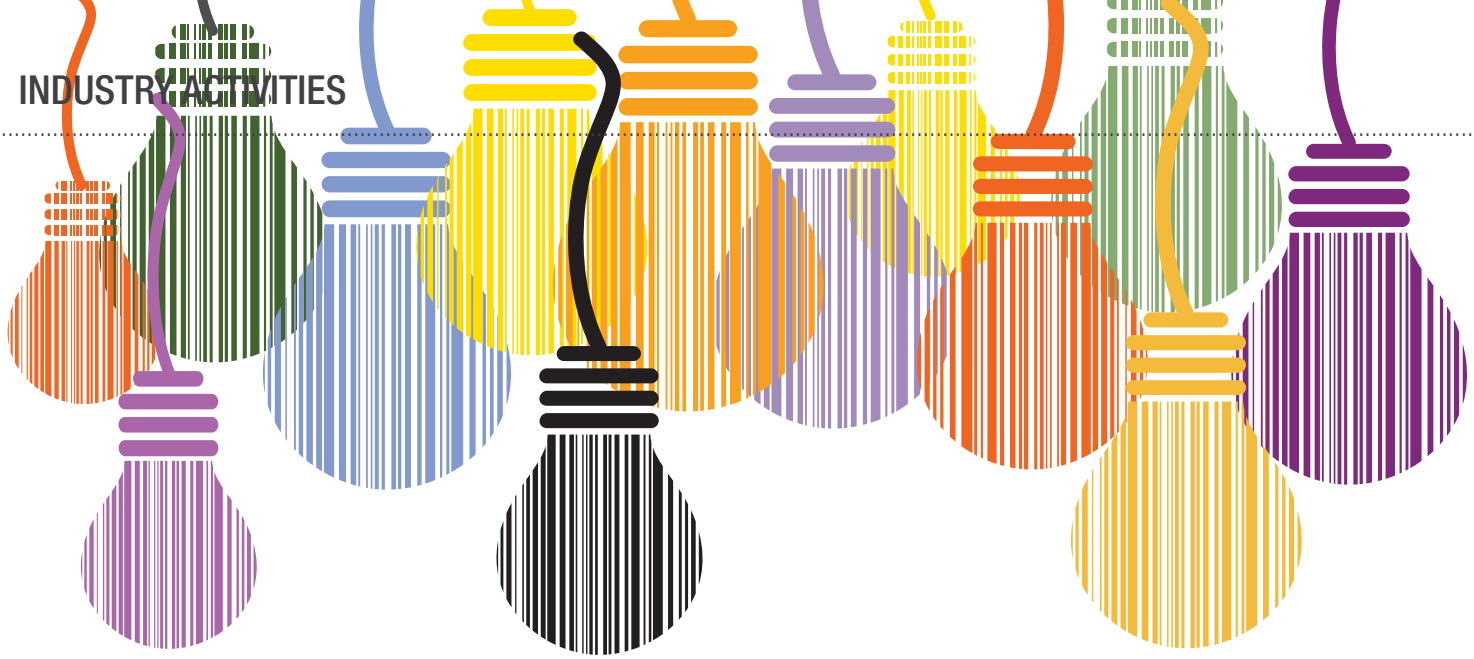
10. Should all electrical incidents be reported?

Yes. Any incident or dangerous occurrence involving electricity must be notified to Energy*Safety* [Electricity (Licensing) Regulations r. 63] and the District Inspector [MSIA s. 78(1)] in the first instance before starting an investigation.

It is also prudent to contact the Department of Mines and Petroleum's Inspector of Mines (Electrical) responsible for the mining operation so the mines inspector has an understanding of the incident before the notification is sent through the online Safety Reporting System (SRS). For incidents not considered serious, this contact should be made during normal working hours.

The electrical supervisor must ensure that all incidents are reported, investigated and recorded according to legislative requirements and the manager advised. The electrical supervisor is required to:

- ensure an entry is made in the mine record book and electrical log book for all such incidents [MSIR r. 5.11]
- maintain the electrical log book and record in it all information required under Part 5 [MSIR r. 5.11]
- regularly liaise with the manager on the status of all statutory matters within their area of responsibility.



CME Safety & Health Innovation Awards

RECOGNISING INNOVATION

The CME Safety and Health Innovation Awards recognise and acknowledge individuals, teams and companies that have developed new initiatives or original solutions to specific safety and health problems in the workplace.

The Awards aim to promote the application of safety and health innovations across the Western Australian resources sector, as part of industry's commitment to continuous improvement in safety and health outcomes.

The deadline for entries is 27 March 2015 and finalists will be notified by 1 June 2015. The Innovation Awards will be celebrated at the 2015 CME Safety and Health Conference held on 27-28 July at the Perth Convention and Exhibition Centre.

This year's conference program is designed around the overarching theme of *Leadership, Resilience and Best Practice*. It features speakers, workshops and opportunities for delegates to share ideas, learn from the experts, and join in the discussion on key safety and health issues.

SCOPE

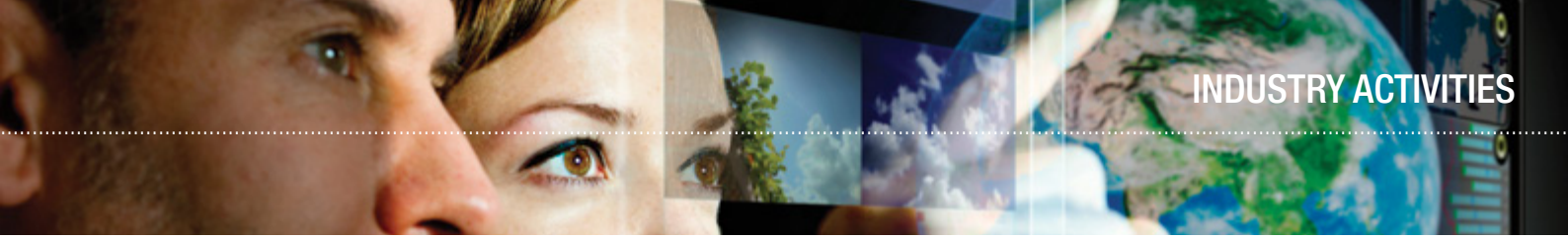
The Chamber welcomes submissions from individuals, teams and companies in the following categories:

- People – safety and health innovations to support the safety, health and wellbeing of the workforce
- Systems – innovative implementation and/or design of systems or procedures to improve safety and health outcomes
- Engineering – innovation in maintenance, engineering and/or infrastructure to enhance safety and health.

ENTRY

Entry is open to all Western Australian resources sector companies and sites, including contractors servicing the Western Australian resources sector. There is no limit on the number of nominations a company can submit.

Applicants are invited to register and lodge an online submission via the Chamber's Innovation Awards website portal at **www.cmewa.com**



UWA CENTRE TAKES ON SAFETY CHALLENGES

How does safety operate within complex organisations? How do leaders prioritise safety, balance trade-offs between safety and productivity, and build a positive safety culture? To achieve the next step change in improving safety and health outcomes, it is important to understand the human and organisational factors that create safe systems.

The Centre for Safety at The University of Western Australia (UWA) was formally launched in March 2014. The Centre's mission is to produce cutting-edge research, innovative ideas and practical solutions for safety-critical industries.

The Centre is a hub supporting collaboration between researchers and industry. Adopting a multidisciplinary approach to research, education and policy development, the Centre enables integrated solutions for complex industry issues. It works closely with a range of industries, particularly energy and mining, where a strong safety culture, high reliability, and prevention of major accident events are essential.

The Centre allows UWA experts from Biomechanics, Business, Engineering, Health, Psychology and Sports Science to coordinate work on topics such as:

- safety innovation and proactivity
- leading indicators
- safety leadership
- strategic change in dynamic environments
- organisational safety capability
- the role of safety professionals
- supporting safety capability in developing countries
- wellbeing, fatigue management and recovery
- remote operations — working at and from a distance
- resilience and process engineering.

The Centre also coordinates work across a number of UWA Centres including The Accelerated Learning Laboratory, The Centre for Sleep Science, The University's Occupational Biomechanical Facilities, The Centre for Offshore Foundation Systems, The Centre for Mining, Energy and Natural Resource Law, The Centre for Social Impact and The International Mining for Development Centre.

Researchers affiliated with the Centre are engaged in industry-based research with mining, oil and gas, construction and maritime companies. Projects include:

- benchmarking the "status of safety" — safety risks, practices, and beliefs in developing countries
- assessing the determinants and consequences of safety climate in the maritime industry
- effects of adaptive compliance on maintenance, business and safety outcomes
- operator influence on contractor safety culture
- evaluation of FIFO fatigue management practices
- demonstrating safety commitment: the antecedents and behaviours
- identification of individual driver, supervisor and organisational level factors associated with work-related road traffic injury.

For further information, visit **www.centreforsafety.com.au**

DMP PARTNERS UNIVERSITY FOR PROPOSED SAFETY RESEARCH HUB

Industrial Transformation Research Hubs (ITRH) is a scheme to engage Australia's best researchers in issues facing the new industrial economies and training the future workforce. This scheme supports collaborative research activity between the Australian higher education sector and industry, with a focus on strategic outcomes that are not independently realisable.

The University of Western Australia has submitted an ITRH proposal to the Australian Research Council for *Safety Supporting Innovation and Productivity in Complex Environments.*

If the proposal is successful, the Department of Mines and Petroleum will work with the Centre for Safety, and other industry partners, to ensure the project has major benefits for the resources sector in Western Australia.

This would mainly be achieved by publicising the Centre's activities through the Department's website and in *Resources Safety Matters* magazine, so watch this space!

TYC

Northern Star Allstars in the 2014 Underground Mine Emergency Response Competition

IMPORTANCE OF MINE RESCUE COMPETITIONS

The ability of mining companies to respond in emergencies is put to the test annually as the Goldfields and Perth play host to mine emergency response competitions.

The Department of Mines and Petroleum supports these competitions by providing staff in a variety of roles and sponsoring individual events. To acknowledge participants, the Department also photographs the competitions and reports the results through articles in *Resources Safety Matters* magazine.

Last year's Chamber of Minerals and Energy Underground Emergency Response Competition was held at the Mount Charlotte underground mine in Kalgoorlie from 31 October to 2 November. The Department provided adjudicators for the Incident Management Scenario event and sponsored the Breathing Apparatus Skills event.

On 29 and 30 November 2014, Perth hosted the annual MERC: Mining Emergency Response Competition. The event was held at Langley Park and provided an opportunity for the general public to see how mines respond to a variety of emergency scenarios. The Department sponsored the Emergency Response Team Readiness event and provided a "casualty" for the Hazmat Scenario event and administrative support for the Vertical Rescue event.

Simon Ridge, Executive Director Resources Safety, firmly believes that such competitions reinforce the importance of mine rescue in Western Australia.

"The competitions are an important way to gauge the capacity of mine sites to deal with on-site emergencies," Mr Ridge said. "It gives emergency response teams a good understanding of what their strengths are and the areas where they can improve. This is vital in ensuring competence across all areas of mine emergency response."

He also said that the experience and knowledge teams receive by participating in such competitions is invaluable.

"Workers from the sites that have teams in these competitions can be assured of the priority their companies give to having well-trained rescue teams," Mr Ridge said.

"The commitment to emergency response shown by the teams and companies involved should never be taken for granted. Having skilled mine rescue teams should not be seen as a luxury but as a necessity."

HONOUR BOARD

1st best team	KCGM 1
2nd best team	St Barbara Leonora
3rd best team	Norton Gold Fields Paddington
Breathing apparatus (BA) skills	Sunrise Dam, AngloGold Ashanti
Fire fighting	KCGM 1
First aid	KCGM 1
Incident management scenario	James Lill, Granny Smith Crusaders
Rope rescue	Northen Star Kalgoorlie
Search and rescue	KCGM 1
Team skills	La Mancha Kalgoorlie Operations
Theory	St Barbara Leonora
Theory individual	Nick Sutherland, Sunrise Dam
Team safety	KCGM 1
Overall BA skills	KCGM 1
Overall first aid	Silver Lake Resources
Best scenario – team vote	Team skills
Best captain	Drew Miller, KCGM 1
Best new captain	Jamie Stratton, KCGM 2
Best new team	Sunrise Dam, AngloGold Ashanti
Chief Adjudicators' Award for Event Management	Rope rescue

KCGM 1 TYC

COMPETING TEAMS

Agnew Gold

Granny Smith Crusaders, Gold Fields Australia

Kambalda Mutual Aid (Independance Long, Mincor and Silver Lake Resources)

KCGM 1

KCGM 2

La Mancha Kalgoorlie Operations

Metals X Higginsville

Northern Star Allstars

Northern Star Kalgoorlie

Norton Gold Fields Paddington

Silver Lake Resources

St Barbara Leonora

Sunrise Dam, AngloGold Ashanti

Drew Miller, KCGM 1 TYC

SHAKY START AND SHRILL FINISH

After taking care of the theory questions on the Friday evening, participants in the 2014 Underground Mine Emergency Response Competition headed off for a good night's sleep before the early morning start to the underground events on 1 November.

For those who forgot to set their alarms, nature provided a wake-up call on Saturday morning with a magnitude 4.5 earthquake at about 3.15 am. With an epicentre near Coolgardie, many people in Kalgoorlie were gently shaken awake by the seismic event. Fortunately, there were no issues at Mount Charlotte and the competition went ahead as planned.

After a successful weekend of mine rescue activities, the Chamber of Minerals and Energy's competition closed with the presentation dinner at the Goldfields Institute of Technology.

There was no rest for the organisers as a fire alarm went off early in the evening, keeping everyone on their toes. The false alarm was quickly dealt with, which was not surprising given the expertise in the room that could be called upon. Once the shrill alarm was silenced, proceedings got underway.

The Chamber's Chief Executive, Reg Howard-Smith, said that the event was focused on training industry personnel to respond to hazards present in the resources sector.

"Our people work hard in challenging conditions and we want to make sure they go home safe and healthy every day," said Mr Howard-Smith.

"The event prepares teams to respond to any emergency situation, while sharpening the skills they hopefully will never have to put to use," he added.

Thirteen teams competed this year across eight challenging scenarios including search and rescue, rope rescue, breathing apparatus skills, team skills, fire-fighting, first aid, incident management and theory.

Kalgoorlie Consolidated Gold Mines (KCGM 1) took out the overall honours for Best Team, followed by St Barbara Limited in second place, and Norton Gold Fields in third place.

TESTING EMERGENCY RESPONSE CAPABILITIES

When you think of the Chamber of Minerals and Energy's Underground Mine Emergency Response Competition, you probably think about rescue teams battling raging fires, abseiling down mine shafts, or perhaps crawling through confined spaces.

You probably don't think about sitting in what is essentially an office, surrounded by adjudicators acting out an emergency incident using props such as phones, radios and walkie talkies.

Yet the Incident Management Scenario is arguably one of the most mentally challenging scenarios in the annual competition. It is large, complex and requires clear thinking from competitors.

Inspector of Mines Terry Siefken has been involved in emergency response competitions since he started working with the Western Australian mines inspectorate in 1994. He is now an adjudicator in the Incident Management Scenario, which was introduced in 2007.

"I really enjoy participating in the competition and see it as a natural extension of my role as an Inspector," Terry said.

Terry said that the event was introduced to "lift the competition to the next level".

"Originally it was hoped that ex-team captains and team managers would compete in this event, when they could no longer actively participate in the team events," he said.

"However, in recent years, the event has become a platform for mine managers, who are more likely to manage a real-life incident, to test their skills."

The most recent scenario involved two workers installing pipes in an underground pump station.

"The bracket on the basket of the integrated tool carrier, or ITC, in which they are working, fails and the workers spill out of the basket and into the area directly below," Terry said.

"This area contains scaffolding around the water tanks and pumps, on which they are installing pipes.

"Consequently the workers are injured, as a result of coming into contact with these objects. Unfortunately, one worker is impaled upon steel tubing, and the other falls into one of the water storage tanks.

"The Incident Manager has to manage the rescue of the injured workers, while also dealing with the pressures of external agencies. This includes the site's corporate office, mutual aid teams from nearby mine sites, media enquiries and the regulator, which is the Department of Mines and Petroleum."

Terry has noticed the level of competition improving over the years.

"This is as a result of improved technology and training, but also as a result of a more intense focus on mining incidents, and the need to deal with them in a professional manner," he said.

For Terry, a good performance starts with "a calm but organised approach" by the team's nominee for this event.

"The participant needs to be familiar with the function of an emergency response plan, which systematically addresses each item, in order of importance," he said.

"They need to demonstrate good record keeping and ensure each item on the response plan checklist has been attended to, in the correct order of priority."

While the scenario may not have some of the visual appeal of some of the other events, it serves an important purpose.

"This scenario provides participants with a 'no consequences' opportunity to test their skills in managing an emergency, before perhaps having to do it for real, back at their own mine," Terry said.

"I also believe that the Department's involvement in this event, through the participation of inspectors as adjudicators, provides an invaluable opportunity for us to influence the standard of management of incidents.

"It is also a chance to observe the current state of emergency response management capabilities, within the industry, and thus add to our knowledge of current trends and approaches."

BREATHING APPARATUS SKILLS

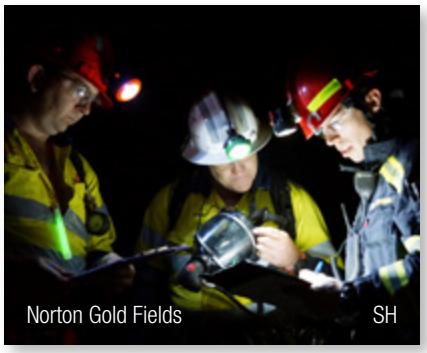

St Barbara SH

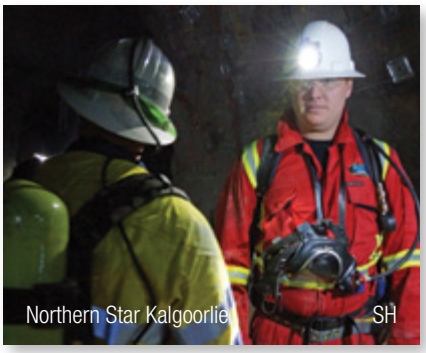

Metals X Higginsville SH


Norton Gold Fields SH

FIRE FIGHTING


Sunrise Dam SH


Norton Gold Fields SH


Northern Star Kalgoorlie SH

FIRST AID


Northern Star Allstars TYC


La Mancha TYC

Silver Lake TYC

INCIDENT MANAGEMENT SCENARIO


Kambalda Mutual Aid SH


La Mancha SH


KCGM 1 SH

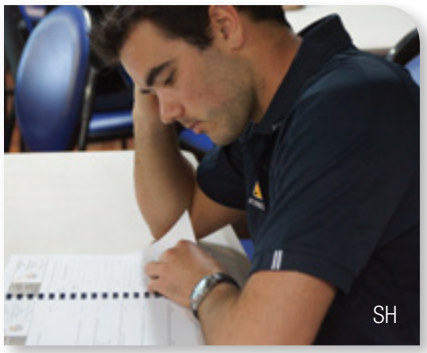

SH

SEEN AROUND


SH

THEORY


TYC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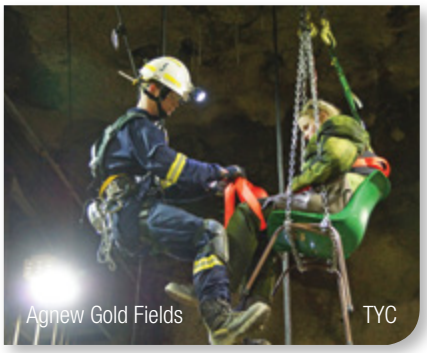
ROPE RESCUE


Agnew Gold Fields TYC


Kambalda Mutual Aid TYC


Northern Star Allstars TYC

SEARCH AND RESCUE


Agnew Gold Fields SH


KCGM 2 SH


KCGM 2 SH

TEAM SKILLS


Granny Smith Crusaders TYC


St Barbara TYC


Northern Star Kalgoorlie TYC

SH

PARTICIPATING TEAMS

Aditya Birla, Nifty Copper
Argyle Mines Rescue, Argyle Diamonds
BHP Billiton, BHP Iron Ore,
Fortescue Metals Group, Fortescue VEST Mining
Fortescue Metals Group Port, Fortescue Force
Newmont Boddington Gold
Northern Star Resources
Northern Star Resources, Paulsens Gold Mine
Rio Tinto, Rio Tinto East,
Rio Tinto, Rio Tinto West
Saracen, Saracen Emergency Response Team
Synergy, Muja Power Station
Western Areas, Forrestania Nickel Operation

HONOUR BOARD

Best captain	Simon Alldritt, Newmont Boddington Gold
Overall team safety	Fortescue VEST Mining
Overall first aid	Newmont Boddington Gold
Overall breathing apparatus	Saracen Emergency Response Team
Outstanding medic	Pippa Debeaux, Paulsens Gold Mine
Outstanding volunteer	Emma Cullen, Downer EDI
Road crash	Newmont Boddington Gold
Hazardous chemicals	Rio Tinto West
Vertical rescue	Rio Tinto East
Fire fighting	Paulsens Gold Mine
Confined space	Saracen Emergency Response Team
First aid	Paulsens Gold Mine
Emergency response team readiness	Nifty Copper

SH

SH

WHY BRING EMERGENCY RESPONSE TO THE CITY?

Resources Safety Matters asked Jen Pearce, a MERC stalwart from Red Earth Health Solutions, about how this Perth-based event went in 2014.

Q. What is the goal of the MERC and why is it held in Perth?

A. Mining by its nature can be a high risk profession. With Western Australia having over a third of Australia's mining workforce, emergency response and safety is a very high priority. As Perth is a hub for many FIFO workers, the organising committee saw the city as the ideal location to hold the MERC so we could raise awareness for emergency services and achieve our objectives.

The event weekend was open to the public free of charge. We encouraged friends and families to join us to catch a glimpse of what their loved ones can be faced with when they go to work. Quite often the families of FIFO workers have limited understanding of the challenges they may face. We hope that allowing the partners and children to see this type of competition can make a difference and help bridge that gap.

The event was very successful last year, attracting teams from the South West at Muja Power Station all the way up to Argyle Diamonds in the East Kimberly region. The MERC is unique in that we bring together teams from all facets of the resource sector, regardless of what they are mining or processing as they are faced with similar challenges in an emergency.

The competition not only showcases emergency response teams from resource companies but is building stronger networks and communities across the sector. Each year the organising committee works to improve the event. Increasing participant interaction was a focus in 2014 and we introduced a Mini Olympics Challenge as an ice breaker. This friendly competition can be a powerful networking and sharing opportunity for our emergency response community.

At the Awards Ceremony on the Sunday night, we brought together the senior management from these companies as VIPs to show support for their teams and again create an opportunity for these networks to strengthen.

Q. So what are MERC's objectives?

A. It aims to:

- Promote emergency response and rescue within the resources industry and the community throughout Western Australia.
- Provide emergency response teams with realistic scenarios to evaluate their knowledge and skills within a competition environment and, in doing so, promote learning as the primary objective of the competitions, provide positive learning experiences and training opportunities for employees and volunteers through confidence building and skills improvement and provide reward and recognition for team members.
- Develop within the resources industry, and in particular between emergency response team members, a working and social network for the exchange of information and views. Also promote the benefits of Mutual Aid agreements between sites.
- Provide an opportunity for benchmarking against industry standards.
- Raise awareness of the skills and dedication of members of the emergency response teams across industry, including management both locally and nationally, and demonstrate to the broader community and Government the industry's commitment to safety.

Q. How has the event grown over the four years since it started?

A. Support for the MERC has been strong from the start. However, it has taken us time to gain recognition and awareness for the competition and its objectives. MERC 2014 was the strongest in regards to support and recognition from across the industry and from all levels within the companies involved. There were 13 teams, which is the most we have had competing. We pulled together 47 sponsors to make the competition a success. As MERC is a fully sponsored event, it would not be possible without all of us coming together with the common goal of building safer working communities and running a successful industry event.

Q. How challenging were last year's scenarios and what ones stood out for you?

A. To nominate one scenario that stood out from the rest is difficult as each scenario challenged the teams on different disciplines and skill sets. The feedback from the competing teams and team managers was very positive across the scenarios.

Q. How many people came down to check out MERC 2014?

A. MERC 2014 attracted about 2,000 people each day. As I walked around and talked to people, there was a diverse group of families, industry representatives and the general public who had heard our radio advertising, seen the banners along St Georges Terrace or knew about the event through participating companies and sponsors.

Q. How important are these events in ensuring sites are prepared for emergencies?

A. MERC provides an invaluable opportunity for companies from across the industry to test their skills against industry standards, identify areas of improvement, and train their volunteers in a safe and controlled environment. The MERC helps to improve the scope of learning through basic skills training modules and exposure to realistic scenarios performed under the pressure of competition. Should volunteers be faced with a real-life situation, this practical training greatly improves their confidence and ability to respond in a controlled and safe manner.

Q. Many emergency response teams have mutual aid arrangements? How important are these (and by extension these competitions) in ensuring communities have emergency response capacity?

A. Due to the remote locations of many mines sites, it is common practice for them to have mutual aid agreements with their local shires, other sites and the state emergency services. This means rescue teams attend emergencies outside the mine perimeter to assist the local community in situations such as road accidents, medical emergencies, fires, floods and much more. This is an extremely important role as quite often these volunteers are the first on scene and can be pivotal to the outcome of an emergency situation. The competitions have a much wider impact on our remote communities, and we can all benefit from an event like the MERC.

Q. MERC raises funds for charities. How did you go in 2014?

A. The funds raised each year for MERC determine what we are able to achieve and donate to charity. The event is fully sponsored, so the concept of supporting charity was introduced by the organising committee to ensure any surplus funds at the end of the competition were put back into the community.

In 2014, we had fantastic support but cash sponsorship was substantially lower due to the economic climate. Logistical changes were made and we focussed on in-kind sponsorship and donations for a raffle and sausage sizzle. I am pleased to report that we were still able to support charity. Donations to date now total $168,000.

In 2014, each competing team chose a charity to receive a share of the $23,000 raised at MERC 2014.

$1,000 each to:

- 1IFE – Nifty Copper (Aditya Birla)
- PMH Foundation – Argyle Mines Rescue (Argyle Diamonds)
- Cancer Council – Fortescue VEST (Fortescue Metals Group)
- Salvation Army – Fortescue Force (Fortescue Metals Group Port)
- Telethon Adventurers – Northern Star Resources

$2,000 to:

- Miners' Promise – Saracen Emergency Response Team (Saracen)

$3,000 to:

- Telethon Adventurers – Paulsens Gold Mine (Northern Star Resources)

$5,000 to:

- Royal Flying Doctors – $1,000 each from BHP Iron Ore (BHP Billiton), Forrestania Nickel Operation (Western Areas Ltd), Muja Power Station (Synergy), Rio Tinto East (Rio Tinto) and Rio Tinto West (Rio Tinto)

$8,000 to:

- Kids' Cancer Project – Newmont Boddington Gold

TYC

CONFINED SPACE


Saracen ERT SH


Northern Star SH


Nifty Copper SH

EMERGENCY RESPONSE READINESS


BHP SH


FMG VEST SH


Muja Power Station SH

FIRE FIGHTING


Argyle SH


Forrestania Nickel Operation SH


Nifty Copper SH

FIRST AID


FMG Force SH


Forrestania Nickel Operation SH


Argyle SH


TYC

HAZARDOUS CHEMICALS


Rio Tinto West SH


Paulsens SH


Newmont Boddington SH

ROAD CRASH


BHP SH


Muja Power Station SH


Newmont Boddington SH

VERTICAL RESCUE


Rio Tinto East TYC


FMG Force TYC


Paulsens TYC

SEEN AROUND


SH


SH


SH

SH

PROSECUTIONS

DANGEROUS GOODS

Unlawful possession of explosives leads to jail term and fine

Unlawful possession of explosives is taken very seriously in Western Australia, especially when blasting explosives (high explosives) are involved. Although offences involving the possession of fireworks typically result in monetary penalties, the possession of high explosives may also result in jail terms.

In 2014, a search warrant conducted by WA Police led to the discovery of seven cartridges of blasting explosives in an individual's home. The offender was sentenced to 6 months' imprisonment to run concurrently with other convictions. In another case last year, WA Police stopped and searched a vehicle, finding 30 cartridges of high explosives, safety fuse and over 100 m of detonating cord. The offender was imprisoned for 6 months and fined $1,000.

The use of emergency flares in non-emergency situations is also taken seriously in court. An individual celebrating New Year's Eve in 2014 set off a red marine parachute flare. These flares are for use aboard marine vessels that are in distress and require immediate assistance, and are designed to be seen up to 15 kilometres away. The offender was remorseful and pleaded guilty, and was fined $1,500.

If you find explosives and do not hold a licence to possess them, the Department of Mines and Petroleum has a pamphlet on abandoned and unwanted explosives and flares that provides guidance about how to safely arrange for their destruction.

Fine for unsafe fuel storage

A man was fined $7,500 and ordered to pay $3,886 in court costs on 10 December 2014 after being found guilty in the Merredin Magistrate's Court on eight charges relating to the unsafe and unlicensed storage of dangerous goods. The string of charges followed a series of site inspections by Dangerous Goods Officers from the Department of Mines and Petroleum.

Ross Stidolph, the Department's Director Dangerous Goods and Petroleum Safety, said that officers initially inspected the site in the Shire of Trayning in the State's northern Wheatbelt on 7 November 2012.

"The officers were checking that storage tanks at this unlicensed fuel storage site had been decommissioned by the operator," Mr Stidolph said.

"During this inspection the officers identified two ground level storage tanks were still in use — one large tank for diesel and a smaller one for petrol."

The total capacity of the two tanks was more than 20,000 litres.

"The court also heard that the operator failed to display HAZCHEM warnings or fuel identification signs," Mr Stidolph said. "In addition, the site had inadequate spill containment, the location of the tanks failed to meet separation requirements and fire protection equipment was not clearly identifiable for use in an emergency.

"Despite being issued with a remediation notice from the Department and a number of follow-up letters and calls from Dangerous Goods Officers, the operator failed to comply with the regulations. Following an inspection on 20 March 2013, the Department charged him under the *Dangerous Goods Safety Act 2004*."

At the time, the operator was using the tanks to store more than 17,000 litres of fuel.

"The regulations are there for a purpose, and the ultimate reason is the safety of workers, the public and our emergency services," Mr Stidolph said.

"This decision sends the important message that the responsibility to safely store dangerous goods needs to be taken seriously, and that it is better to work cooperatively with the Department to properly address safety issues."

DMP ignites crackdown on fireworks in lead up to Australia Day

In the lead up to the City of Perth's annual Skyworks and other fireworks events for Australia Day, the Department of Mines and Petroleum issued a reminder that it is illegal to possess fireworks in Western Australia without an appropriate fireworks licence.

The dangerous goods safety regulator issued the warning that anyone involved in the illegal storage, transportation or use of fireworks was being targeted and would be referred to police if caught.

Erin James, Team Leader Dangerous Goods, said that 91 people had been charged with illegal possession of fireworks in Western Australia between January 2012 and mid-February 2015.

"Fireworks are extremely dangerous and must be stored, transported and used safely as they can cause serious injuries including burns and blindness, and can even be fatal," Miss James said.

"Fireworks can be very dangerous if used by people who aren't trained and competent. If you are in possession of fireworks or know someone who is, please don't touch them — call the police who will ensure they are safely removed.

"Do not dispose of fireworks in the rubbish bin, as this puts council workers and the public at risk."

Recently, the Yarloop Volunteer Bushfire Brigade, along with three other brigades and Department of Parks and Wildlife fire fighters, gave up their New Year's Eve to fight a fire started by the illegal use of fireworks and flares.

While the fire ultimately only damaged fences and, fortunately, didn't result in injuries or damage to houses, the incident highlights the potential danger of fireworks when used by people who aren't correctly trained.

Every year, Dangerous Goods Officers monitor Australia Day events to ensure the approved fireworks displays are conducted safely. These displays are set up and run by trained professionals who understand the risks that fireworks pose and use the appropriate controls.

Such events are established in conjunction with local councils, WA Police and fire and emergency services to ensure contingency plans are in place to protect the public.

Information on storing, transporting and handling of explosives and fireworks is available at www.dmp.wa.gov.au/6684.aspx

The list of approved fireworks events can be viewed at www.dmp.wa.gov.au/6684.aspx#6773

MINES SAFETY

Company fined for electrician's death

Crushing Services International Pty Ltd (CSI) has been fined $115,000 plus court costs of more than $3,000 in relation to the death of contracted electrician Kurt Williams on 14 August 2013. The sentence was handed down in South Hedland Magistrate's Court on 20 October 2014.

Mr Williams was greasing a motor when he was fatally crushed by a ladder attached to a tripper unit at the top of the ore processing facility at Fortescue Metal Group's Christmas Creek mine.

CSI was charged under the *Mines and Safety Inspection Act 1994* for failing to provide a safe working environment.

The company was initially fined $225,000. However, this was reduced by 30 per cent for an early guilty plea and further reduced due to CSI's remorse, previous clean record, and the company's assistance and cooperation in the investigation.

Simon Ridge, Executive Director Resources Safety, said that he was pleased this case was now settled.

"The company's guilty plea has enabled this matter to be resolved quickly and saves the family further distress that a lengthy court process can cause," he said.

Mr Ridge said that the company had worked with the Department and assisted throughout the investigation and court process.

"This serves as a strong reminder that safety needs to be the number one priority for everyone, including mine operators," he said.

"With more than 100,000 people working in our resources industry there is no room for complacency when it comes to safety in the work place. The Department's safety reform agenda is at the heart of continued efforts to assist industry to reach the ultimate goal of zero harm."

Fine for contractor's death

On 7 November 2014, Alcoa Australia was fined $68,000 in Perth Magistrate's Court for failing to provide or maintain a safe work environment with respect to the death of a contractor five years ago. The company was also ordered to pay court costs of $5,000.

On 2 September 2009, 51-year-old Paul Fry fell to his death while working at Alcoa's Wagerup Refinery, south of Perth.

Mr Fry was on night-shift when he fell at least 25 metres having accessed an open manhole. He was working with two colleagues doing descaling work on a large metal tank at the refinery when the incident happened.

Simon Ridge said that the case served as a tragic reminder of the workplace hazards and risks that are present across Western Australia's resources industry.

"The lives of Mr Fry's family and friends have been changed forever because of this tragic but, ultimately, preventable incident," Mr Ridge said. "No fine or penalty can ever make up for the price paid by Mr Fry and his family and friends."

However, Mr Ridge said that the sentence should serve as a serious reminder for operators to address the hazards and risks on their sites.

"While there will always be hazards and risks working in the resources industry, they should not result in workers being harmed or killed," Mr Ridge said. "This is why it is vital for operators and their workers to understand and address the risks and hazards at their site to ensure the safety of all present."

Note: In 2012, Transpacific Industries, the contractor that employed Mr Fry, was fined more than $170,000 by the Federal Court.

Crane designer fined following crane collapse

On 29 January this year, Etschmann Engineering was fined $16,000 and $5,000 in court costs after failing to design a crane to the appropriate Australian Standard.

The engineering firm pleaded guilty in Perth Magistrates Court to breaching regulation 6.33(b) of the Mines Safety and Inspection Regulations 1995 following the structural collapse of an 80 tonne crane during test loading in April 2013.

Andrew Chaplyn, State Mining Engineer and the Department of Mines and Petroleum's Director Mines Safety, said that the outcome was a watershed for the Department, having never previously prosecuted a designer.

"Safety in design is one of the major areas of concern identified by the Department," he said. "We hope this sends a strong message to designers working across the mining industry, but in particular in Western Australia, that negligent or inferior services will be not be accepted.

"I take this opportunity to remind all those involved in servicing the mining industry of their duties under the Mines Safety and Inspection Act and regulations."

Mr Chaplyn said that the safety regulator was promoting a risk-based approach that should employ the hierarchy of control.

"Engineering sits above the two lowest levels of control, administrative controls and personal protective equipment or PPE, the last two being relied on far too much in WA mining," he said.

"We really want to see sites climbing the hierarchy leading to safer workplaces, and we will work with them to achieve this."

QUEENSLAND CORONER CALLS FOR BETTER TYRE MANAGEMENT PRACTICES

"Any recommendation needs to consider certain important aspects, namely that they be sufficiently practical, they be, within reason, cost-effective, and can be achieved utilising, or readily created using, existing technology. If these fundamental aspects can be met there is a greater likelihood that the particular recommendation will be implemented."

This statement was made by Queensland's Central Coroner, Magistrate David O'Connell, in September 2014 before giving his recommendations following the inquest into the death of a truck driver at a Bowen Basin coal mine in December 2010. The Queensland Coroner's Court was told that Wayne MacDonald was killed when a 24 inch tyre he had just replaced exploded.

Mr MacDonald was an experienced driver who drove heavy trucks hauling coal. During his work, one of the tyres on a trailer failed so he drove his truck to the appropriate facility at the mine site to change it.

He used a short-handled, manual jack, placed under the appropriate axle of the trailer, to lift the trailer and change the flat tyre. A work colleague had provided what was thought to be a suitable replacement tyre from those available. The tyre was marked in chalk with the notation "~~SLOW LEAK~~/OK".

The truck tyre was then inflated, in a protective cage, to what was considered to be the operational tyre pressure. Mr MacDonald had completed the tyre-changing task without incident until he was lowering the trailer to the ground using the jack. This task required him to place himself between two pairs of wheels on the four axle (double bogie) trailer. As the replacement tyre came into contact with the ground, it failed catastrophically in what was later described as a "zipper failure".

Mr MacDonald, who was lying on the ground, positioned between the trailer's tyres, was hit by a percussive shockwave of air causing him fatal injuries. He died at the scene.

Although all parties accepted that the tyre failed due to a zipper failure, the Coroner could not reach a conclusion regarding the cause. When trying to establish what might have led to the failure, he was unable to precisely determine the service history, or usage, of the particular tyre.

The independent tyre expert engaged by the Queensland Mines Inspectorate gave evidence that the tyre was in good condition and an examination before its failure would not have shown the defect that led to the zipper failure.

Although no conclusion was drawn regarding the exact cause, the Coroner did make findings on steps to minimise the risk of tyre burst, through zipper failure, in the mining environment.

QUEENSLAND CORONER'S RECOMMENDATIONS

1. That management of mine sites, and their engaged contractors, review all tyre management practices to ensure that tyres on their mine sites are being operated within their specific design parameters applicable for their use. This review needs to occur within three months, and then annually the mine site needs to ensure that compliance is being maintained.
2. That any jack used by an operator has a handle of sufficient length to allow the operator to safely use the jack without the operator being in, or under, the truck or trailer, or within close proximity of the vehicle's tyres whilst jacking occurs.
3. That the industry investigate, and implement within two years, remote, or wireless, tyre pressure sensing equipment to allow operators to monitor tyre pressures from within the cabin of the truck.
4. That until remote or wireless tyre pressure sensing equipment is introduced for these mine site tyres that the practice of tyre tapping should not be continued, and that accurate, calibrated, pressure gauge should be used to check correct tyre inflation whenever operational requirements dictate that pressures are to be checked.
5. That an Australian Standard for up to 24 inch diameter truck tyres be investigated, created, and, if considered appropriate, implemented into law by regulation within a period of two years, and if no Australian Standard is created within two years then a Recognised Standard under Part 5 of the *Coal Mining Safety and Health Act 1999* be implemented within one year.

   Editor's note: This refers to Queensland legislation.
6. That whenever a tyre supplier grants a dispensation from the designed operating parameters of a tyre, that the tyre supplier provide, and receive written acknowledgement of from the customer, an appropriate and formal information package which clearly specifies the approved conditions of operation of that dispensation.

7. That whenever a tyre supplier grants a dispensation which a mine site operator uses, that the equipment's owners and operators incorporate into their written training and operating procedures the specific details of those dispensations.
8. That whenever a tyre manufacturer grants a dispensation from the designed operating parameters of a tyre, that the variations be permanently embossed (alternatively termed "tyre stamping") on the sidewall of the tyre, and that the embossing be completed in a method which is not readily removable, and remains legible, throughout the tyre's serviceable life.
9. That every tyre, whether new or repaired, undergo integrity testing by its inflation in a suitable tyre inflation cage, to a pressure of 120% of the tyre's recommended minimum cold operational inflation pressure, and then left for 20 minutes to test its integrity, before its pressure is then reduced to its recommended minimum operating pressure before the tyre is then fitted for use.

   Editor's note: Tyre inflation cages should be designed and rated for their intended use by a competent person. A competent person should also develop, based on risk assessment, safe work procedures (SWPs) for pressure testing of tyres, and operators trained in application of the procedures.

FURTHER INFORMATION

The full Coroner's report, including details of the findings and recommendations, is available at www.courts.qld.gov.au

WESTERN AUSTRALIAN GUIDANCE COMING

A guideline on tyre safety for heavy vehicles on Western Australia mining operations has been drafted with significant input from an industry working group. It is intended to replace the current guideline on tyre safety, fires and explosions.

Resources Safety will be seeking industry feedback on the draft in late March 2015. Sign up for the weekly news alerts to be advised when the public comment period starts.

TYRE BLASTS AND STORED ENERGY

From the Coroner's Report, Item 34:

"There is some use, by way of background information, in providing a simple overview of the types of forces involved in these incidents. These tyre-blasts produce very significant energy. To place this into perspective for the ordinary person one interested party to this inquest produced a document from the tyre manufacturer which relevantly states that the force of a burst tyre has enough energy to lift a small car, a 'Mazda 3' model motor vehicle, eight metres into the air. I feel this adequately conveys to the layman the extent of the forces at work in a truck tyre blast."

WHAT IS A "ZIPPER FAILURE" IN TYRES?

A zipper failure results from ply cord failure in the steel radial chords, or plys, in the tyre wall. It can occur through two main events.

- From the operation of the tyre well outside its design load, speed or inflation pressure limits, leading to a weakening in the steel cords of the tyre's plys.
- Through accidental sidewall damage that has weakened the steel cords of the tyre, such as a cut caused by forklift tines during handling, prior to any use.

TYRE TAPPING – WHAT IS IT?

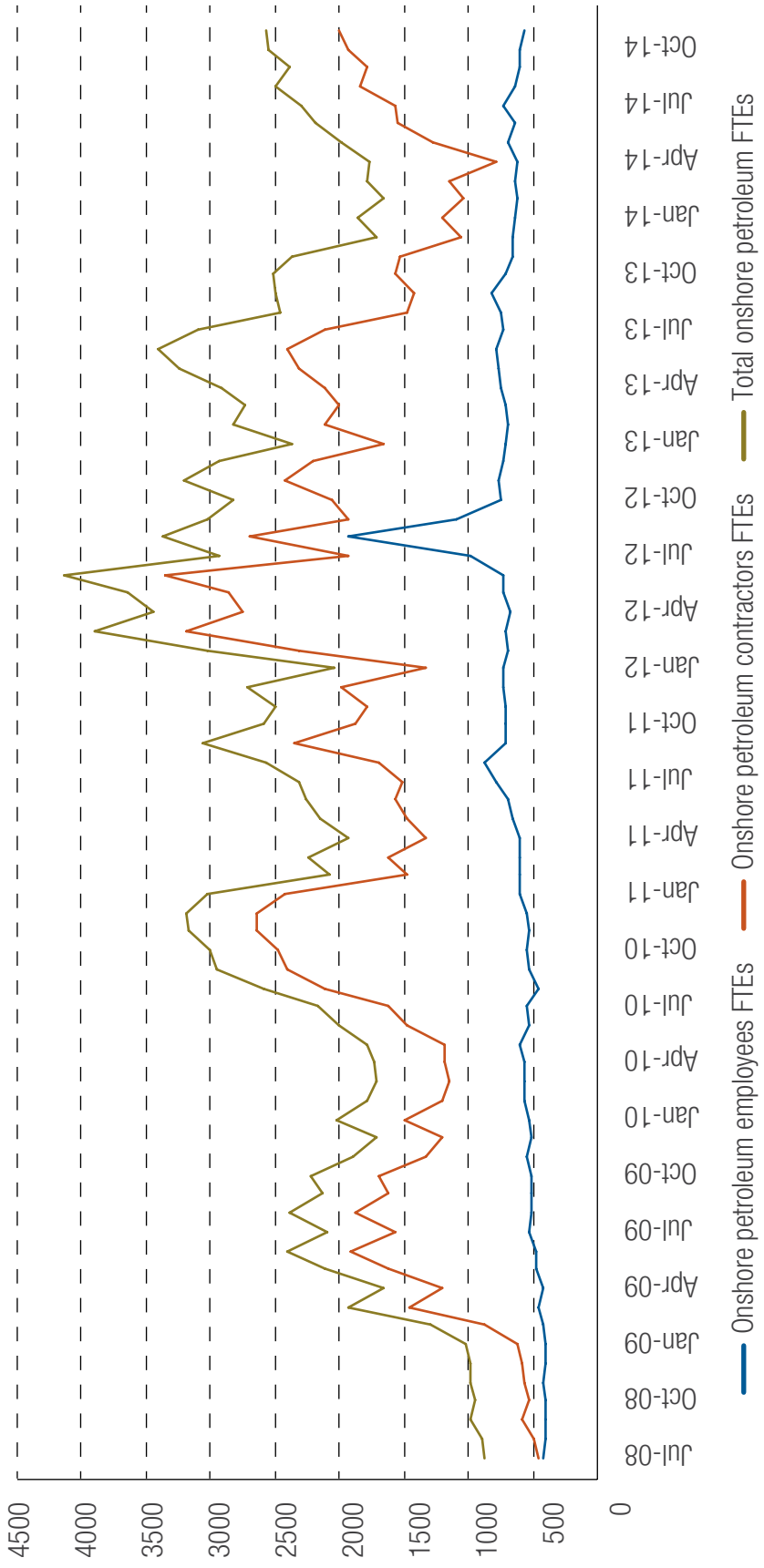
Evidence was given at the Queensland inquest that some experienced truck drivers test tyre pressures by process called "tyre tapping". The side of an inflated tyre is hit with a metal bar to listen for a specific sound indicating the tyre is at the appropriate pressure.

It was said that an experienced operator can readily use this method to determine if tyre pressures are correct. No evidence was given as to precisely how this method can determine between correct inflation, and slightly less than correct inflation, but tyre experts said that under inflation may be a percentage of just 4%.

The Coroner stated that it was difficult to accept that even an experienced truck driver would be able to discern the difference in pressure of just 5% through tyre tapping — which is the percentage at which a tyre requires further inflation as it is outside the 4% margin, or range, of appropriate pressure.

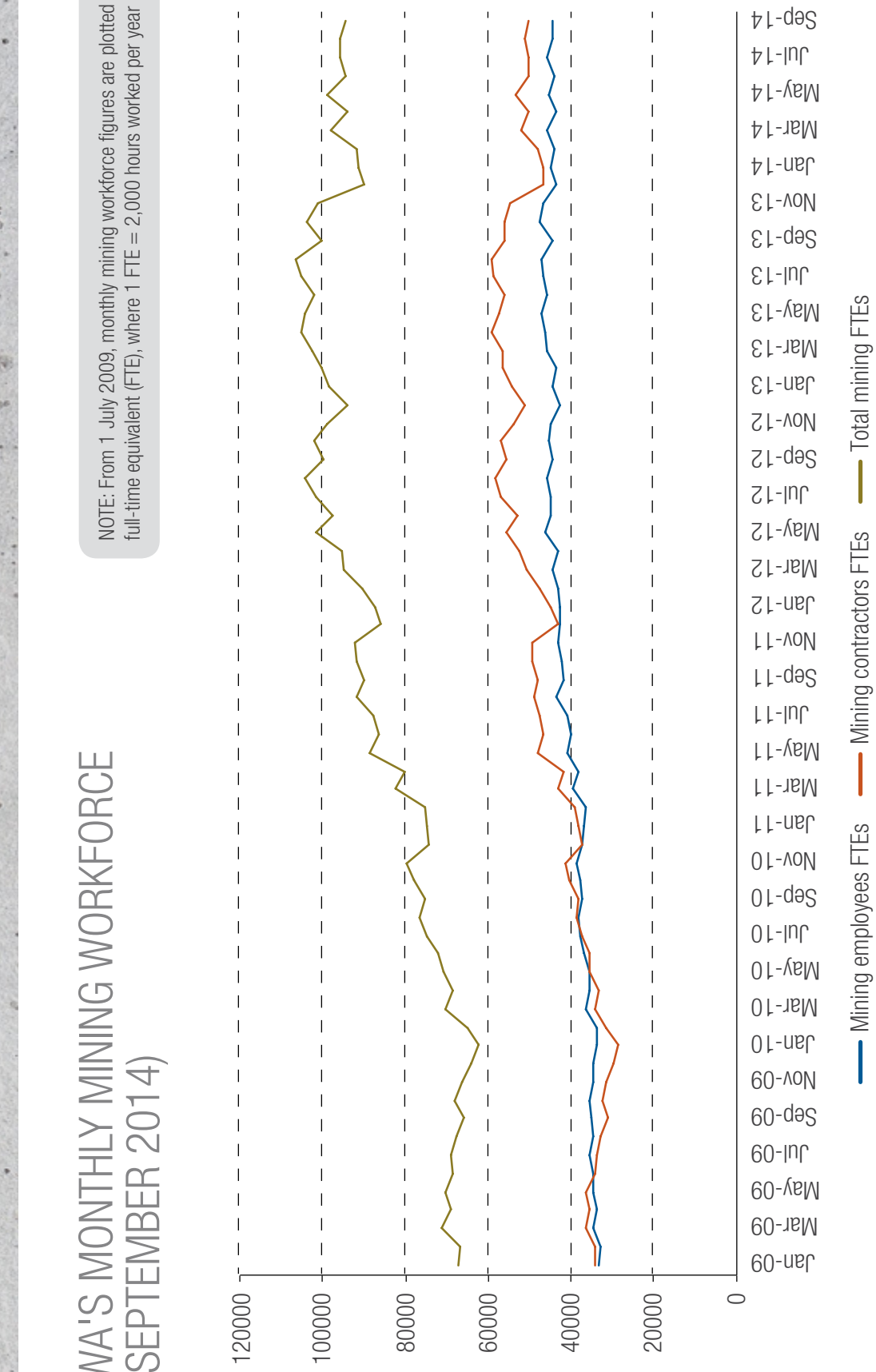
WA'S MONTHLY ONSHORE PETROLEUM WORKFORCE (NOVEMBER 2014)

NOTE: Monthly petroleum workforce figures reported as hours but plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year

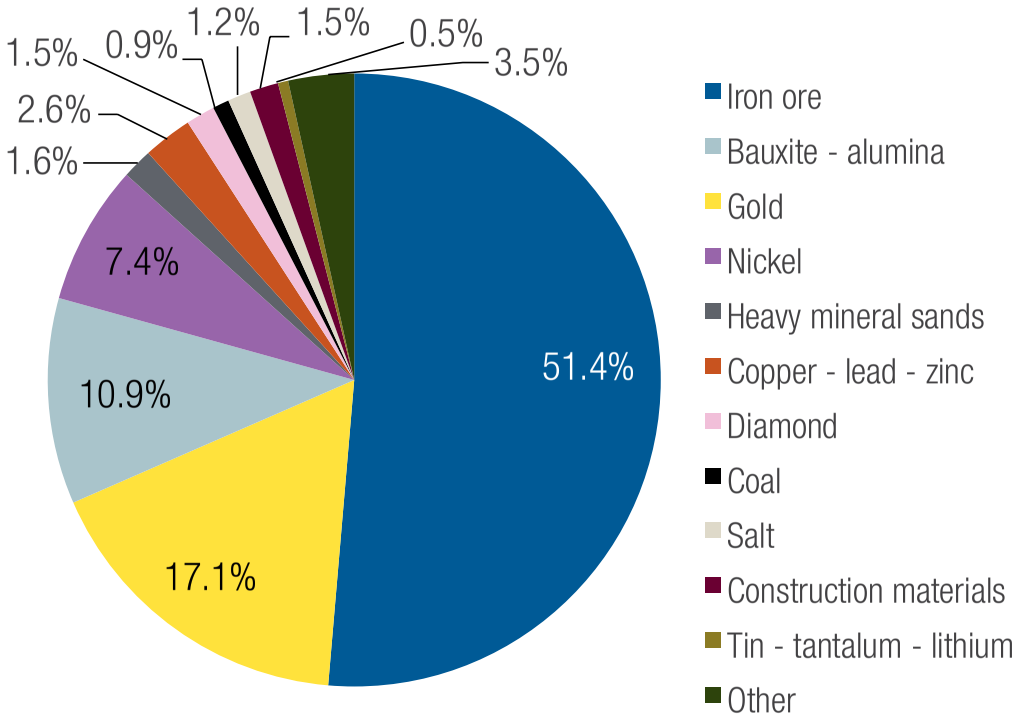


WA'S MONTHLY MINING WORKFORCE (SEPTEMBER 2014)

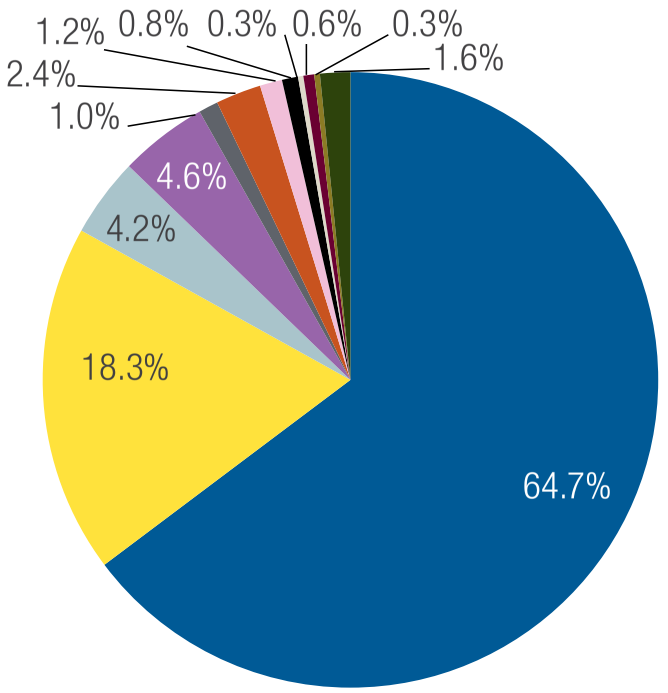
NOTE: From 1 July 2009, monthly mining workforce figures are plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year



WA'S MINING WORKFORCE – PERCENTAGE BY COMMODITY (SEPTEMBER 2014)



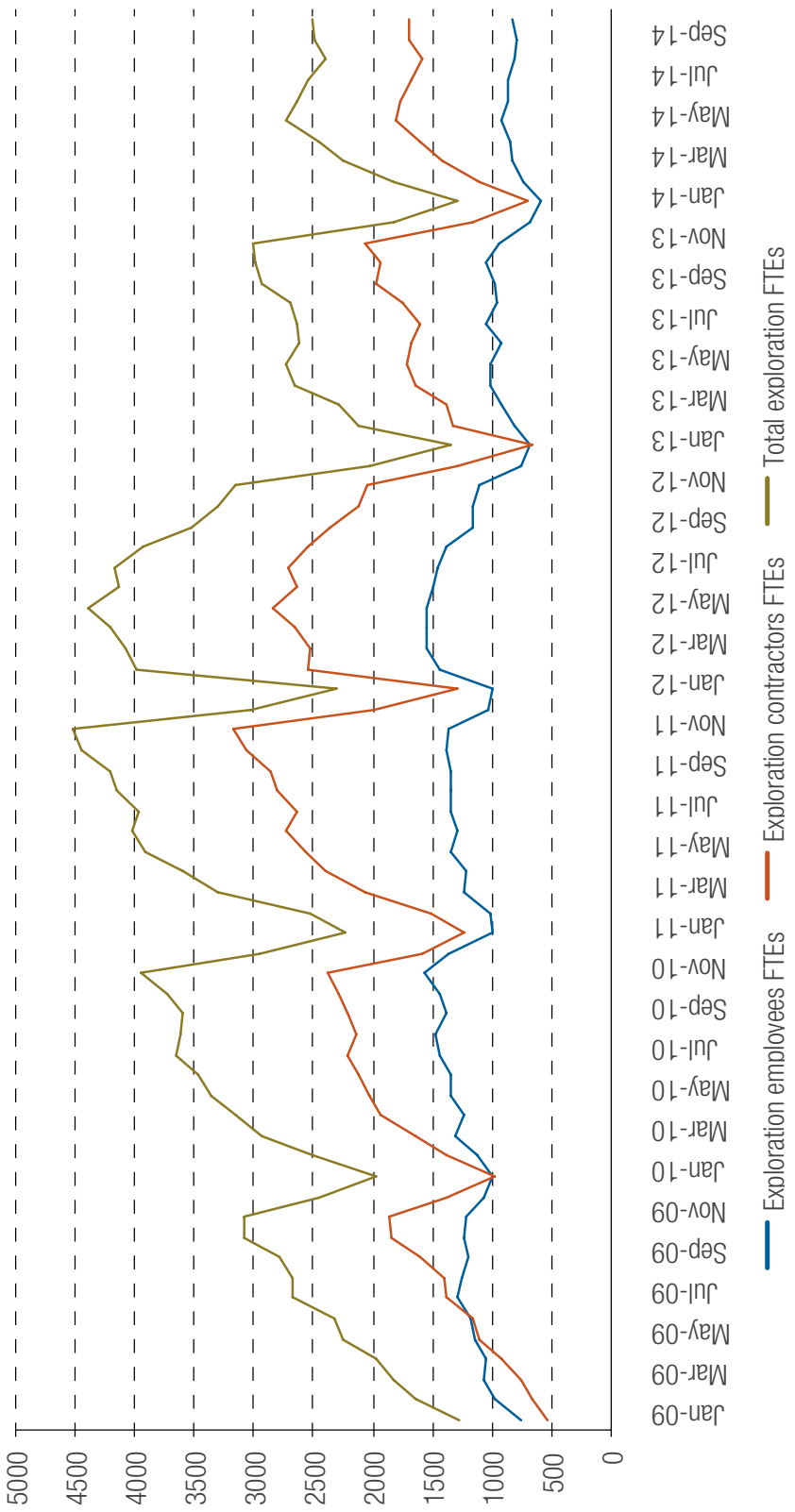
Mining employees FTEs



Mining contractors FTEs

WA'S MONTHLY MINERAL EXPLORATION WORKFORCE (SEPTEMBER 2014)

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



COMMODITY PRICES AND SAFETY PERFORMANCE

Over various minerals boom-and-bust cycles, claims are made about the impact of the economic cycle on safety performance. One such claim is that safety performance declines in the lead up to a boom because of the shortage of skilled labour and need to recruit inexperienced workers.

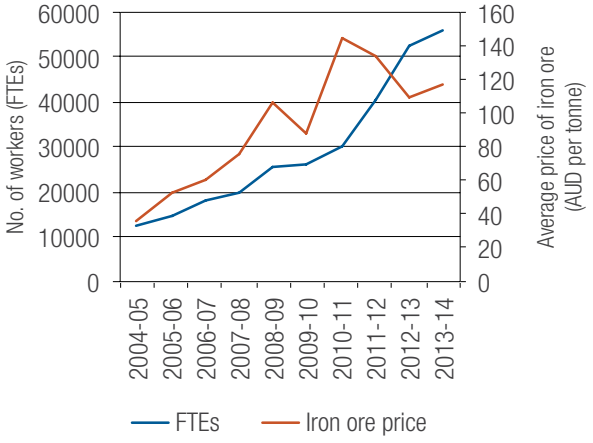
The Resources Safety Division of the Department of Mines and Petroleum has just completed a study to test the validity of such claims, using the iron ore industry as an exemplar as it is large in both financial and workforce terms. Walter Wemyss, a Graduate Officer on rotation from the Department of Regional Development, undertook a comparative analysis of serious injury data, full-time equivalent workforce data and the price of iron ore over the last ten years to assess the correlation, if any, between safety performance and commodity price.

The study found a positive but lagging relationship between the numbers of workers, counted as full-time equivalent employees (FTEs), and the price of iron ore (Graph 1). The number of FTEs increased by 349% over the ten-year period from 1 July 2004 to 30 June 2014 while the price of iron ore increased by 228%.

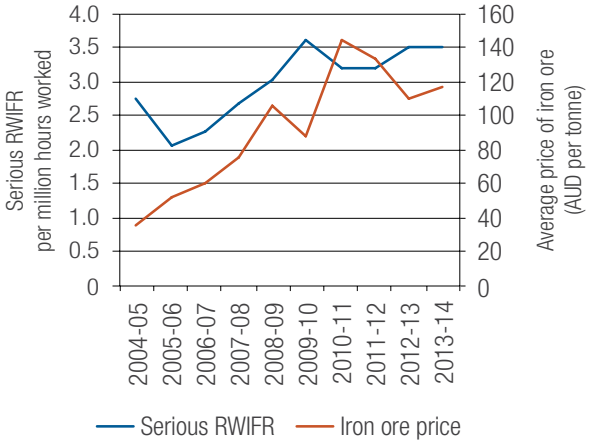
The price of iron ore initially rose more rapidly than the number of FTEs, reflecting the nature of the recent mining boom, which saw commodity prices rise at unparalleled rates. The investment phase that followed the price boom led to significant growth in the workforce as companies invested heavily in projects and site expansions.

The study showed a positive correlation (R = 0.68) between the serious restricted work injury frequency rate and the iron ore price over many of the past ten years (Graph 2). The frequency rate deteriorated by 28.3% as the price of iron ore increased at a rate of 228%. This could be interpreted as a less experienced and more transient workforce being engaged as the mining boom took off, creating new challenges for managers looking to ensure all workers were fully aware of their working environment and potential hazards. Furthermore, high staff turnover during the boom could also have contributed to this trend, as workers in their first year at a mine site or performing a new role may be more susceptible to safety oversights and therefore incidents.

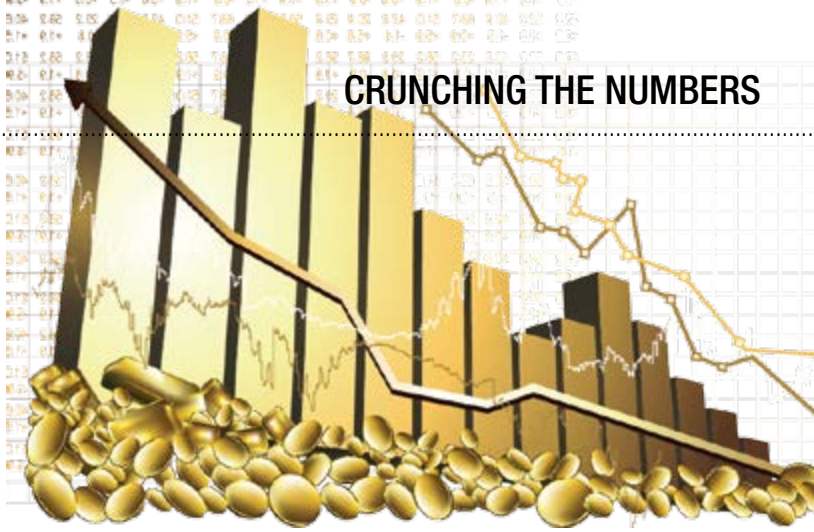
However, the restricted work injury data does show that decline in safety performance started to slow in recent years. From 2010-11, the frequency rate has shown signs of flattening out while iron ore prices have been slowly falling. This change could be attributed to the mining workforce becoming more



Graph 1 *Average annual workforce (as full time equivalent) and average iron ore price between 2004-05 and 2013-14*



Graph 2 *Serious RWIFR and average iron ore price between 2004-05 and 2013-14*

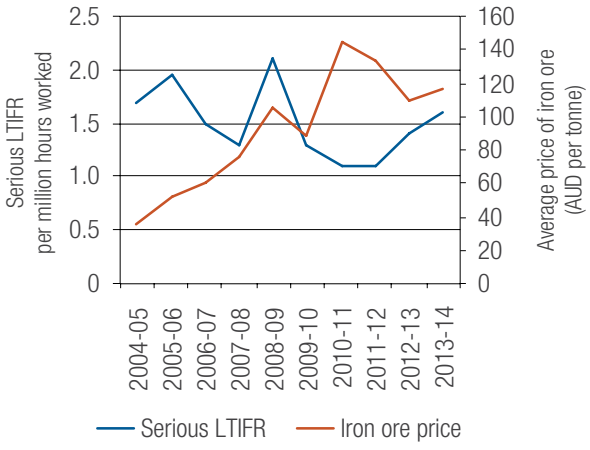


experienced and proficient in safe working practices over time. Other positive influences could include better equipment, more effort in implementing safety management systems, a greater emphasis on induction processes and training, as well as an the development of more safety-conscious cultures.

The analysis of lost time injury frequency rate plotted against iron ore price reveals no obvious relationship (Graph 3). As iron ore prices rose sharply over the past ten years, the frequency rate moved erratically with no apparent consistency.

The report cites several explanations as to why the lost time injury might lack a consistent trend. One of these is that the categorisation of an injury as lost time can be subject to the judgement of medical staff. While one may instruct a worker who suffers an injury to take time off work, someone who favours rehabilitation and is familiar with the availability of alternative duties may send the employee back to work, and therefore no lost time injury is recorded

In summary, the study found a relationship between the iron ore price and workforce numbers, as expected. For claims of a relationship between the iron ore price and safety performance, it can be argued that there is a positive relationship between iron ore price and the frequency rate for serious restricted work injuries. However, there is no evidence to support this claim for serious lost time injuries.



Graph 3 Serious LTIFR and average iron ore price between 2004-05 and 2013-14

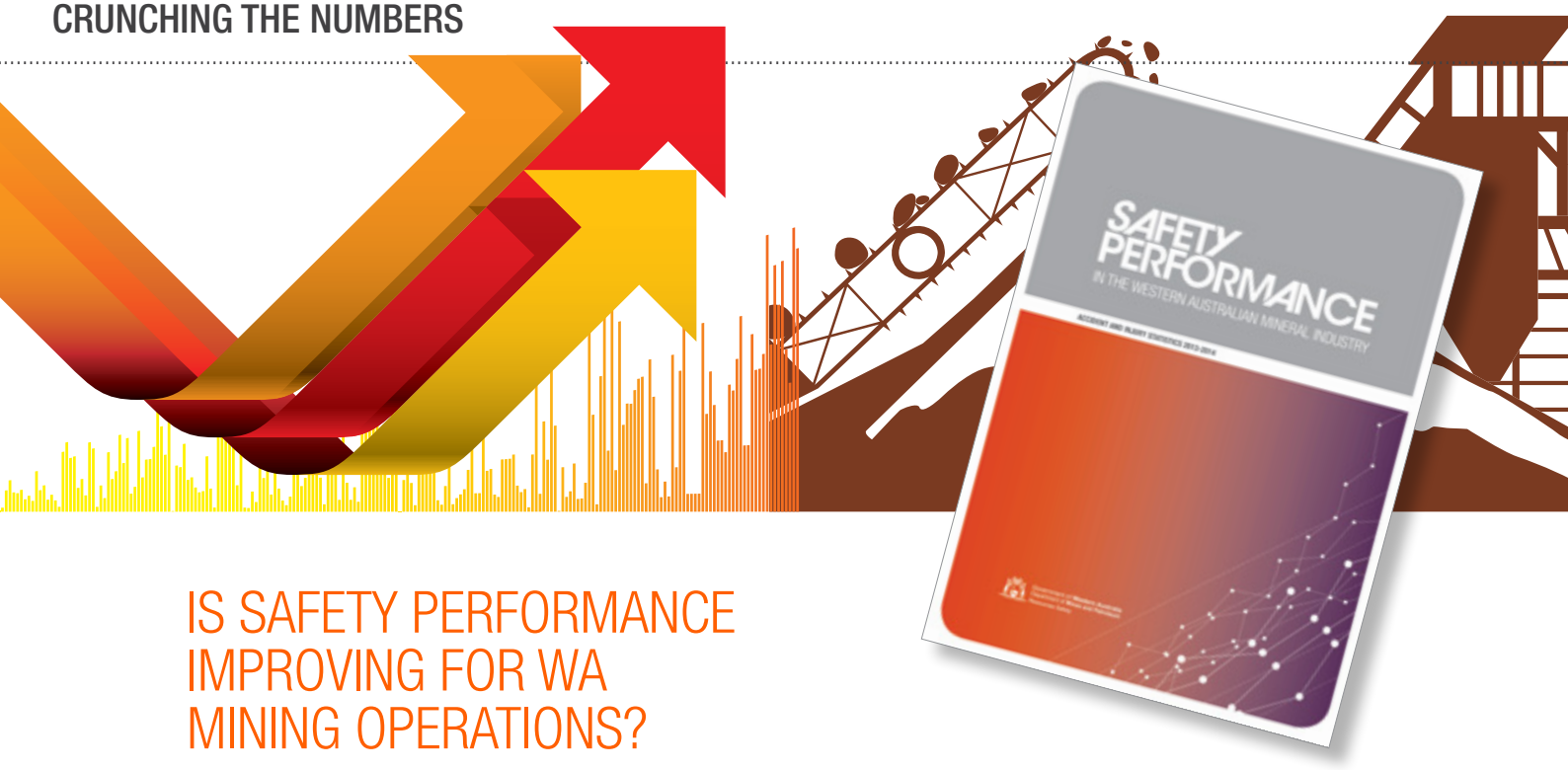
LATEST STATS ON WA'S RESOURCES SECTOR

The Department of Mines and Petroleum publishes key statistical information on the resources sector. There is comprehensive coverage on the composition, magnitude and performance of the Western Australian mineral and petroleum industries, including:

- mineral and petroleum quantities and values
- analysis of selected major commodities
- commodity price trends
- the State's position as a resource exporter
- royalty receipts
- exploration
- investment
- principal producers.

The Department also publishes a statistics digest each calendar and financial year.

Visit **www.dmp.wa.gov.au/ResourceStatistics** to sign up for email alerts about the latest data releases or to download the annual publications.



IS SAFETY PERFORMANCE IMPROVING FOR WA MINING OPERATIONS?

The latest digest covering safety performance in the Western Australian mineral industry for the 2013-14 financial year is now available. The annual safety performance report published by the Department of Mines and Petroleum includes information on:

- fatal accidents
- serious injuries
- lost time injuries
- workers' compensation premiums
- injuries by commodity group
- restricted work (disabling) injuries

for mining, and some statistics for exploration activities.

The statistics for 2013-14 are summarised below. To download the full report, including tables and graphs, visit the mining publications section at www.dmp.wa.gov.au/ResourcesSafety

A QUICK REVIEW OF MINE SITE DATA

How many people worked on mine sites?

There was an average workforce of 107,335 workers, an increase of about 1% over the previous year's average of 106,371.

Were there fatalities?

Unfortunately, yes. There were three work-related fatalities on gold mines and two at iron ore operations.

What is happening with lost time injuries (LTIs)?

There were 456 LTIs during the year, which is 41 fewer than for the previous year.

Although the overall LTI duration rate deteriorated by 4% for 2013-14, rising from 23.5 to 24.4, the overall LTI frequency rate (LTIFR) improved by 8%, falling from 2.5 to 2.3.

The overall injury index improved by 1.7%, falling from 58 in 2012-13 to 57 in 2013-14.

There were 386 serious LTIs during 2013-14, which is 25 fewer than for the previous year, although the overall serious LTIFR remained unchanged at 2.0.

What about injuries by commodity group?

The iron ore sector LTIFR deteriorated by 6%, rising from 1.6 to 1.7.

The bauxite and alumina sector LTIFR improved by 11%, falling from 4.5 to 4.0.

The gold sector LTIFR deteriorated by 4%, rising from 2.5 to 2.6.

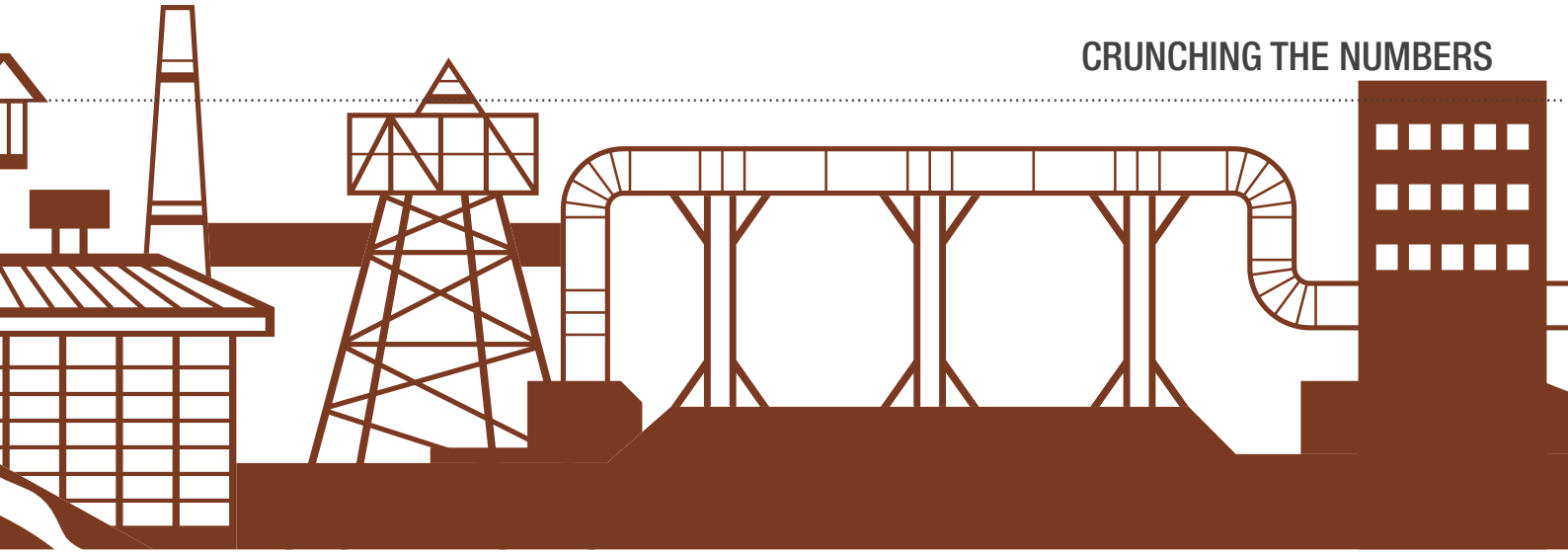
The nickel sector LTIFR remained unchanged at 3.0.

What about restricted work injuries (RWIs)?

There were 912 RWIs during 2013-14, which is 9 fewer than the previous year.

The overall RWI frequency rate deteriorated by 2%, rising from 4.6 to 4.7.

The overall RWI incidence rate fell by 8%, from 9.2 to 8.5.



A QUICK REVIEW OF EXPLORATION DATA

How many people were involved in exploration activities?

There was an average exploration workforce of 2,304 workers, a decrease of 17% from the previous year's average.

What was reported to the Department?

Six LTIs were reported for the year, which is 23 fewer than the previous year.

The overall LTIFR improved by 74%, falling from 5.1 to 1.3.

There were 30 RWIs reported during 2013-14. This resulted in a RWI frequency rate of 6.3, which is an increase of 9% over the previous year. The RWI incidence rate was 13.0, which is also an increase of about 9%.

LOOKING FOR INCIDENT TRENDS OR TOOLBOX MEETING TOPICS?

The Department of Mines and Petroleum receives several hundred incident reports each month from mining operations. The incident outcomes range from minor to serious and potentially serious.

The legislation requires the following events to be reported:

- any extensive subsidence, settlement or fall of ground or any major collapse of any part of the operations of a mine, or any earth movement caused by a seismic event
- any outbreak of fire above or below ground in any mine
- any breakage of a rope, cable, chain or other gear by which persons are raised or lowered
- any inrush of water from old underground operations or other source
- any accidental ignition of dust below ground, the discovery of the presence of potentially harmful or asphyxiant gas, or an outburst of such gas in any part of a mine
- any accidental ignition or detonation of explosives, or any delayed or fast ignition of explosives
- any explosion or bursting of compressed air receivers, boilers, or pressure vessels
- every electric shock or burn to a person and every dangerous occurrence involving electricity
- any incidence of a person being affected by poisoning or exposure to toxic gas or fumes
- any loss of control of heavy earth-moving equipment, including failure of braking or steering.

Managers at mine and exploration sites must also report any event not covered above that they consider had the potential to cause serious injury or harm to health, even though no injury or harm has resulted, as well as incidents affecting registered plant (i.e. leading to breakage, distortion, damage or failure).

Over 11,000 reports have been received since 2010 and can now be accessed using the online search of incident summaries for industry awareness. Just go to the mining accidents and incident webpage at www.dmp.wa.gov.au/8004.aspx

Summaries can be searched using incident types and dates, and results exported as a Microsoft Excel file for viewing and analysis. For example, if you wanted to find out about fires associated with drilling activities you would select Incident Type 4 and set the desired date range, conduct the search and export the Excel file. It is then simply a case of searching using a specific keyword, such as "drill", to identify the incidents you are interested in.

UNSAFE DESIGN IMPLICATED IN WORK-RELATED FATALITIES

Safe Work Australia has examined 523 worker fatalities from 2006 to 2011 for which there is sufficient information on the circumstances to make a judgement on the contribution of unsafe design to the incident. The resulting statistical report was published in November 2014.

The study determined that 63 (12%) of the fatalities were:

- definitely caused by unsafe design, or
- design-related factors clearly contributed to the fatality.

A further 125 fatalities (24%) were considered possibly design-related. These included incidents where either:

- the circumstances suggested that unsafe design played a role, or
- the fatal outcome might have been avoided had existing safety technology been used.

Safe Work Australia's report presents further analysis of these design-related fatal incidents on the basis of the circumstance category that best summarised the incident. Many brief example narratives of the fatal incidents are included, along with a summary of the evidence that led to the classification.

Visit www.safeworkaustralia.gov.au (publications and resources section) to download a copy of *Work-related fatalities associated with unsafe design of machinery, plant and powered tools, 2006-2011*.

DESIGNING FOR WESTERN AUSTRALIA RESOURCE PROJECTS AND MHFS

Mines Safety and Inspection Act 1994

s. 14. Plant designers etc., duties of

1. A person who designs, manufactures, imports or supplies any plant for use at a mine must, so far as is practicable —
   (a) ensure that the design and construction of the plant is such that persons who properly install, maintain or use the plant are not, in doing so, exposed to hazards

Petroleum and Geothermal Energy Resources (Management of Safety) Regulations 2010

Petroleum Pipeline (Management of Safety) Regulations 2010

Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007

The safety case for any major hazard facility (MHF) or petroleum facility should explain the process operations and why particular safety design solutions were adopted.

The facility description needs to cover the:

- relevant design standards used
- design and operating philosophies for the facility
- layers of protection used to protect personnel.

The formal safety assessment should focus on identifying those hazards associated with major accident events (i.e. those accidents with the potential to cause multiple fatalities) and how the risks are being managed to ALARP (as low as reasonably practical).

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **207**

POTENTIAL FOR SERIOUS INJURY FROM UNCONTROLLED ROTATION OF ROTARY KILN DRYER

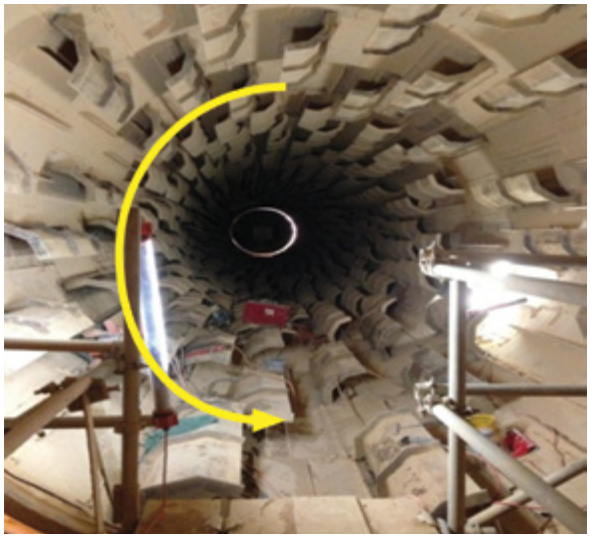
ISSUED: 22 OCTOBER 2014

Summary of incident

Three workers narrowly escaped serious injuries when the rotary kiln dryer they were working in unexpectedly rotated 180 degrees. They were about 6 metres from the exit platform at the end of the kiln, which is 26 metres long.

The workers were preparing to weld a lifter plate on the inside of the rotary kiln dryer's shell when the shell rotated.

The diameter of the rotary kiln dryer is 3.6 metres and there was the potential for serious injury from falling equipment (including a welding machine and other lifter plates) and tripping hazards.



Inside view of the rotary kiln dryer showing lifter plates welded to the shell and the direction of shell rotation during incident

Probable causes

Direct

- The rotary kiln dryer's shell was not restrained.
- There was no evidence that the rotary kiln dryer was energised or switched on at the time, and it appears that the rotation was caused by a shift in the centre of gravity during repairs in the dryer.

Contributory

- The risk analysis for the task did not identify the potential for the shell to rotate. Consequently, there were no controls in place to prevent inadvertent rotation.
- The workers did not have the original equipment manufacturer's (OEM's) instructions regarding maintenance tasks, and there was no site procedure for the replacement of lifter plates.
- The workers undertaking the maintenance work were neither familiar with the task nor adequately supervised while undertaking the task.

Actions required

Mine operators are reminded of the importance of maintaining safe systems of work for tasks carried out in, or in the vicinity of, rotary kiln dryers and similar plant that can rotate. They should apply the same rigour and standards as used for other workplace activities, and ensure that:

- the potential for the centre of gravity to move and cause uncontrolled rotation is recognised and addressed
- OEM's instructions for the safe use and maintenance of such plant are available and understood by those using them
- workers are adequately trained in infrequently performed tasks and are supervised to enable them to perform these tasks safely.

Further information

Visit **www.dmp.wa.gov.au/ResourcesSafety** for information on occupational safety and health in the resources sector.

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **208**

BYSTANDER STRUCK BY COMPONENT EJECTED FROM ACCUMULATOR

ISSUED: 17 NOVEMBER 2014

Summary of incident

A bystander in a mining heavy vehicle workshop had his arm broken when he was struck by a component ejected from a suspension hydraulic accumulator that was being worked on by a fitter.

Before the incident, the accumulator had been checked to a point where it was believed that it had been made safe. Check steps included:

- several days before the incident, when removing the accumulator from the haul truck, opening the poppet valve at the gas end of the accumulator to vent nitrogen gas to atmosphere
- closing the poppet valve after the gas had vented
- on the day of the incident, re-opening the poppet valve as a precaution to check for gas pressure — the valve body was then briefly removed from the accumulator, and loosely screwed back in a couple of turns, but left sufficiently loose to allow oil to continue draining through the open valve and a relief groove in the valve body.

After ejection of the piston, the oil draining out of the accumulator foamed for some time (see “Further information” for explanation).

Probable causes

Direct

- Contrary to original equipment manufacturer (OEM) disassembly instructions, the hydraulic end cap was removed while the poppet valve was still in the gas end cap.

Contributory

- The phenomenon of dissolved gas bubbling from the oil had not been identified nor allowed for during the disassembly process.
- The repair was considered such a frequent and routine task that it appeared not to warrant a detailed risk assessment nor a review of the task methodology.
- Detailed written procedures specifically for work on accumulators were not readily available.
- The information that was available on site had not been reviewed for some time.

Actions required

This incident highlights the need to ensure that pressure vessels, such as accumulators, are handled and managed appropriately. In particular, OEM instructions should be followed to:

- fully depressurise the pressure vessel before disassembly
- open the vessel to the atmosphere before and during disassembly
- disassemble the pressure vessel.

Industry and vocational training needs to clearly emphasise the importance of following OEM and site procedures when working on pressure equipment.

Mine operators are reminded of the importance of maintaining safe systems of work for tasks involving pressure vessels. They should ensure that:

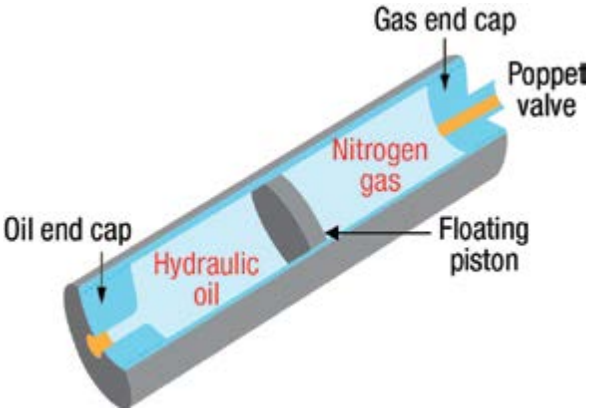
- written work procedures are maintained and made available to workers
- maintenance is only carried out by competent workers using appropriate tooling, parts and materials produced to the current design specification.

The possibility that residual pressure may remain in the vessel needs to be considered as it can lead to unexpected component movement during removal.

Further information

Accumulator failure is commonly attributed to the piston seal wearing out. The performance of the suspension system deteriorates, leading to poor ride quality, vehicle damage and stability issues.

When the piston seal fails, hydraulic oil leaks from the hydraulic chamber, passing the floating piston and entering the accumulator's gas chamber. As oil slowly fills the gas chamber, the high pressure exerted on the oil by the gas during operation can force gas to dissolve into the oil. There can be excessive foaming when the pressure is released (e.g. during maintenance). As gas bubbles from the oil, it can build to sufficient pressure that, when the hydraulic end cap is removed, the piston can be ejected from the accumulator.



Schematic sectional view of a hydraulic accumulator. The piston is not fixed but is free to slide inside the accumulator barrel as the oil and gas pressures vary

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **209**

POTENTIAL SIGNAL TUBE DETONATOR EXPLOSION ("SNAP, SLAP AND SHOOT") DURING CHARGE-UP

ISSUED: 20 NOVEMBER 2014

Summary of incident

A mobile processing unit (MPU) and spotter had finished loading explosives into the last blast hole of a row of drill holes. When the MPU started to drive off the shot, the spotter moved to the next row of drill holes to prepare for loading them. As the MPU moved forward, the downline lead of the signal tube detonator for the hole that had just been loaded became entangled with the MPU's rear protection bar. The lead had been looped around a stake, as is normal practice.

The downline lead stretched until it snapped, raising the potential for an initiation due to the "snap, slap and shoot" phenomenon. Fortunately, the detonator did not initiate.

Note: "Snap, slap and shoot" is possible when signal tube detonator plastic tubing is stretched to snapping point. When the plastic tubing recoils after snapping, percussive slapping can initiate the thin layer of high explosives contained within the plastic tube and cause the detonator to fire (or shoot).

Probable causes

Direct

- The spooled downline lead was looped around a stake at the same height as the rear protection bar, allowing the lead to become tangled as the MPU moved forward.
- The design of the MPU's rear protection bar allowed the downline lead to become entangled.

Contributory

- The spotter was not observing the movement of the MPU as he had already moved to the next row of drill holes.

Photograph showing proximity of downline lead and stake to MPU's rear protection bar during loading

Actions required

Mine operators are reminded of the importance of maintaining safe work practices for all charging tasks. They should ensure that:

- equipment is designed or modified to eliminate the risk of entanglement
- where a task requires a spotter, this person is positioned where they can observe the safe and unhindered movement of equipment.

Further information

www.dmp.wa.gov.au/6651.aspx#17164

Australian Explosives Industry Safety Group (AEISG), 2011, *Code of good practice – mobile processing units*. (see section 5.2.10 on rear impact protection for MPUs)

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **210**

ELECTRICIAN CRUSHED BETWEEN LIFT CAR AND LIFT SHAFT STRUCTURE – FATAL ACCIDENT

ISSUED: 15 DECEMBER 2014

Summary of incident

Note: The Department of Mines and Petroleum's investigation is ongoing. The information contained in this significant incident report is based on materials received, knowledge and understanding at the time of writing.

An electrician received fatal injuries when he was crushed between a lift car and the lift shaft structure and then fell to the bottom of the lift shaft.

A maintenance request had been raised for a service lift located in a powerhouse building. The lift had stopped moving and some of the doors on the lift shaft were not closing. Two electricians were sent to troubleshoot and fix the problems.

After an initial inspection of the lift, the electricians went to the lift motor room located above the lift shaft. To get the lift moving again to help identify the problems, they bridged (i.e. bypassed) sections of the lift control circuit.

One electrician left the motor room and went downstairs to the top floor where the lift car was situated. He rode the car down to the ground floor to check if the shaft doors were closed.

The other electrician subsequently went to the shaft doors on the top floor. He tried to contact his colleague on the radio a few times and then by telephone, but could not get a response. He then went downstairs to the ground floor where he found the lift shaft doors open, but no sign of the lift car. His colleague was lying on the bottom of the lift pit.

Probable causes

Direct

- Sections of the lift control circuit had been bridged and the lift car was not isolated.
- The lift may not have been in maintenance mode.
- Part of the electrician's body was projecting outside the lift car when it moved upwards.

Contributory

The preliminary investigation by the Department of Mines and Petroleum has been unable to definitively determine why the lift car unexpectedly moved upwards. However, a number of factors relating to work environment, safe systems of work, competency and supervision may have contributed to this fatal accident.

Work environment

The lift involved in the incident is one of nine installed on the site in 1988, with three lifts installed later. The original nine lifts are similar with only minor differences between them.

- Since 2010, there had been 400 breakdown notifications for the 12 lifts, including 42 for the lift involved in the fatal accident.
- Scheduled maintenance is carried out by one site electrician working with the lift manufacturer's contract technicians.
- Breakdown troubleshooting and repairs on site are typically conducted by shift electricians. They have little or no formal training in lift maintenance, and learn on the job from more experienced electricians.
- The majority of shift electricians could not correctly identify the position of the lift maintenance switch when shown a photograph of the maintenance switch on the lift involved in the accident.

Safe systems of work

Safe work instruction

- There was a safe work instruction (SWI) for lift electrical maintenance but it did not cover all aspects of the breakdown troubleshooting undertaken by electricians.
- There was no reference in the SWI about:
  - the need to bridge some of the lift control circuits (and how to do this safely)

Mines Safety Significant Incident Report No. 210 continued

  - the potential for crushing hazards when the lift moves
  - the requirement for two people to undertake certain tasks (and the communication set-up).

Risk assessments

Lifts have moving parts with potential crush hazards — electricians deal primarily with electrical hazards.

- Shift electricians often did not write job hazard analyses (JHAs) or individual risk assessments.
- JHAs were not stored or reviewed after the work had been completed. They only required supervisor approval if the resultant risk was considered to be above "low".
- There appeared to be an established practice of using verbal or mental risk assessments.

Bridging of control interlocks

There are circumstances in lift maintenance and breakdown troubleshooting that require temporary bridging of safety circuits so the lift can be moved to an accessible position.

- While the shift electricians used bridging approval forms, some had not read the whole site procedure covering the bridging of control interlocks.
- The lifts had been treated separately from the rest of the site's plant. It was commonly believed a bridging approval form was needed for equipment, but not lift control circuits.

Competency and supervision

- There appeared to be no formal system in place to check that electricians were correctly using SWIs, JHAs and individual risk assessments.
- None of the four electricians on the crew rostered for the day of the fatal accident were familiar with the SWI for lift electrical maintenance. However, electricians on the other crews were aware of the SWI.
- The supervisor had been appointed less than three months before the accident, and had not worked in a supervisory role, nor received formal training as a supervisor before this appointment.
- The line superintendent had been in the role less than one month before the accident.

Actions required

The hazards that maintenance workers are exposed to can change with each job step. Unless the troubleshooting and fault-finding steps are planned beforehand, then it will be difficult to assess the risk of each step and implement controls.

- Employers should ensure their safe systems of work also deal with maintenance activities that cannot be carried out with the equipment completely de-energised, such as inching, jogging, testing and troubleshooting live equipment.
- Supervisors and workers should check that SWIs are provided that cover the specific work to be undertaken. They need to take the time to risk assess each step of the job and confirm that the work plan identifies and controls all hazards. If there are changes to the SWI, these need to be reflected in a JHA.

The risks associated with maintenance or troubleshooting on lifts and hoists are not new or unique to mining. Employers with lifts or hoists at their operations should review the comprehensiveness and currency of their systems of work. Particular care is required when troubleshooting, especially if a control circuit needs to be bridged, which allows the lift or hoist to move, potentially exposing workers to crush hazards.

Further information

Visit **www.dmp.wa.gov.au/ResourcesSafety** for information on occupational safety and health in the resources sector, such as the toolbox presentations, guideline and report listed below.

- Assessing the risk within the task
  www.dmp.wa.gov.au/documents/Powerpoint_presentations/MSH_MSR_2014AssessingRiskTask.pptx
- Review of fatal accidents on WA mines 2000-12
  www.dmp.wa.gov.au/documents/Powerpoint_presentations/MSH_MSR_2013ReviewFatalAccidentsMines.ppt
- Effective safety and health supervision in Western Australian mining operations – guideline
  www.dmp.wa.gov.au/documents/Guidelines/MSH_G_EffectiveSafetySupervisionWA.pdf
- Fatal accidents in the Western Australian mining industry 2000-2012 report
  www.dmp.wa.gov.au/documents/Reports/RP_FatalAccidentsMINING_2000-12.pdf

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **211**

FREIGHT TRUCK DRIVER INJURED IN FALL FROM TRAILER

ISSUED: 16 DECEMBER 2014

Summary of incident

Two freight truck drivers were delivering rolls of 100 mm diameter poly pipe to a mine. Each roll weighed more than 300 kg. The rolls were strapped together in packs of five and had been loaded in three separate packs, standing upright on the trailer deck.

After releasing the restraints holding the packs on the trailer, the two drivers and site store person decided to release the straps binding the packs so the rolls could be unloaded individually.

One driver entered a pack of five rolls to release the two binding straps but was unable to release the ratchet on one strap. The second driver, who was standing on the ground beside the trailer, used a knife to cut that strap while the first driver was still inside the pack.

The pack separated and the rolls fell. Two rolls fell off the trailer. The middle roll landed half on the trailer. The remaining two rolls landed partly on the middle roll and partly on the trailer deck. The uppermost roll slid off the trailer on the other side, dragging the driver with it.

The driver fell to the ground, landing on his head and shoulder. He received a compound leg fracture.

Probable causes

Direct

- There was uncontrolled movement of the rolls of poly pipe when the pack's strap was cut.
- The truck driver was positioned inside the pack when the poly pipe rolls moved.
- The truck driver was working at height without fall protection.

Contributory

- Although a site procedure was available for loading and unloading, the hazard of stored energy and the need to undertake a job-specific risk assessment were not recognised.

Rolls of poly pipe that fell after the pack's binding strap was cut. The driver fell to the right side of the trailer after being caught in a sliding roll. Note the intact packs of poly pipe rolls at back of trailer showing the arrangement of restraints

Mines Safety Significant Incident Report No. 211 continued

- The store person and truck drivers had not unloaded packs of poly pipe rolls of this size at the site before.
- The method and equipment required to safely unload the pipe packs from the trailer had not been communicated to the truck drivers or store person.
- The binding strap ratchet could only be operated by a person standing inside the pack.
- The style of binding strap ratchet was unfamiliar to the truck drivers.

Actions required

Mine operators and supervisors are reminded of the importance of maintaining safe work procedures for handling large, heavy or awkward items of freight, including when working at height. Recommended actions include:

- ensuring personnel loading and unloading freight understand the hazard of stored energy and have the information, equipment and training necessary to handle freight safely
- reviewing site freight unloading procedures and adequacy of risk management controls, including the need for specific risk assessments where job parameters have changed.

Further information

Visit **www.dmp.wa.gov.au/ResourcesSafety** for information on occupational safety and health in the resources sector, including the following safety alerts relating to loading and unloading activities:

- Mines Safety Significant Incident Report No. 206 *Forklift struck by truck while unloading*
- Mines Safety Significant Incident Report No. 112 *Loading service vehicle onto trailer*
- Mines Safety Bulletin No. 48 *Unloading service vehicles on minesites*
- Mines Safety Bulletin No. 11 *Forklifts – access ramps to road haulage trucks*

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **212**

FALL FROM HEIGHT AT MOBILE SCREENING PLANT

ISSUED: 23 JANUARY 2015

Summary of incident

To inspect the headchute of a mobile screening plant, a supervisor climbed the steelwork above the elevated platform and handrail to access the headchute inspection hatch. As he opened the headchute inspection door, which weighed more than 10 kg, it came away from its hinge pins and fell onto the elevated platform. The supervisor lost his balance. He fell backwards over the top handrail onto the conveyor, about 3 m below, and then to the ground, a further 3.5 m below that. Fortunately, he was not injured.

Probable causes

Direct

- The design of the mobile screening plant does not offer safe access to the headchute inspection hatch — the hatch cannot be reached while standing on the elevated platform.
- The inspection door's design allows it to easily detach from its hinge pins.
- The supervisor was working at height without fall protection.

Contributory

- The elevated platform handrails were not sufficiently high to prevent a fall from an elevated position above the platform.
- Although a site working-at-height procedure was available, the potential to fall from height was not identified and, therefore, controlled for the task of inspecting the headchute.
- No risk assessment, such as a job hazard analysis (JHA) or a job safety analysis (JSA), was conducted for the task.

Photograph showing the location of the headchute inspection hatch on the mobile screening plant and the supervisor's fall path

Actions required

In accordance with Australian Standards AS 1657 and AS 4024, designers, manufacturers, importers and suppliers of mobile screening plant should:

- ensure the designs of elevated screening plants and conveyors are reviewed to identify hazards associated with the plant
- conduct a risk assessment of the tasks workers are likely to undertake on the plant to identify where they may be exposed to the identified hazards, including the risk of falling from height

Mines Safety Significant Incident Report No. 212 continued

- ensure adequate control measures are in place
- provide information to mine operators regarding the risk assessments, control measures and safe systems of work for the plant.

Mine operators should:

- ensure workers are trained to identify fall-from-height hazards they might encounter
- review elevated screen plants and conveyor systems to identify all reasonably foreseeable hazards, including specific tasks that expose workers to the risk of falling from height
- conduct a risk assessment to identify hazards and reduce worker exposure, so far as is practicable
- review and, where necessary, update site procedures to ensure controls are adequately documented in the safety management system, including the need for specific risk assessments when working at height.

Further information

Australian Standards, **www.standards.org.au**

- AS 1657 *Fixed platforms, walkways, stairways and ladders – Design, construction and installation*
- AS 4024 *Safety of machinery*

Visit **www.dmp.wa.gov.au/ResourcesSafety** for information on occupational safety and health in the resources sector.

- Mines Safety Significant Incident Report No. 211 *Freight truck driver injured in fall from trailer*
- Mines Safety Significant Incident Report No. 202 *Fall from crane deck results in serious injury*

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **213**

MAINTENANCE WORKER PINNED BY BULLDOZER BELLY PLATE – FATAL ACCIDENT

ISSUED: 11 FEBRUARY 2015

Summary of incident

Note: The Department of Mines and Petroleum's investigation is ongoing. The information contained in this significant incident report is based on materials received, knowledge and understanding at the time of writing.

A maintenance worker was fatally injured by the uncontrolled release of stored energy when working in the field on a belly plate (also known as a bottom guard or under guard) fitted to a bulldozer. No energy isolation mechanism was installed between the belly plate and the ground during the work.

Before removal of the belly plate's fastening bolts, a "come-a-long" device (hand-operated ratchet lever hoist) had been attached to the flange on the right-hand (non-hinged) side of the plate. The worker then lay on the ground beneath the belly plate to access the fastening bolts on the left-hand side. When the fastening bolts were removed, that side of the belly plate fell and pinned the worker to the ground. The plate and accumulated material weighed more than 400 kilograms and the worker was fatally injured.

The underneath of the bulldozer showing the belly plate. Note: The come-a-long device has been moved from its position at the time of the accident

Probable causes

Direct

- A stored energy hazard was left uncontrolled as no support was installed between the ground and the belly plate.
- The worker was beneath the belly plate when it fell.

Contributory

- The belly plate was not attached in accordance with the specifications of the original equipment manufacturer (OEM) — the hinge was not attached to the frame of the bulldozer and was later found to have pre-existing damage.
- The belly plate had non-OEM modifications, including a shackle welded to its flange and nonstandard fasteners.
- The accumulation of material on the belly plate would have increased its weight and may have obscured critical components, such as the hinge point and missing fasteners.
- No job hazard analysis (JHA) or job safety analysis (JSA) was performed for this task.

Damaged hinge on left-hand side of belly plate shown after cleaning

Mines Safety Significant Incident Report No. 213 continued

View from below showing non-OEM modifications to the right-hand side of the belly plate

Actions required

Employers

Implement safe systems of work such that:

- when plant is damaged, a competent person assesses the damage and advises the employer regarding:
  - the nature of the damage
  - whether the plant can be repaired
  - what repairs are necessary to reduce exposure to hazards associated with the plant.
- when plant is to be modified, competent persons:
  - assess the amended design for potential exposure to hazards
  - inspect and test the modified plant before it is returned to service to verify it has been altered in accordance with the design specifications.

Managers and supervisors

- Provide detailed safe work instructions (SWIs) or safe work procedures (SWPs) that identify the hazards and controls for each job step, and the potential for hazards to be masked.
- Ensure practicable measures are available to reduce the exposure of workers to hazards (e.g. capacity to relocate maintenance tasks from the field to the workshop).
- Ensure workers are trained to:
  - recognise sources of stored energy, and understand and have access to suitable energy control measures
  - report damaged equipment promptly so it may be assessed and repaired as necessary, and returned to service in a safe condition.
- Instil safe work practices such that workers do not place themselves under suspended loads or in the line of fire.
- Ensure workers complete a JHA or JSA and have it assessed as adequate for the task by the supervisor before work is allowed to commence.
- Ensure anyone working on a task contributes to the development of the JHA or JSA, and reads and acknowledges its contents.

Workers

- Always follow the approved safe system of work when performing any task.
- Ensure a JHA or JSA is completed and assessed as adequate by the supervisor, and that you understand its contents before starting the work.

Further information

Visit **www.dmp.wa.gov.au/ResourcesSafety** for information on occupational safety and health in the resources sector, including the following safety alert:

- Mines Safety Bulletin No. 93 *Lowering and raising of bottom guards on dozers – fatal accidents*

MINES SAFETY BULLETIN NO. **115**

220 VOLT OUTLETS IN LIGHT VEHICLES

ISSUED: 19 NOVEMBER 2014

Background

Some light vehicles used on mining operations have a 220 volt three-pin socket outlet installed in the rear luggage compartment. Electricity to the outlet is supplied from an inverter, which is connected to the vehicle battery. This allows the plug-in connection of electrical equipment that is mains voltage powered at up to 100 watts.

Example of 220 volt three-pin electrical socket in light vehicle

Summary of hazard

Some outlets are not provided with residual current device (RCD) protection, which is required by regulation 5.24(1)(b) of the Mines Safety and Inspection Regulations 1995.

The outlet is designed to deliver mains-equivalent voltage at limited wattage capacity. Use of faulty electrical equipment without the protection of an installed RCD may result in electric shock to the equipment operator or bystanders.

Contributory factors

- When faulty electrical equipment is used from an RCD protected circuit, the value of the earth fault current is limited to below 30 mA for a very short period, which significantly reduces shock hazards.
- No such protection is provided for the 220 volt outlets on some vehicles.

Actions required

Where 220 volt three-pin socket outlets are not protected with an RCD, they must not be used for the connection of portable, mobile or moveable electrical equipment while on a mining operation. To prevent their use, arrange for such outlets to be disabled or removed by a competent person.

Note: This instruction applies to the 220 volt outlet only. Use of the vehicle for all other purposes remains unaffected.

Further information

Visit www.dmp.wa.gov.au/16315.aspx for information on electrical safety in the resources sector.

MINES SAFETY BULLETIN NO. **116**

USE OF MOBILE ELEVATED WORK PLATFORMS (MEWPS) WITHIN OR ADJACENT TO STRUCTURES WITH RESTRICTED ACCESS

ISSUED: 8 DECEMBER 2014

Summary of hazard

Over the past 18 months, the Department of Mines and Petroleum has received dozens of incident reports involving the use of mobile elevated work platforms (MEWPs) within or adjacent to structures with restricted access. Most relate to construction activities.

MEWPs are being damaged and people injured due to basket placement in or adjacent to a structure with restricted access.

Incidents include:

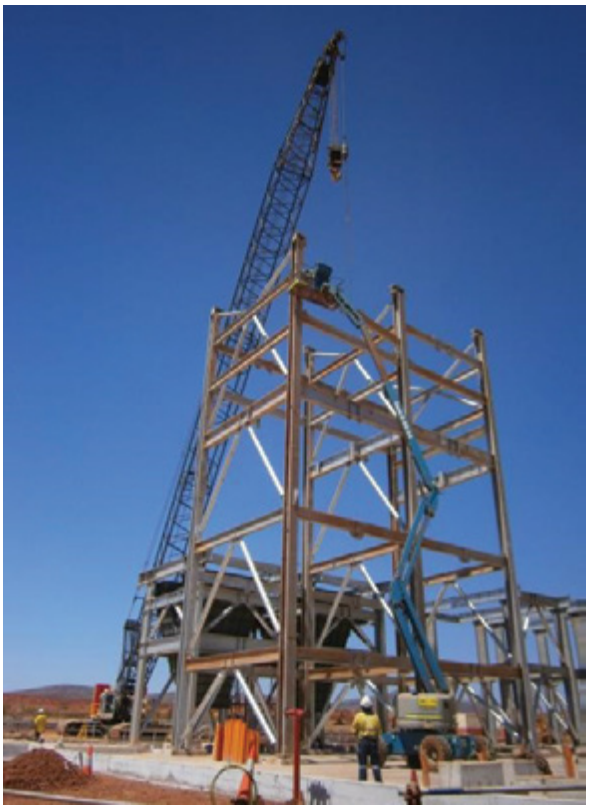
- an employee attempting to manoeuvre into a steel structure was seriously injured when he became trapped between the MEWP control panel and framework
- all eight connecting bolts between a MEWP basket and rotator assembly sheared when the basket came into contact with a steel structure
- a MEWP basket knuckle was damaged when the basket became entangled in a steel structure while being withdrawn.

MEWPs being used in and near a structure with restricted access

Contributory factors

Using a MEWP in a restricted workplace increases the potential for entanglement or entrapment. Contributory factors identified in the reported incidents include:

- operators not being competent or not receiving machine-specific training, leading to:
  - incorrect operation of the MEWP
  - operator leaning over handrail or control panel
  - operator not allowing enough room for delays in response to hand control operation
  - operator not fully understanding the functions and response times of each control movement of the MEWP



Spotter has obscured view of work being undertaken by MEWP operator and might not recognise potential for interaction with other activities

- spotters not receiving competency-based training, leading to incorrect positioning to see and advise operators on hazards
- risk assessment not identifying potential for:
  - interaction with other work parties, leading to inadequate communication between parties
  - operator to be distracted
  - spotter being asked to conduct multiple tasks
  - view of work to be obscured, leading to inappropriate spotter positioning or insufficient spotters
- MEWPs not being maintained to original equipment manufacture (OEM) requirements, leading to loss of control of movement.

Actions required

Mine operators are reminded of the importance of undertaking risk assessments for work being undertaken using MEWPs. The emergency plan for work in restricted-access areas should include a suitable response to entrapment or entanglement within a structure.

When using a MEWP, the following measures are recommended:

- supervisors should
  - conduct a risk assessment that involves operators and spotters before starting a task
  - ensure operators and spotters are competent to conduct the task
  - where required, use more than one spotter for a specific task
- operators should
  - have a current high risk work licence for operating the MEWP
  - be assessed as competent for the type of MEWP to be used, as well as the work to be done and operating environment
  - conduct a pre-start check before a machine is operated to ensure it is responsive to control commands
  - keep all parts of their body within the confines of the MEWP basket while in operation
- spotters should
  - be in a position to see and advise on hazards
  - establish suitable communications with the MEWP operator and other work parties in the vicinity
  - not be distracted by doing other tasks while the MEWP is in use
- maintainers should
  - maintain each MEWP onsite to OEM requirements so it operates as expected.

Further information

Visit **www.dmp.wa.gov.au/ResourcesSafety** for information on occupational safety and health in the resources sector.

MINES SAFETY BULLETIN NO. **117**

PREVENTING ELECTRIC SHOCKS DURING WELDING

ISSUED: 22 DECEMBER 2014

Summary of hazard

The welding electrical circuit comprises a power source, electrode lead, electrode, work piece, work terminal and work lead. An electric shock may result if a person becomes part of the welding electrical circuit during welding.

Over the past three years, the Department of Mines and Petroleum has received more than 160 electric shock incident reports during welding on Western Australian mining operations. Fortunately, no one has been electrocuted but any shock received during welding has the potential to be fatal.

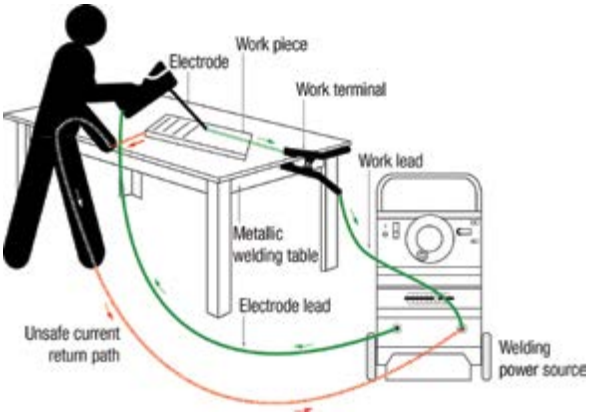
Contributory factors

The most common ways that a person becomes part of the welding electrical circuit are by:

- inadvertently touching exposed metallic or conductive parts during welding
- welding in wet or humid conditions, which increases the risk of inadvertent contact through water or sweat, which are conductive
- not using fit-for-purpose personal protective equipment (PPE)
- using a welding electrical circuit that is faulty due to inadequate testing and maintenance.

Actions required

Workers need to be competent in the tasks they undertake. Those involved in welding should understand the welding electrical circuit and how to maintain a safe current path.



Example showing the safe current path (green) and unsafe current return path (red dots) if welder with inadequate PPE becomes part of the welding electrical circuit by touching the table

Safe work procedure

A safe work procedure for welding work should be developed and implemented in accordance with Australian Standard AS 1674 *Safety in welding and allied processes* and the Welding Technology Institute of Australia's Technical Notes 7 and 22. This includes:

- conducting a job-specific risk assessment
- implementing measures to mitigate risks arising from the work environment
- visually inspecting the work environment, welding equipment and welding electrical circuit before each welding job.

Work practices

Welders should:

- be aware of their work environment to avoid becoming part of the welding electrical circuit (e.g. know what should not be touched)
- ensure there is adequate insulation of welding electrical components to avoid inadvertent body contact with any exposed live electrical part

- connect the work terminal as close as practicable to the work piece to provide the least resistant current return-path back to the welding power source
- ensure earth leakage protection does not exceed 30 mA
- isolate the welding activity from other work carried out in the area

  Note: Where it is necessary to carry out more than one welding activity in the same work area, a safe current return-path should be maintained for each welding activity.

- avoid welding in wet or humid work areas
- use protective devices such as a voltage reduction device (VRD) or manual trigger switch.

If it is not practical to avoid working in wet or humid conditions, implement additional control measures such as:

- ensuring equipment is dry before welding
- using fit-for-purpose personal protective equipment (PPE) and clothing (e.g. personal protection that insulates body parts from any exposed metallic conductive parts of the welding electrical circuit)
- providing additional PPE for change-out when that being used becomes wet or damp.

Testing and maintenance

An electrical supervisor at a mine must ensure that electrical equipment and installations at the mine are maintained in a safe working condition through routine testing and maintenance by a licensed electrician. The test plan should include verification of:

- the welding electrical circuit
- protective devices
- earth continuity and insulation resistance.

Further information

- AS 1674.2 *Safety in welding and allied processes*
- The Welding Technology Institute of Australia (WTIA)
  - Technical Note No. 7 *Health and safety in welding*
  - Technical Note No. 22 *Welding electrical safety*

MINES SAFETY BULLETIN NO. **118**

WORKING ALONE WITH CORROSIVE SUBSTANCES – POTENTIAL LOSS OF COMMUNICATIONS

ISSUED: 11 FEBRUARY 2015

Background

Many activities at a mine are undertaken by a person where verbal or visual communication with other employees is not possible. Under these circumstances the person is considered to be working alone, and the potential risk of an existing hazard is increased — possibly to a level necessitating extra precautions.

A number of incidents involving people working alone with corrosive substances have occurred in the past few years. Recently, there was a serious incident involving a process operator who became separated from his two-way radio, thereby removing the only means by which he could contact emergency services for assistance.

Summary of hazard

Operators working with or near large volumes of corrosive substances are at risk of being engulfed should a loss-of-containment event occur. During such an event, they may lose communication and an alternative means of contact may not be available.

Contributory factors

Any of the following could affect communication procedures that rely on two-way radios:

- the initial rush of solution unbalances the operator and separates them from their two-way radio
- the operator removes contaminated clothing and, inadvertently, their two-way radio
- the operator's vision is impaired by corrosive solution entering their eyes as they remove contaminated clothing
- the operator is, for a long period, unwilling to leave the safety shower.

In these scenarios, the operator cannot use their two-way radio to contact emergency services.

Actions required

The manager at a mine is responsible for ensuring that the risks associated with any person working alone are evaluated, and control measures are implemented to minimise the risks. Supervisors and those working alone should ensure that:

- they are aware of the high-risk hazards and activities in their work area
- all practicable measures are taken to control the hazards and minimize the risks associated with their work
- they are familiar with the appropriate safety equipment and its location (e.g. emergency safety showers, exits)
- the agreed communications strategy is adhered to.

Where a person working alone is injured in the workplace, there should be measures in place to minimise the time that the injured person remains unattended. These measures may include:

- supervisors or other competent persons visiting the workplace at a frequency deemed necessary based on a formal risk assessment
- the person working alone making contact with another worker at frequent pre-arranged intervals
- video surveillance of work areas
- alarming all safety showers that are likely to be used in an incident scenario where an operator is unable to use their two-way radio
- providing a personal duress alarm system, where practicable.

Note: Regulation 10.5 of the Mines Safety and Inspection Regulations 1995 has specific requirements for people working alone while underground.

Further information

- www.dmp.wa.gov.au/8058.aspx#6908
  NSW Department of Mineral Resources, 2002, Minerals Industry Safety Handbook, Edition 1, Section 3.2 - People Working Alone
- www.commerce.wa.gov.au/worksafe/frequently-asked-questions-working-alone
  Frequently asked questions – Working alone
- www.csmf.net.au/products-for-sale
  Commonwealth Safety Management Forum, 2009, Out there! National guidelines for working alone, overseas or in a remote locality (second edition): CSMF, Canberra, 42 pp.
- www.comcare.gov.au/Forms_and_Publications
  Commonwealth of Australia, 2013, Comcare's guide to remote or isolated work: Comcare, Canberra, 30 pp.
- www.hse.gov.uk/toolbox/workers/lone.htm
  Lone workers

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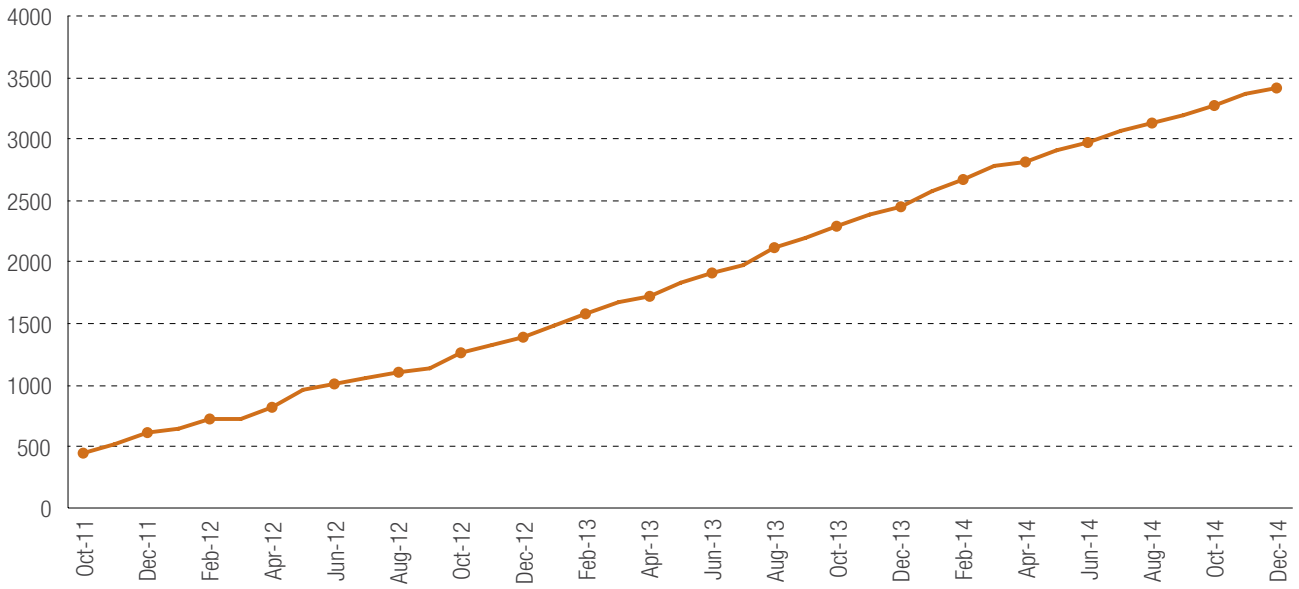

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Resources Safety

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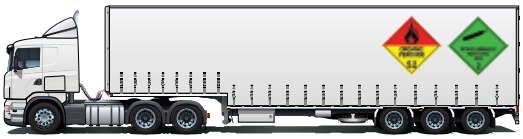

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Go to www.dmp.wa.gov.au/DGTransport or use the QR link to access the self-audit guide.

FURTHER INFORMATION

Send a blank email to the address listed to receive information about transporting dangerous goods.

- Packages (e.g. 200 L drums, gas cylinders)
  packages@dmp.wa.gov.au
- Placardable units (e.g. tanks, IBCs, isotainers)
  punit@dmp.wa.gov.au
- Approved emergency responders for placard loads
  er@dmp.wa.gov.au

CONTACT US

For all other dangerous goods safety and licensing enquiries (including explosives, fireworks and major hazard facilities)

Telephone: (08) 9358 8001

Email: dgsb@dmp.wa.gov.au

HEAD OFFICE

RESOURCES SAFETY DIVISION, DEPARTMENT OF MINES AND PETROLEUM

Street address: Level 1, 1 Adelaide Tce, East Perth WA 6004
Postal address: Mineral House, 100 Plain St, East Perth WA 6004
Telephone: +61 8 9358 8002 (Monday-Friday, 8.30 am to 4.30 pm)
Facsimile: +61 8 9358 8000
Email: ResourcesSafety@dmp.wa.gov.au
NRS: 13 36 77 (the National Relay Service is an Australia-wide telephone access service available at no additional charge to people who are deaf or have a hearing or speech impairment)

DANGEROUS GOODS SAFETY

including explosives, fireworks and major hazard facilities

Telephone: +61 8 9358 8002
Facsimile: +61 8 9358 8000
Email: ResourcesSafety@dmp.wa.gov.au (licensing enquiries)
dgsb@dmp.wa.gov.au (dangerous goods safety enquiries)
rsdspatial@dmp.wa.gov.au (dangerous goods pipelines enquiries)
CriticalRisksMHF@dmp.wa.gov.au (major hazard facility enquiries)
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MINES SAFETY

including exploration, mining and mineral processing

Telephone: +61 8 9358 8079 (general enquiries and safety and health representatives)
+61 8 9358 8102 (mines safety reporting)
+61 8 9358 8461 (health surveillance, biological monitoring and contaminant monitoring [CONTAM])
Facsimile: +61 8 9325 2280
Email: MinesSafety@dmp.wa.gov.au (general enquiries)
mineshreps@dmp.wa.gov.au (safety and health representatives)
contammanager@dmp.wa.gov.au (contaminant monitoring and reporting)
occhealth@dmp.wa.gov.au (health surveillance and biological monitoring)
plantregistrations@dmp.wa.gov.au (plant registrations)
For a serious mining accident or incident, the mine or exploration manager must advise their District Inspector as soon as practicable.

NORTH INSPECTORATE

Street address: Level 1, 1 Adelaide Tce, East Perth WA 6004
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Telephone: +61 8 9358 8079
Email: north.inspectorate@dmp.wa.gov.au

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Postal address: Locked Bag 405, Kalgoorlie WA 6433
Telephone: +61 8 9021 9411
Email: east.inspectorate@dmp.wa.gov.au

WEST INSPECTORATE

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Email: west.inspectorate@dmp.wa.gov.au
OR
Street address: 66 Wittenoom St, Collie WA 6225
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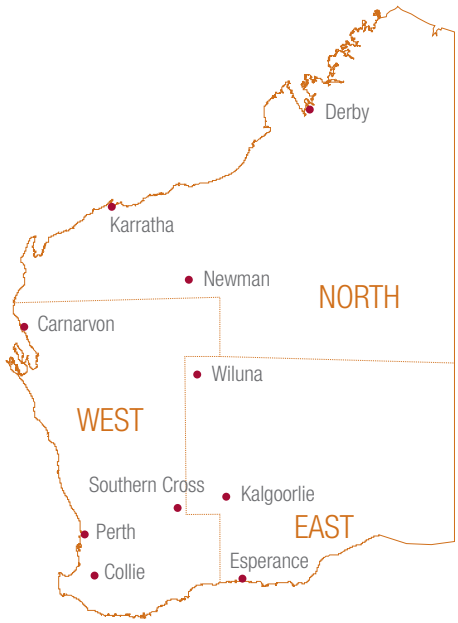

MINE PLANS

Telephone: +61 8 9358 8115
Facsimile: +61 8 9358 8000
Email: rsdmineplans@dmp.wa.gov.au

SAFETY REGULATION SYSTEM (SRS)

Telephone: +61 8 9358 8002 (select option 3)
Email: SRSManager@dmp.wa.gov.au

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