

Resources

# Safety

matters

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Government of Western Australia  
Department of Mines and Petroleum  
Resources Safety

## **MINES SAFETY ROADSHOW GETS A MAKE-OVER**

.....  
AUTONOMOUS SAFETY CODE  
A WORLD FIRST

.....  
DRONES – COMING TO THE AIR  
NEAR YOU!

.....  
DANGEROUS GOODS SAFETY  
ON DISPLAY



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Scan this QR code for past issues of *MineSafe* and *Resources Safety Matters*



*Mines inspectors at the bi-annual Mines Inspector Forum*

**The Department of Mines and Petroleum recently acknowledged the appointment of the first mines inspector of Aboriginal descent. Following implementation of the Reform and Development at Resources Safety or RADARS strategy in 2009, Resources Safety has built a modern and diverse inspectorate that has a broad range skills and life experiences.**

The three safety inspectorates, which cover dangerous goods, critical risks and mining, have reached a degree of staff diversity that reflects the resources sector itself. According to data recently published by the Western Australian Chamber of Minerals and Energy, about 18 per cent of the resources sector workforce is female.

In total, Resources Safety has 109 inspectors and officers of whom 20 per cent are female. We have employees from 24 countries of origin, ranging from recent graduates to engineers with more than 40 years in the resources sector.

This breadth of life experience means that, as well as having the necessary technical capabilities, the inspectorate is better equipped to respond to the needs of the sector in an empathetic manner. This is important as Resources Safety is committed to providing tangible support to industry as it seeks positive cultural change.

When positions are advertised for Resources Safety, potential candidates can be assured that the Department welcomes diversity and seeks applicants from a wide variety of experience and backgrounds so we can better meet the needs of industry.

## NEW MIAC MEMBERS WELCOMED

I am pleased to report that the tripartite Mining Industry Advisory Committee (MIAC) was reconvened in July, with membership of the reconstituted MIAC commencing on 30 July 2015. This is a significant event for safety in the State's mining and exploration sectors.

Mr Simon Bennison	Industry member
Mr Andrew Chaplyn	Government member (ex officio)
Mr Christopher Davis	Expert member
Ms Adrienne LaBombard	Industry member
Ms Peta Libby	Expert member
Mr Glenn McLaren	Union member
Mr Stephen Price	Union member
Mr Martin Ralph	Expert member
Mr Simon Ridge	Government member (ex officio)
Mr Greg Stagbouer	Expert member
Mr Robert Watson	Industry member
Mr Gary Wood	Union member

Given the diverse backgrounds of the members, I consider MIAC well placed to provide advice to Government and industry stakeholders on safety and health issues related to mining and associated activities.

As the Chair of MIAC, I welcome the newly appointed members and look forward to working with them to identify strategies to help improve industry's safety performance.

**Simon Ridge**  
*Executive Director Resources Safety*  
30 September 2015

*Note: There was no May issue for Resources Safety Matters this year, so the September magazine is the second and final issue of 2015.*



WHS Resources Bill Stakeholder Forum held on 23 July 2015

## HAVING A SAY ON SAFETY REFORMS

**Stakeholder involvement was recently sought by the Department of Mines and Petroleum as part of the State Government's process to modernise and consolidate safety legislation covering mining, petroleum and major hazard facilities (MHFs) in Western Australia.**

Simon Ridge, Resources Safety Executive Director, said that the call for input was the second of a three-stage consultation process, known as the Regulatory Impact Statement (RIS).

"In 2014, the first stage looked at the structure of the current legislation and recommended consolidating the safety requirements from six different Acts into one Act," Mr Ridge said.

As well as consolidating safety provisions, the legislation is being modernised and made more consistent across industries and between jurisdictions.

"This year, we are consulting on the modernised and consolidated Act, which will be introduced through the Work Health and Safety (Resources) Bill. Next year, we will consult on the regulations," Mr Ridge said.

As the resources industry continues to transition towards a risk-based approach to safety and the introduction of

new technologies, it is important for legislation to be less prescriptive and more adaptable to change.

"Each industry sector presents its own risks and safety requirements," Mr Ridge said.

"However, there are many common elements. The new Act, based on the model legislation used nationally, should deliver improved consistency between industry sectors, as well as with the Commonwealth, while still including industry-specific provisions in the regulations."

The proposal for a single Act covering health and safety for mining, petroleum and MHFs is not a new concept.

"Consolidated legislation has already been implemented in two other States," Mr Ridge said.

The Department engaged Marsden Jacob Associates to independently manage the RIS consultation process on the proposed Bill.

A stakeholder forum was also held on 23 July 2015 as part of the process. The consultation paper and further information about the forum presentations are available on the Marsden Jacobs website at [www.marsdenjacob.com.au/work-health-safety-resources-bill](http://www.marsdenjacob.com.au/work-health-safety-resources-bill)



The Minister (at left) and Department staff Iain Dainty, Mick Malec and Ross Stidolph at the Kalgoorlie Explosives Reserve

## EXPLOSIVES RESERVE HOSTS MINISTERIAL VISIT

**In the afternoon of Monday 29 June, the Minister for Mines and Petroleum made his first visit to the State-managed Kalgoorlie Explosives Reserve. The Minister's visit began with a safety briefing and a short history of the reserve.**

Under the guidance of the reserve manager, Mick Malec, the Minister toured the reserve and met with representatives of two companies that manufacture explosives on site.

The first site visit was with Explosives Manufacturing Services (EMS) and hosted by Managing Director Duncan Minto, who explained the company's range of products and its part in supporting the resources sector. Minister Marmion saw the manufacturing process firsthand.

The second visit was conducted at Orica's bulk AMEX plant. The Minister was hosted by Orica's Richard Powell and shown the manufacturing process for ammonium-nitrate-based explosives.

During both visits, the Minister was able to respond directly to questions from the reserve users. Topics covered included leases (the Minister signs all leases between the State of Western Australia and reserve users), the future of the reserve and the options for its expansion.

Orica and EMS are thanked for allowing the tours of their facilities and providing briefs that were informative and gave the Minister a better understanding of explosives manufacturing in Western Australia.

## DIGITAL DMP IS COMING

**The Department of Mines and Petroleum is continuing to improve its interactions with customers by rolling out online systems to provide faster and more seamless ways to conduct business with the Department. These systems will provide 24/7 access, improved processing timelines and reduce red tape.**

.....  
The resources industry will be familiar with elements of the Safety Regulation System (SRS), which has been progressively implemented since 2012. Functions currently in operation include:

- mines and petroleum levy payments
- lodgement of project management plans (PMPs) and radiation management plans (RMPs)
- incident and injury reporting
- CONTAM lodgement
- dangerous goods security card renewals.

A key feature of Digital DMP is that paper-based transactions with the Department are being phased out and replaced with online lodgements. For example, dangerous goods driver licence applications went live on 28 August 2015 and will be followed by other dangerous goods licensing systems through 2015-16.

The Department will inform relevant industry sectors when transactions that affect them are available online. Helpful tools, training, and dedicated staff will be provided to assist with the transition.

Where an online process is available, you are encouraged to use it. If you are not currently transacting with the Department online, you can create a free online account via the website at [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)

The service desk is available between 8.30 am and 5.00 pm (WST), Monday to Friday. To get in touch, call 08 9222 0777 or email [it.servicedesk@dmp.wa.gov.au](mailto:it.servicedesk@dmp.wa.gov.au)

Your feedback is important to the success of implementing Digital DMP. To provide feedback, visit the website.



### SRS PROBLEM? WHO TO CONTACT

Telephone: 9358 8002 (select option 2)

Email: [SRSManager@dmp.wa.gov.au](mailto:SRSManager@dmp.wa.gov.au)

## REPORT HELPS UNRAVEL SAFETY RISKS IN MINING

**A**n analysis of more than six hundred serious mining injuries has improved our understanding of injury risks and causes in Western Australia's mining industry.

The State Mining Engineer Andrew Chaplyn said that the recently released report would help increase our understanding about what causes serious accidents and how to prevent fatal outcomes.

"The Department analysed 658 serious injuries, including three fatalities, reported by the mining industry during a six-month period from 1 July to 31 December 2013," Mr Chaplyn said.

The analysis follows on from the Department's review of 52 fatal accidents in the mining industry between 2000 and 2012.

"The key objective of both these reports was to develop a better understanding of the injury risk profile of the State's mining industry," Mr Chaplyn said. "These risk profiles have been compared to establish if the hazards and causation factors identified from the recent serious injury data are consistent with the results of the fatal accident review."

"Both the serious injury review and the fatal accident review have independently identified the three main hazards for all employees. They are falling while working at height, being in the line of fire for objects or suspended loads, and being struck or crushed by machines and heavy components."

The selected serious injury data was shown to be statistically consistent over a period of ten years, and will be used to

establish baseline standards for monitoring the effectiveness of fatality prevention strategies.

"The Department is encouraging companies to build on the information available, and develop more comprehensive hazard and risk profiles for their own sites," Mr Chaplyn said.

"In particular, job and task analysis should focus attention on critical tasks and activities where risks are heightened."

The Department has been sharing the results of the reviews with key representative groups in Perth and regional centres.

"In addition, presentations have been made at Nifty, Woodie Woodie and Telfer — the three mine sites in the Pilbara where there have been fatal accidents this year," Mr Chaplyn said.

Mines and Petroleum Minister Bill Marmion said that the serious injuries report was a valuable resource for everyone involved in Western Australia's mining industry.

"The simple concept of 'golden safety rules' can reinforce critical awareness and controls, such as never start work if there is a risk of falling from height, never stand under anything that can fall on you and never place any part of your body where it can be crushed," Mr Marmion said.

"Despite a fatality-free year in 2012, and six deaths in 2009, there have been on average two to three deaths per year on WA mine sites. However, this report identifies that there are on average about 200 high consequence injuries every twelve months that have very similar causal factors to fatalities.

"Reviewing the rate of high severity injuries including amputations, fractures and crush injuries could help provide key indicators, so more effort can be focused on critical activities with a link to serious injuries or fatalities."

### WANT A COPY OF THE REPORT?

*Analysis of serious injury data for the Western Australian mining industry, July-December 2013: What lessons can we learn?*

This report is available on the Department's website, and hard copies have been posted to mine and exploration managers, and safety and health managers and representatives.

Copies of the report will also be distributed during the 2015 Mines Safety Roadshow in October and through the Department's regional offices.



## LOOKING AFTER THE NEXT GENERATION – GRADUATE UPDATE

*In the February 2015 issue of Resources Safety Matters, Michael Wolter talked about his time with BHP Billiton as one of the three-month rotations in his graduate program. Here he gives us an insight into his second industry rotation. Michael was appointed as a dangerous goods officer in July.*

**Earlier this year, a collaboration between Resources Safety and Orica allowed me to increase my knowledge of the manufacture and use of explosives, and build on the experience I gained at BHP Billiton.**

The three-month placement began with a trip to Murrin Murrin (Minara Resources) to assist Orica employee, Peter Agnew, with an internal checkpoint audit of the site. This demonstrated the benefits of robust internal auditing. Internal audits can be a particularly valuable tool for personnel on site, provided the information is displayed in an easy-to-understand format.

Following the Murrin Murrin stint, I visited Orica's customer service centres at the Superpit (Kalgoorlie Consolidated Gold Mines), DeGrussa (Sandfire Resources), Perth Quarries and Cloudbreak (Fortescue Metals Group). I was also able to check out Orica's manufacturing plants at the State Explosives Reserves in Kalgoorlie and Pippingarra, which is near Port Hedland.

At the customer service centres, I accompanied the mobile processing unit (MPU) operators as they went about their work. This included loading blast holes, maintaining the MPUs, and daily security checks in the yard.

My visit to the manufacturing plants was particularly interesting as I saw the production process from start to finish for Orica's packaged and bulk explosives.

For me, the use of Take 5s and cleanliness of Orica's sites were indicators of the company's commitment to developing a strong safety culture. The teams I worked with were committed to doing the job properly and not cutting corners, and they operated efficiently and safely.

My thanks go to Orica, in particular Leslie Williams (Advisor Compliance and Security), Paul Harrison (Statutory Liaison Manager) and Ian Jamieson (Field Operations Manager – Western Region).

Throughout the placements, Orica and BHP Billiton allowed me to work closely with their compliance personnel. This experience was invaluable in increasing my practical knowledge of explosives use in mining. I hope that such collaborations can continue with industry for future graduates in dangerous goods safety.

*Orica's Peter Agnew (left) and Michael Wolter. Photo courtesy Orica Pty Ltd*







CALL FOR SAFETY  
AND HEALTH  
REPRESENTATION IN  
POSTGRADUATE STUDY

*Shibani Chakraborti (left) and Dr Janis Jansz.  
Photo courtesy Curtin University*

Safety and health representatives make a major contribution to workplace health and safety in the Western Australian mining industry. With potential changes in the Western Australian mining health and safety legislation, there is a need to understand what is required to enable safety and health representatives to continue to work effectively.

Shibani Chakraborti is enrolled at Curtin University working on a PhD supervised by Dr Janis Jansz and Dr Apurna Ghosh (WA School of Mines). She is conducting research on the Influence of safety and

health representatives in the Western Australian mining industries. Her aim is to identify the influence and support that safety and health representatives can have in the Western Australian minerals sector to facilitate the achievement of a high standard of workplace safety.

If you are a safety and health representative at a Western Australian mining or exploration operation, and are willing to be interviewed, contact Shibani at [shibani\\_c2@hotmail.com](mailto:shibani_c2@hotmail.com) or 0449 771 650.

## JOINT TAILINGS STORAGE GUIDES WILL STREAMLINE APPLICATION AND COMPLIANCE PROCESSES

**F**ollowing the release of *Tailings storage facilities in Western Australia – code of practice*, the Department of Mines and Petroleum's Resources Safety and Environment Divisions have worked together to prepare two guides that complement the code of practice and aim to improve certainty in approvals and compliance.

The two new guides were released in August and are now available on the Department's website.

The tailings storage facility (TSF) guides were prepared by a working group including geotechnical mines inspectors and senior environmental officers. Their content aligns with the industry feedback received when developing the code of practice.

"The guidance material streamlines the application and compliance processes for industry, and ensures a consistent approach to the Department's regulatory activities," Environment Division Executive Director Dr Phil Gorey said.

"The two divisions have worked closely together in recent years to reduce duplication and minimise the regulatory burden on industry, while ensuring environmental and safety standards remain high."

The *Guide to the preparation of a design report for tailings storage facilities* assists designers preparing the TSF design report. In turn, the *Guide to Departmental requirements for the management and closure of tailings storage facilities* assists TSF designers and operators preparing the reports required to manage a TSF.

Environmental guidelines, mining tenement conditions and the TSF code of practice require these reports to be submitted to the Department.

Andrew Chaplyn, Director Mines Safety, said that the need for the guidance material on TSF reports became apparent while developing the code of practice.

"Officers from the Resources Safety and Environment Divisions worked together during 2012 and 2013 to jointly develop the *Tailings storage facilities in Western Australia – code of practice*, which was released in October 2013," Mr Chaplyn said. "The Department undertook extensive industry consultation, including two public comment periods, while developing the code of practice.

"During the consultation process, it became apparent that guidance was needed to help industry comply with the reporting requirements, and the two TSF guides were consequently developed through 2013 and early 2014."

The TSF working group consulted with industry geotechnical specialists on the content of the *Guide to the preparation of a design report for tailings storage facilities*.

"The design report that is required is technically detailed and, for that reason, specialist industry input was sought," Mr Chaplyn said.

Comments received from seven industry specialists were incorporated into the guides.

Environmental and geotechnical assessment of hazardous structures, such as TSFs, often result in an increase in end-to-end approval timeframes. To expedite the environmental approval for TSF design reports, the guide also allows Registered Managers and tenement holders to engage independent and technically competent third party reviewers to verify the TSF design report.

As part of the Department's commitment to continually improve safety and environmental management, the design may still be audited before or subsequent to environmental approval, and additional information may be requested.



"THE INSPECTORS' SKILLS, KNOWLEDGE AND COMMITMENT TO SAFETY ARE UNQUESTIONABLE, AND THEY WILL BE A VITAL ADDITION TO WESTERN AUSTRALIA'S MINE SAFETY INSPECTORATE,"

– BILL MARMION

*Minister for Mines and Petroleum Bill Marmion (left) and Clint Woosnam*

## NEW MINES INSPECTORS WELCOMED

**F**our new mines inspectors have been officially sworn in by Mines and Petroleum Minister Bill Marmion.

"The inspectors' skills, knowledge and commitment to safety are unquestionable, and they will be a vital addition to Western Australia's mine safety inspectorate," Mr Marmion said.

Clinton Woosnam, Warren Mitchell, Gary Clinch and Brad Sheldrick completed six months of rigorous training and testing to qualify, and all have extensive experience across the Western Australian resources sector.

"Between them, these four new inspectors have spent more than 90 years working in the mining industry," the Minister said.

"Not only do they have a comprehensive understanding of day-to-day operations, they also have a passion for safety. As inspectors, they have an opportunity to use their skills and experience to make a difference to safety across Western Australia's mining industry."

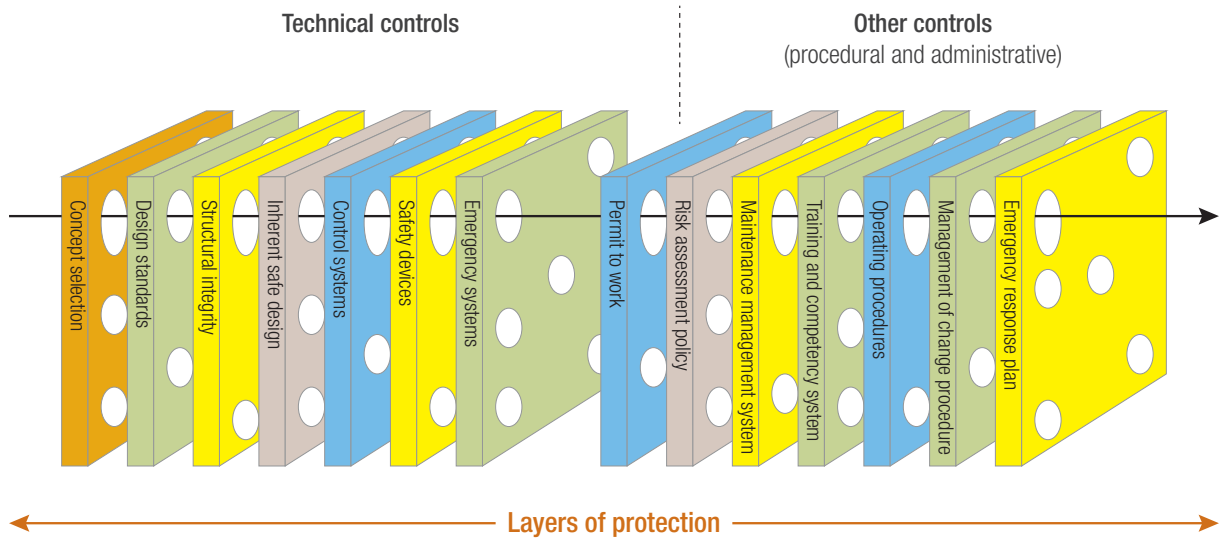
Mr Marmion said that he was particularly pleased the State's first Aboriginal Inspector of Mines, Clinton Woosnam, had been appointed.

"I hope his success encourages more Aboriginal people into the industry and the Department of Mines and Petroleum," he said.

"Clinton Woosnam has a family history of mining and I am delighted he has managed to realise one of his long-held ambitions. The dedication and professionalism of all our new inspectors will further strengthen WA's safety culture and the mine safety inspectorate."

### DID YOU KNOW ...

- People recruited for Inspector of Mines positions must have tertiary qualifications or accreditation as a mine shift boss, plus extensive experience.
- Before being appointed as an Inspector of Mines, the person must pass seven training modules, including managing effective stakeholder relationships and leading and influencing change.
- Once appointed, inspectors must complete a further seven modules, including investigative techniques and risk management training, so they can fully discharge their duties without close supervision.



*Defence-in-depth model*

## DANGEROUS GOODS AND PETROLEUM SAFETY

### PERFORMANCE STANDARDS FOR MAJOR HAZARD FACILITIES (MHFS)

As petroleum prices continue to drop to multi-year lows, industry is rising to the challenge of operating in a more uncertain financial climate. In this operating environment, Resources Safety will keep working with industry to ensure operators manage their safety obligations and the focus remains on operator safety.

The recent anniversaries of Texas City (ten years) and Macondo in the Gulf of Mexico (five years) serve as timely reminders of the importance of focussing on safety and managing risk. Their legacies reverberate through industry to this day, requiring operators and site management and leadership to demonstrate their commitment to safe plant and safe people.

The well-received ALARP Forums were rolled out at the end of 2014 in Perth, and earlier this year in Karratha. In a similar vein, we are considering a discussion of performance standards with industry.

Performance standards are key standards established by the operator of a major hazard facility (MHF) covering the performance required of a:

- system
- item of equipment
- person or procedure.

They are used as a basis for managing the risk of a major accident event (MAE). In effect, as one of the site's key critical controls, performance standards underpin the safeguards in place to ensure an MAE is avoided.

The robust development and effective use of performance standards contribute significantly to demonstrating that control measures for preventing and mitigating MAEs are appropriate and adequately managed.

The performance standards and how they contribute to the layers of protection to help prevent MAEs can be illustrated using a defence-in-depth model.

Resources Safety is committed to engaging proactively with industry to promote understanding about managing these important controls.



## WHAT CAN HAPPEN IF EMERGENCY RESPONDERS DON'T KNOW WHAT THEY ARE DEALING WITH?

In August this year, two massive explosions at a port warehouse in Tianjin, China, killed more at least 141 people, injured hundreds more and devastated large areas of the city.

While the investigation report is yet to be released, there have been suggestions that water sprayed on some of the chemicals by fire fighters responding to an initial incident could have led to the blasts. Calcium carbide, known to be at the site, reacts with water to create the highly explosive acetylene.

Chemical experts suggest an acetylene blast could then have detonated the other chemicals for a much larger blast.

See [www.bbc.com/news/world-asia-china-33844084](http://www.bbc.com/news/world-asia-china-33844084) for more information.



TYC

## FOCUS ON DANGEROUS GOODS TRANSPORT SAFETY

As part of on-road enforcement this year, hundreds of trucks carrying dangerous goods and explosives were inspected by dangerous goods officers during Operation Austrans. The operation took place over May and June and was a tripartite effort also involving the Western Australian Police and the Department of Transport. Several trucks were issued with remediation notices.

The worst offender potentially faces fines of up to \$6,000 for breaching dangerous goods safety requirements. The vehicle contained mixed dangerous goods and had the following shortfalls:

- transport document did not list all of the dangerous goods present
- emergency information holder was unlabelled
- placarding (dangerous goods warning signs) on the vehicle was too small
- cabin fire extinguisher was out of date and discharged
- vehicle was overloaded.

Although the dangerous goods transport requirements may seem minor to some, they are designed to save lives in an emergency situation. For example, a working fire extinguisher can prevent a minor fire escalating to a more serious incident.

For emergency responders, it is vital that dangerous goods manifests are present and accurate to help them determine what a vehicle is carrying. Emergency workers put themselves at risk to ensure the safety of the public and help rescue those involved in an incident. This information is essential to ensure the safety of all those involved and the success of dealing with the situation.

Operation Austrans has highlighted that the majority of dangerous goods transport companies and drivers are doing the right thing. However, the Department will continue to target companies and individuals that put their own safety and the safety of the public at risk when transporting dangerous goods.

### Ross Stidolph

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



## MINES SAFETY

### SEEKING EXCELLENCE IN MINES SAFETY REGULATION

Much has been written about what constitutes good practice safety regulation. Even with the best possible legislation, the regulator needs to do more to maximise the benefits of a good statutory regime. A credible and effective safety regulator is:

- independent and able to challenge the reasoning of others
- technically competent with complementary administrative excellence
- consistent, transparent and accountable
- balanced, informed, and geared to learning.

Around the world, the most highly regarded safety regulators are those that build and maintain capacity, constantly refresh competencies and engage fully with the industries being regulated.

Capacity translates into having sufficient technical and administrative resources to plan and deliver the program of work necessary to achieve the agreed strategic outcomes. Those regulators ahead of the pack have moved from being a reactive organisation to one where proactive, influencing behaviour is the normal way of working.

Competency is a critical factor in attaining a world-class safety regime. The skills needed by individuals to become respected safety regulators are not taught at academic institutions. The best regulators build on a good technical and practical grounding through mentoring, further learning and specialised professional development.

### Where does the mines inspector fit in the statutory regime?

The role of a safety inspector is demanding and challenging, requiring integrity and decision-making abilities, often in difficult situations. An often-quoted description of the inspector's role comes from C. Maxwell in his 2004 review of Victorian safety legislation, who wrote that:

*"Being a good inspector is, therefore an extraordinarily difficult job. The inspector has to be, variously, an expert at hazard identification and risk assessment; an expert at systems engineering; an expert at micro economics; competent at statutory interpretation; and have skills as a diplomat/negotiator/mediator."*

To carry out the functions of an effective regulator, inspectors must have the appropriate skills and experience across a broad spectrum of technical disciplines, as well as the necessary legal, management and educational competencies.

While challenging, the role of a mines inspector is also rewarding. Whether working in industry or for the regulator, we are all committed to see our work mates return home to their loved ones.

The powers of mines inspectors in Western Australia are defined in the *Mines Safety and Inspection Act 1994*. As public servants, inspectors are also required to meet the high standards of the Department of Mines and Petroleum's code of conduct, including declaring conflicts of interest and conducting themselves with integrity.

Entering sites is a significant part of an inspector's role and a professional approach is required. Most site requirements to ensure a safe visit should have already been fulfilled, such as fit-for-work testing, relevant inductions, provision of procedures and meeting personal protective equipment (PPE) requirements.

### Who does what in the mines inspectorate?

The organisational structure of the mines inspectorate may create some confusion with statutory designations, such as State Mining Engineer and the three categories of inspectors of mines (Senior, District and Special Inspectors).

In terms of management roles, the Mines Safety Branch is headed by a Director supported by three Regional Inspectors, who manage specific inspector groups and are responsible for specific projects and programs.

The inspector groups are divided into teams, with a Team Leader reporting to the relevant Regional Inspector. There are five teams based on geographical location, and one team focused on plant throughout the State.

The current skill set and matrix management approach allows the leadership team to ensure there is a balance between proactive educational and reactive investigative roles so that the promotion of safer outcomes is the priority.

**Andrew Chaplyn**

*Director Mines Safety and State Mining Engineer*

## INVOLVING REGISTERED MANAGERS IN THE REGULATOR'S SAFETY DISCUSSIONS



*DMP's Doug Barclay (left) with Ron Ellis (Metals X), Christo Marx (First Quantum Minerals) and Rob Lewis (Hanking Mining)*



*DMP's Director General Richard Sellers*

The Department of Mines and Petroleum hosted the inaugural Registered Managers Forum in Perth on 19 August.

The forum was developed following a review of the Department's annual Mine Safety Roadshows. It was identified as a way to work more closely with senior site managers and drive safer outcomes on Western Australian mining operations.

The forum attracted more than 100 registered managers, quarry managers and operational managers from around the State. It gave the safety regulator an opportunity to

speak to key industry influencers to discuss how we can work together to drive positive changes to safety culture across the mining sector.

Issues raised included questions around safety strategies, the roles of operators and regulators, and how can we all move safety forward. The forum also highlighted some of the lessons from the serious injury analysis report recently released by the Department.

Feedback from the forum highlighted the importance of collaboration in the continual drive to improve safety and health performance in the resources sector.

All photos TYC

# CALENDAR OF EVENTS

## OCTOBER

- 01** **SAFework AUSTRALIA MONTH 2015**  
All of October  
[www.safeworkaustralia.gov.au](http://www.safeworkaustralia.gov.au)
- 13** **2015 MINES SAFETY ROADSHOW**  
13 October, Geraldton      22,23 October, Newman  
15, 16 October, Bunbury      27,28 October, Kalgoorlie  
20 October, Port Hedland      29, 30 October, Mandurah  
21 October, Karratha
- 21** **DRILLFEST 2015**  
21-22 October, Perth  
[www.adia.com.au](http://www.adia.com.au)

## NOVEMBER

- 04** **2015 MINES SAFETY ROADSHOW**  
4, 5, 6 November, Perth
- 06** **CME UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION**  
6-8 November, Kalgoorlie  
[www.cmewa.com](http://www.cmewa.com)
- 10** **FLUORO CONFERENCE**  
10-11 November, Perth  
[www.ifap.asn.au/fluoro](http://www.ifap.asn.au/fluoro)
- 18** **SAFETY IN DESIGN CONFERENCE**  
18-19 November, Perth  
[www.idc-online.com](http://www.idc-online.com)
- 28** **2015 MERC MINING EMERGENCY RESPONSE COMPETITION**  
28-29 November, Perth  
[www.themerc.com.au](http://www.themerc.com.au)

## DECEMBER

- 05** **AIOH2015 CONFERENCE**  
5-9 December, Perth

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

Latest event information at [www.dmp.wa.gov.au/events](http://www.dmp.wa.gov.au/events) or use the QR link.







DMP's Patrick Senyca (left) and Doug Barnard, Yara Pilbara

## ALARP FORUM TRAVELS TO KARRATHA

**E**nsuring on-site risks are as low as reasonably practicable – or ALARP – was the focus of two Karratha forums for petroleum and major hazard facility operators held earlier this year.

Resources Safety Division's Critical Risks Group took the *Reducing approval times – What is 'reasonably practicable'?* forums to Karratha in February to highlight the principles of ALARP.

Ross Stidolph, Director Dangerous Goods and Petroleum Safety, said that the forums were designed to provide operators with an overview of the requirements to ensure risks can be driven to as low as reasonably practicable.

"Importantly, we wanted to demonstrate and document this process to petroleum operators and major hazard facilities to highlight the standards expected by the Department," Mr Stidolph said.

"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 Karratha events were organised following the success of the Department's first ALARP forum held in Perth in November 2014.

"The Perth event was quickly booked out so, following discussions with local operators, it was decided to hold two forums in the Pilbara, which has a high concentration of petroleum and major hazard facilities," Mr Stidolph said.

"The Karratha forums were just as successful. Holding industry forums is an important focus for our Critical Risks Group as we continue to work with industry to improve safety cases and highlight safety issues."

A fourth and final forum was run in Perth on 17 April.

# Mines Safety Roadshow 2015

Bunbury Geraldton Kalgoorlie Karratha  
Mandurah Newman Perth Port Hedland

## MINES SAFETY ROADSHOW GETS A MAKE-OVER

### CONTINUAL IMPROVEMENT

The Department of Mines and Petroleum's Mines Safety Roadshow is in its 11th year and remains one of the Department's most important proactive strategies targeting mines safety. This interactive annual event has grown in size since its inception, and it is now held in eight locations across Western Australia to coincide with Safe Work Australia Month.

The recent tenth anniversary was a fitting time for Resources Safety to review the current roadshow format and assess its effectiveness as a:

- means of engaging with all levels of industry
- forum for communicating and sharing safety concerns.

The review was conducted by an independent consultant. Industry feedback from previous events was used, as well as input from a variety of stakeholders and an analysis of marketing and communication strategies.

This year's modified roadshow format addresses the review findings and feedback from last year's roadshow survey. In particular, there are additional dates at some venues to accommodate the expected increased interest in the 2015 program. This allows for more manageable group sizes for the workshops, making it easier to interact and exchange ideas.

The review also highlighted the importance of continuing to support additional approaches to engage with industry. This includes holding targeted mines safety events (e.g. recent Registered Managers Forum) and expanding the *Know Your Hazards* video series.

### THE ROAD AHEAD... LOOKING AT HEIGHTS IN 2015

The 2015 Mines Safety Roadshow will be held between 13 October and 6 November. The presenters aim to raise awareness of industry issues and inspectorate concerns, and share solutions in a relaxed, positive environment.

This year's focus is on the risks associated with height and the selection of appropriate controls. This topic is not just about working at height, but also falls from height (both high and low), rock falls and fall of ground. Two new hazard videos relating to the topic will be showcased.

Proceedings will start with the usual overview of industry's safety performance, plus an overview of the results of the serious injuries study completed recently.

Supervisors, safety and health representatives and others responsible for site safety and health are encouraged to attend. The event is free but pre-registration is required to reserve a place. Late registration (i.e. less than one week before the event) is subject to availability.

Additional dates have been added to the schedule for Bunbury, Newman, Kalgoorlie, Mandurah and Perth, with registrants able to choose the day that best suits them.

Visit [www.dmp.wa.gov.au/events](http://www.dmp.wa.gov.au/events) for more information on the program, venue location and registration details.

# Height

FALLING FROM HEIGHT  
WORKING AT HEIGHT  
ROCK FALLS  
FALL OF GROUND  
RISKS AND CONTROLS

**Geraldton** Tuesday 13 October

**Bunbury** Thursday 15 October OR  
Friday 16 October

**Port Hedland** Tuesday 20 October

**Karratha** Wednesday 21 October

**Newman** Thursday 22 October OR  
Friday 23 October

**Kalgoorlie** Tuesday 27 October OR  
Wednesday 28 October

**Mandurah** Thursday 29 October OR  
Friday 30 October

**Perth** Wednesday 4 November,  
Thursday 5 November OR  
Friday 6 November

## HAZARDOUS HEIGHTS – NEW VIDEOS ADDED TO DMP COLLECTION

Falls from height remain the number one cause of injuries and fatalities in the mining industry. Most mines in Western Australia have locations where people are required to work at height, or where there is a risk of falling from equipment, or an underground mine level, or into openings.

Following on from the success of the first three *Know your hazard* videos related to dogging, rigging and lifting, released in 2014, and feedback from last year's roadshow participants, two videos have been produced to raise awareness of the hazards when a person falls from a height and the consequences of the incident.

The first video explains why falls from height – whether a stumble of a few centimetres or a fall of metres – can result in serious outcomes. The perception of what heights are “safe” is challenged and the effect on the human body is explained.

By understanding the basic principles behind what you are doing and the hazards, safer work practices and better risk

controls can be adopted, which is the first step towards reducing the risk of accidents in the workplace.

The second video explores the social consequences that a fall from height can have on a person's career, relationships, hobbies and mental health, as well as their family and friends. Three families affected by a loved one falling from height at work have generously shared their stories to raise awareness of the impact of workplace accidents. An incident may last a few seconds but the consequences can last a lifetime.

The first public screening of the videos will be at the 2015 Mines Safety Roadshow, in conjunction with a presentation to support the understanding of the physical concepts featured.

The videos will be available for sharing or download and distribution for educational purposes after the roadshows.



## HIGHLIGHTING OCCUPATIONAL HYGIENE MANAGEMENT

**T**he Department of Mines and Petroleum presented two information sessions in May to support industry as the regulatory regime for occupational health and hygiene transitions towards a risk-based approach for Western Australian mining operations.

Sessions in Kalgoorlie and Perth were well attended. About 200 participants, including safety personnel, consultants and managers, took the opportunity to meet with inspectors and colleagues and get the latest information.

Risk-based hygiene management planning was discussed in light of the recently released guide and changes to the contaminant monitoring (CONTAM) procedures. The sessions also focused on ventilation, noise management and diesel emission management plans.



Neil Taylor and Chriss Ellem of Norton Gold Fields with DMP's Clay Wittchen (right) at the Kalgoorlie information session



Full house at the Perth information session

### CRITICAL CONTROL MANAGEMENT FOR MINING



Many high-hazard industries throughout the world use the critical control management (CMM) process to identify and manage critical controls that can either prevent a serious incident or minimise the consequences if there was one.

The International Council on Mining and Metals (ICMM) recently published the *Health and safety critical control management: good practice guide*, which captures the CMM approach specifically for use by the minerals sector.

The publication presents nine steps, ranging from step 1, which helps develop the scope of CCM implementation, to step 9, which offers guidance on the appropriate response and actions to be taken when critical controls are underperforming, leading to an incident.

Critical control systems are illustrated using examples (e.g. diesel particulate over-exposure).

Supplementary material includes the CCM journey model and mapping tool, which are designed to help organisations assess their maturity and readiness in adopting the process.

The report can be downloaded from the ICMM website at [www.icmm.com/document/8570](http://www.icmm.com/document/8570)



Stephen Lane and Michael Wolter about to draw the winning entry



Winner Lloyd Searley receiving his prize from Stephen Lane

## TRUCK SHOW AN OPPORTUNITY TO LEARN ABOUT DANGEROUS GOODS SAFETY

**The Department of Mines and Petroleum participated in the 2015 Perth Truck and Trailer Show in July. This biennial event is hosted by the Commercial Vehicle Industry Association, a division of the Motor Trades Association of WA.**

Dangerous goods officers from the Resources Safety Division manned a joint booth with Main Roads staff to answer questions about transporting dangerous goods safely.

Ross Stidolph, Director Dangerous Goods and Petroleum Safety, said that the Department was committed to providing information and raising awareness about the safe transport of dangerous goods.

“As well as having experienced officers on hand to answer any questions, on the Friday we held an information session about

our Six Pillars of Dangerous Goods Transport campaign,” Mr Stidolph said.

“The campaign highlights issues such as documentation, placarding, restraint, segregation, packaging and vehicle requirements.”

The booth showcased a prototype application developed by Resources Safety to help truck drivers and others involved in transport activities understand the requirements for the safe transport dangerous goods. The prototype was well received and will be developed further before public release.

Resources Safety also held a competition to test attendees’ knowledge of dangerous goods transport. Participants who answered the questions correctly went into a draw to win a safety bag and equipment. The winner was truck driver Lloyd Searley.

Daphne Lobo demonstrating the prototype application for safe dangerous goods transport





DMP's Deputy Director General Tim Griffin (left) and Environment Operations Team Leader Ryan Mincham

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## PROTECTING WORKERS AND THE ENVIRONMENT

**M**ines and Petroleum Minister Bill Marmion has said that support for a robust, safe and environmentally responsible exploration industry was a top priority for the State Government.

"Western Australia's resources industry continues to be one of the most important economic and employment drivers for the State," Mr Marmion said.

The Minister made the comments ahead of the Department of Mines and Petroleum's 2015 Exploration Industry Forum held in Perth on 26 June. The Forum was jointly presented by the Resources Safety and Environment Divisions, and replaced the annual Exploration Safety Roadshows held for the past seven years.

As well as an update of the safety and environmental reform processes, the event provided the latest information and guidance for those involved in safety and environmental

management associated with mineral exploration. Topics included:

- safety and environmental performance and reporting
- program of works (PoW) submissions
- management plans for occupational health and hygiene, including an introduction to radiation safety
- the mining rehabilitation fund (MRF)
- guidance on exploration appointments and responsibilities.

Attendees were invited to stay afterwards and view the hazard awareness videos produced by the Department in 2014.

Feedback about the forum was positive, with attendees also appreciating the opportunity to meet the Departmental staff with whom they would interact when addressing safety, health and environmental issues.

The talks are available as toolbox presentations at [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)



All photos TYC

Mines inspectors Thomas Kim (left) and Dean Crouch



TYC

### FOCUS ON RADIATION SAFETY

Dean Crouch and Thomas Kim, mines inspectors and radiation specialists with the Department of Mines and Petroleum, ran the *Radiation Management Information Session for Industry* held on 17 July 2015, following the AusIMM International Uranium Conference 2015.

The session was organised to raise awareness of recent changes to the interpretation of radiation management plans (RMPs) after their re-alignment with legislation.

Over 80 radiation and field technicians, geologists and environment consultants attended to get the latest information.

The half-day program included an instrumentation workshop and covered safety and environmental performance and reporting, RMPs, radiation safety appointments and responsibilities, and guidance on mining radiation safety.



## DANGEROUS GOODS SAFETY ON DISPLAY

**D**angerous goods officers featured in the Hazards and Heroes display at this year's ChemCentre Open Day on 22 August. The display focussed on the important role played by government departments and agencies in keeping the community safe. Over 3,500 people attend the annual event at the Centre's Bentley headquarters, which aims to promote science within the community.

Six officers volunteered their time to staff the stand and raise awareness of the safe management of commonly available dangerous goods such as pool chlorine and LP gas bottles. As parents chatted with officers, children were kept entertained with face painting, peep-through photo board of emergency responders, and colouring-in pictures of petrol tankers, fireworks and dangerous goods placards.

Dangerous Goods Team Leader Erin James said that the event was an opportunity to educate the community about the Department's role.

"Every day people interact, one way or another, with dangerous goods – from the trucks transporting dangerous goods across the State, to the chemicals we use in our homes.

"Our goal is to raise awareness of the safety issues around dangerous goods. The Open Day is the perfect opportunity to highlight how the community is protected from incidents involving dangerous goods."



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## WARNING ON FALSIFIED HIGH RISK WORK LICENCES

**E**arlier this year, WorkSafe issued a warning to check high risk work licences after being alerted to the existence of altered documents.

WorkSafe was told that licences were being changed to include additional classes of high risk work for which the owner had not been trained. After being electronically scanned and altered, copies of the amended licences were then sent as email attachments to prospective employers.

High risk work licences are only issued to workers who have been appropriately trained and assessed as competent to perform high risk work safely. They apply to anyone engaged in work considered to be "high risk", including scaffolding, dogging and rigging work and the operation of cranes, hoists, pressure equipment and forklifts.

WorkSafe advises employers or anyone in control of a workplace to satisfy themselves that potential employees for high risk work have the experience they claim to have. The original licence card should be sighted – don't be satisfied with an email or text message containing a scan or photo of the licence.

Anyone who has concerns about a high risk work licence can verify the details using the WorkSafe licence and registration search located on the Department of Commerce website at [www.commerce.wa.gov.au/worksafe/check-high-risk-work-licence](http://www.commerce.wa.gov.au/worksafe/check-high-risk-work-licence)

It is also important to note when WorkSafe identifies fraud in relation to these licences, the cases are referred to WA Police.



### REMINDER ABOUT LICENSED HIGH RISK WORK ON MINING OPERATIONS

As well as holding a high risk work licence for certain types of plant or activity, workers need to be assessed as competent for the type of plant to be used.



## INVESTIGATING MINING INCIDENTS – HOW IS IT DONE?

**The Department of Mines and Petroleum investigates accidents, incidents and occurrences reported in accordance with the *Mines Safety and Inspection Act 1994*. The conduct of the investigation depends on the circumstances of the incident and actions that need to be taken.**

The Investigations Services Branch investigates fatalities and other incidents classified as requiring a Level 1 investigation, or where the consequences surrounding the incident cannot be explained and further investigation is required to help prevent a recurrence.

Level 2 investigations are predominantly conducted by the mines inspectorate with advice provided by Investigations Services when needed. Typically, Level 2 investigations will include serious injuries and occurrences as well as complaints. A significant proportion of serious injuries, as defined under the Act, can be attributed to a sprain or strain and do not require in-depth investigation. For example, an injury such as a contused ankle or a back strain could result in two weeks away from normal duties, but would not require an immediate follow up by the Department as the details may be fully evident.

Sometimes, workplace deaths are a consequence of natural causes. A typical example of this would be a disease that is initiated by lifestyle or hereditary factors. In other cases, workplace incidents may contribute to or initiate the death. The coroner must be satisfied there is no connection between the work and the death, and therefore authorised officers from the Department need to work in collaboration with the site and WA Police to investigate the circumstances. When a post-mortem establishes that a death is by natural causes, and the investigation does not identify any work-related causal factors, the investigation is closed off.

The Department often requires the company reporting an incident or occurrence to carry out a Level 3 investigation of their own and submit a report to the relevant inspector. The following guidance is typically provided for the investigation and report preparation:

- use an accepted investigation technique (e.g. ICAM or Taproot)
- address the causation factors and sequence of events that resulted in the incident
- outline the risk-reduction measures taken and safety system improvements made to prevent a recurrence of the incident
- when discussing risk-reduction measures, consider the hierarchy of control to effect a long-term solution to the problem
- a safety representative and company official such as a line manager or safety professional, should sign off on the report.

Company investigation reports are reviewed once received. The Department may:

- close the case
- require further investigation to be undertaken by the company
- conduct its own investigation if the information in the company's investigation report establishes a reason to do so.

### EXTRACT FROM *MINES SAFETY AND INSPECTION ACT 1994*

#### **s. 53. Functions of representatives**

- (1) The functions of a safety and health representative are, in the interests of safety and health at the mine for which the representative was elected ...
- (b) in the event of an accident, a dangerous occurrence, or a risk of imminent and serious injury to, or imminent and serious harm to the health of, any person, immediately to carry out an appropriate investigation in respect of the matter; ...

## NEW ALCOHOL AND DRUG SUPPORT LINE FOR PEOPLE WORKING AWAY FROM HOME

**P**eople working away from home, including fly-in fly-out workers, are now able to access free, confidential alcohol and drug support with the launch of the Working Away Alcohol and Drug Support Line.

Provided by the Alcohol and Drug Support Service, the support line provides 24/7 telephone counselling, information and referral specifically tailored to anyone working away from home, their families, friends and communities.

Stacey Child, Manager of the Alcohol and Drug Support Service said that the new line aims to build on existing alcohol and drug support, prevention and treatment strategies for people working away from home, particularly within the fly-in-fly-out community.

"There is ongoing concern in the community about the impact of FIFO on workers' mental health and the use of alcohol and other drugs as a method of coping with the unique pressures of working in a FIFO environment," Stacey said.

"We have been working closely with industry to develop the dedicated telephone and online service. This new service is an important step in reducing the impact working away from home can have on someone's alcohol and drug use, and their overall health and wellbeing.

"Our promotional materials aim to increase awareness of the support line and are available free of charge."

For information, call the Support Line on 1800 721 997, send an email to [workingaway@mhc.wa.gov.au](mailto:workingaway@mhc.wa.gov.au) or visit the webpage at [alcoholdrugsupport.mhc.wa.gov.au](http://alcoholdrugsupport.mhc.wa.gov.au)



## INDUSTRY CAN HELP TO REDUCE VOLATILE SUBSTANCE MISUSE

**The misuse of volatile substances is an issue that affects some communities and towns in Western Australia. Inhaling or “sniffing” volatile substances is a dangerous practice and can be fatal. It is particularly concerning when these substances are being misused by very young people.**

A range of industrial products including glues, paints and other solvents is sought out by some young people for the purpose of intoxication, which can make mining companies an unintended source of supply.

Volatile substances used for inhaling are often stolen from worksites, vehicles and local tips, so it is important that these substances are stored and transported securely, and disposed of in a responsible manner.

If your premises are near a town or community where volatile substances are misused, or you are a contractor working in or around such a place, you can provide a great community service by limiting access to the following substances:

- *Aerosols* – particularly spray paints but also other aerosols such as automotive and cleaning products
- *Solvents* – a range of solvents including glues and other adhesives, toluene, paint strippers, degreasers and petrol

- *Gases* – butane or butane–propane gas cartridges used for camping stoves, soldering irons and flame torches.

The Mental Health Commission (formerly Drug and Alcohol Office) in conjunction with the Department of Prime Minister and Cabinet, has developed an industry information kit to help prevent the misuse of volatile substances. The kit aims to inform and support industry and contractors to use, store, transport and dispose of volatile substances responsibly.

The industry information kit is being distributed to mining companies across Western Australia.

To obtain copies of the kit, contact (08) 9370 0333 or visit [www.dao.health.wa.gov.au/vsu/pages/Retailers.htm](http://www.dao.health.wa.gov.au/vsu/pages/Retailers.htm)



The Centre for Safety, which is based at The University of Western Australia, has released a white paper "Chronic unease: A state of mind for managing safety".

The paper is based on work conducted by Centre for Safety researcher, Dr Laura Fruhen, and University of Aberdeen researcher, Professor Rhona Flin. The research was conducted at the University of Aberdeen and sponsored by Royal Dutch Shell. The paper and related poster are available at [www.centreforsafety.com.au/research-translation](http://www.centreforsafety.com.au/research-translation)

## CHRONIC UNEASE – IT CAN BE A GOOD THING!

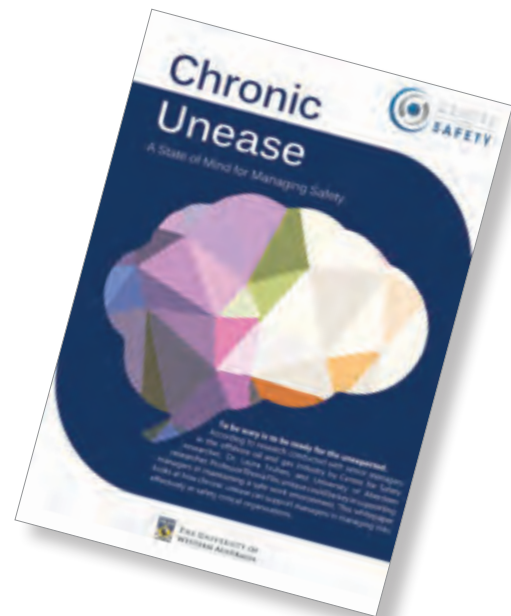
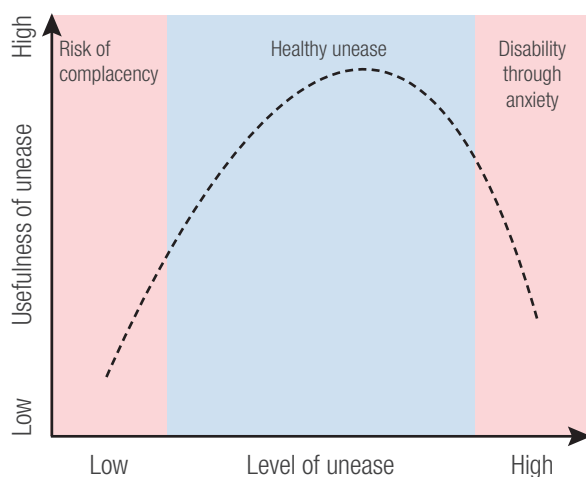
**C**hronic unease refers to the experience of discomfort and concern about the management of risks. It is a healthy scepticism about one's own decisions and the risks that are inherent in work environments.

Some of the world's safest organisations, also called high-reliability organisations (HROs) manage to operate safely over long periods of time in risky contexts. It has been proposed that being in a constant state of unease critically supports their excellent safety record.

These organisations typically:

- evaluate the absence of surprises as a reason for anxiety, not complacency
- assume that they might not fully comprehend the complex systems they operate in, so are preoccupied with failure
- adopt a many-angled approach of constant improvement towards safety issues.

Building on unease as a characteristic of HROs, Dr Fruhen and Professor Flin investigated how chronic unease might support senior manager's ability to handle risks in a way that contributes to their operations' reliability.



Unease can be channelled to have a positive impact on safety. Several responses to unease were identified by the researchers:

- transformational leadership (e.g. motivating team members to question established ways of approaching problems)
- transactional leadership (e.g. setting clear standards on safety)
- demonstrating safety commitment (e.g. providing support for staff on safety issues)
- flexible thinking (e.g. questioning assumptions)
- seeking information (e.g. identifying patterns).

Is more unease always better? The researchers reasoned that there is an optimal and healthy level of unease that should be aimed for. Each manager is likely to have a healthy level of unease (the margins differ for each person), where he or she is alert and manages risks effectively.

Too little unease might lead to complacency, so that warning signals are ignored, ambiguities are marginalised, and negative indicators and adverse consequences are rarely considered.

Too much unease might lead to anxiety that affects decision making, action and, mental health.



Autonomous haul trucks in operation at Rio Tinto's West Angelas mine site.  
Photo courtesy Rio Tinto

## AUTONOMOUS SAFETY CODE A WORLD FIRST

**W**ith the release of the world's first code of practice for safe autonomous mining, Western Australia continues to lead the way in the development of autonomous mining technology.

The code was gazetted on 25 September 2015 after it was endorsed by the Mining Industry Advisory Committee and approved by the Minister for Mines and Petroleum Bill Marmion. It is available from the safety publications section at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)

The Minister said that the document was another example of the State's global leadership in this field.

"Western Australia is at the forefront in the use of this technology, so it makes sense that we also play a leading role in developing safety guidance," Mr Marmion said.

Developed by the Department of Mines and Petroleum through a working group of Western Australian industry experts, the code of practice also had input from technical experts from across the globe.

The working group included representatives from equipment manufacturers, mining companies, technology experts, as well as the regulator.

Director of Mines Safety Andrew Chaplyn said that the International Organisation of Standardisation (ISO) technical committee on mobile autonomous mining systems met in Perth in September last year to discuss global safety standards.

"The forum provided the working group with an opportunity to hear from international experts and share our collective knowledge about safety in autonomous mining. This code of practice was a key part of those discussions," he said.

The code of practice, which took 18 months to develop, will help companies safely introduce and manage autonomous mobile mining systems in their operations.

Mr Chaplyn said that, as for any operation in the resources industry, there is an expectation the risks will be understood and minimised to ensure workers are protected. The code of practice was developed to provide guidance because autonomous mining systems are not specifically covered in the *Mine Safety and Inspection Act 1994* and associated regulations.

### WHAT IS THE DIFFERENCE BETWEEN AUTOMATED AND AUTONOMOUS SYSTEMS?

Chad Frost describes the difference in his paper on *Challenges and opportunities for autonomous systems in space* presented at the US Frontiers of Engineering Symposium held on 22 September 2010. His paper is available at [www.ti.arc.nasa.gov/publications](http://www.ti.arc.nasa.gov/publications)

An **automated system** doesn't make choices for itself — it follows a script, albeit a potentially sophisticated script, in which all possible courses of action have already been made. If the system encounters an unplanned-for situation, it stops and waits for human help (e.g. it "phones home"). Thus, for an automated system, choices have either already been made and encoded, or they must be made externally.

By contrast, an **autonomous system** does make choices on its own. It tries to accomplish its objectives locally, without human intervention, even when encountering uncertainty or unanticipated events.



Left to right: Simon Ridge (Executive Director Resources Safety), Bill Marmion (Minister for Mines and Petroleum) and Richard Sellers (Director General, Department of Mines and Petroleum) are pleased that the new tyre safety guideline is now available

## TYRE SAFETY IN THE SPOTLIGHT

**A guideline on tyre safety for earth-moving machinery was released recently by the Department of Mines and Petroleum's Resources Safety Division. It replaces the 2005 guideline on tyre safety, fires and explosions.**

The new guideline is structured to describe the hazards and types of controls expected during the life cycle of an off-the-road tyre (and its rim or wheel assembly). Developed in conjunction with an industry working group and several tyre experts, its content was enhanced by industry feedback received during the public comment period.

Mines Safety Director Andrew Chaplyn said that the guideline highlighted the risks of working with tyres in the mining industry.

"A number of fatalities in the Australian mining industry have been directly related to not understanding or addressing the risks associated with such tyres," Mr Chaplyn said.

"They are dangerous not only because of their size and mass, but also because of the pressures and combustible materials involved."

Over the past decade or so, there have been several fatal and serious tyre-related incidents at Australian mining operations. Earlier this year, one worker died and another was seriously injured after a tyre exploded during work at a Queensland coal mine.

"These tragedies are a reminder of the importance of tyre safety and the potential for fatal consequences when that safety is compromised," Mr Chaplyn said. "Working with tyre-handling equipment was identified as one of the critical activities in the Department's report on fatal accidents in the Western Australia mining industry for 2000 to 2012."

The guideline describes common hazards when working with tyres, rims, wheels and assemblies on heavy mining equipment. Although aimed at tyres for earth-moving machinery, many of the principles may be extended to other rubber-tyred vehicles on mining operations, such as light vehicles and highway-type trucks.

"It provides guidance on safe systems of work in a mining environment, while allowing for flexibility in both process and documentation," Mr Chaplyn said.

Contact [RSDComms@dmp.wa.gov.au](mailto:RSDComms@dmp.wa.gov.au) to order a free hard copy of the guideline or visit the safety publications section at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) to download a PDF version.

# DRONES – COMING TO THE AIR NEAR YOU!

**W**hen most people hear the word “drone”, the immediate image is of a military unmanned aircraft flying over a war zone, watching with a camera and armed with missiles. Similarly, a “remotely controlled aircraft” is often thought of as something flown at a park, zooming around over the operator’s head for five minutes.

However, recent technological advances have changed that perception. Cheap, lightweight yet powerful electric motors combined with light, long-lasting batteries have revolutionised the drone and remotely controlled aircraft market. A bewildering array of helicopters and aircraft is now available that allow operators to “fly” their machines for a considerable period of time or over a long distance.

Two major technological changes to mobile phones have also been applied to drones. Simple GPS technology enables drones to fly pre-programmed routes autonomously. The biggest change is the use of digital cameras, which transform drones from essentially a toy to a practical, useful device.

Cheap, high-definition digital cameras can be easily plugged in or carried by many shop-bought drones. Some come with an on-board camera as a standard fitting, allowing the operator to manoeuvre the machine as if they were an on-board pilot.

As a result, there has been an explosion in the use of drones as cheap, yet extremely versatile sensor platforms – particularly small drones. Who needs the hassles of an elevated work platform (EWP) with associated working-at-height safety issues to inspect the top of a structure when a drone could do the job. A helicopter drone fitted with a compact video camera or infra-red sensor could fly to the same spot within a couple of minutes, get as close as a person, and send live pictures or data to the operator. Drones are already in use as work tools doing pipeline surveys, visual inspections of towers, buildings and other high structures, as well as aerial site surveys and photography.

## WHAT ARE THE RISKS?

While these devices can be very useful, there are also risks that need to be considered. Not only do drones present business risks (e.g. public image and privacy risks) but there are also technical and safety risks.

Earlier this year, the Department of Mines and Petroleum wrote to all petroleum and major hazard facility (MHF) operators regarding the operation of drones near or over their sites. The Department highlighted the increase in these easy-to-buy and easy-to-operate devices, and their potential to introduce uncontrolled risks.

For example, what would a petroleum facility think about a drone being flown around a cold gas vent if the device:

- uses a localised unshielded radio transmitter
- contains non-explosive atmosphere rated electrically powered systems
- uses uncontained high energy rotating components that build up static electricity
- has no failsafe fall restraint mechanism
- is controlled and kept in position using a radio signal susceptible to interference
- is highly susceptible to sudden wind gusts and turbulence not apparent to the operator
- has to be kept within line of sight of the operator to work
- has an operator who is distant from the device with no formal qualifications to operate it?

Drones are also increasingly used for mining and exploration applications. Due to the size of operations and presence of large mobile plant and other structures, they are seen as a safer and more efficient way of conducting safety and environment inspections, monitoring and surveying. However, the Department recently received its first incident report involving a drone. During a commissioning flight, a drone became unstable after encountering interference and subsequently hit the roof of a double-dome structure. One of its lithium-ion polymer batteries detached and slid between the domes, where it started burning. Fortunately, the fire was extinguished after five minutes. No-one was hurt and the building was not damaged.

While the risks around authorised drone operations can be assessed and controlled, it is much more difficult for sites to control the risks around unauthorised use, such as third-party operations. Also, although more random, the increase in drone availability and number of incidents reported suggest that an uncontrolled drone operating over or near a site is not just foreseeable but likely for some sites.



## WHAT CAN BE DONE ABOUT THE RISKS?

Drone operations that are controlled by a site should be conducted in accordance with the Civil Aviation Regulations 1988. Each flight should also be authorised by the site, based on the risk associated with that flight. It is important that the risk analysis considers the drone operation as a complete system, not just the airborne component. It is also important to consider not only the potential impacts of the drone system on the site, but also potential impacts of the site on the drone system. A permit-to-work arrangement is recommended.

Although prevention of an uncontrolled drone operation is difficult, mitigating its potential effects is within a site's power. Sites can acknowledge and address the risk posed by drones by:

- raising awareness among site personnel of the likelihood and potential consequences associated with drone activities
- sharing knowledge with neighbouring sites
- reviewing the risks around activities where a drone could have an impact.

## DRONING ON ABOUT RPA AND UAV

The Civil Aviation Safety Authority (CASA) uses the term remotely piloted aircraft (RPA) for unmanned aircraft operations in civil airspace as it emphasises that there is a human "in the loop", controlling and overseeing the aircraft, even if that person remains on the ground.

These aircraft are also known as unmanned aerial vehicles (UAVs). The general public refers to them simply as drones.

To add to the acronym collection, the term unmanned aircraft system (UAS) includes not only the aircraft, but all the ground support equipment and personnel.

CASA has identified more than 650 uses for RPA. Most can be categorised as "dull, dirty, dangerous and demanding", and are tasks that an RPA can do best because it does not put its pilot at risk.

Visit [www.casa.gov.au](http://www.casa.gov.au) to find out more.

## SURVEYING MINES WITH DRONES AND LASER SCANNERS

The Mines Safety and Inspection Regulations 1995 and code of practice for mines survey describe the requirements for accurate mine plans. However, the increasing use of drones and laser scanners in surveying has raised issues not considered in the legislation. The State Mining Engineer has provided the following advice.

### Q. May the plans submitted to the Department be a combination of aerial imagery, digital terrain models (DTMs or three-dimensional models) and strings (two-dimensional lines depicting features) rather than strings alone?

- A. Aerial imagery may be used as a backdrop to a plan provided the image is overlaid with sufficient strings and labels to depict the mine's features. The requirements remain for sheet surrounds, a grid, and certification of the plan by the mine surveyor. The source and date of the imagery should be stated on the plan.

Point cloud datasets are inadequate on their own, and require additional processing or manipulation so features are discernible.

DTMs rotated to show various views of the site, pits or underground levels may be used in place of sections provided they are submitted as PDF files.

*Note: Visual representations of the survey data as PDFs are required by the Department, and not the data itself.*

### Q. May drones and laser scanners be used in place of traditional survey techniques?

- A. While section 87 of the *Mines Safety and Inspection Act 1994* defines how mine plans are to be kept and produced, neither the Act nor accompanying regulations prescribe the survey method to be used, although regulation 3.49 covers instruments and accuracy for surveys and plans.

Providing a survey can attain an accuracy of not less than 1:5,000, a drone with laser scanner is an acceptable data acquisition method. The mine surveyor still needs to certify the plans produced using this data.

*Note: As for any other work activity on a mining operation, undertake a risk assessment and implement suitable control measures for hazards (e.g. address potential for harm from using a laser).*



## STAY ALERT

**T**he 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](http://www.dmp.wa.gov.au/ResourcesSafety)

Sign up to Resources Safety's weekly news alerts to receive the safety alerts when they are issued.

### HAZARDS ASSOCIATED WITH STOCKPILES

Several recent incidents on Western Australian mining operations involving the failure of stockpile faces led to the release of *Mines Safety Bulletin No. 119*. Many groups of workers work with or in the vicinity of stockpiles and can be affected by potential instability.

The importance of understanding material properties is emphasised from the design and construction of the stockpile to its operation. The roles of appropriate equipment choice, adequate supervision and training, and regular risk assessments and hazard awareness are discussed.

### CLASSIFIED PLANT RECORDS

The recent failure of a national asset integrity services company resulted in clients losing access to their "cloud-based" electronic record storage and management systems for classified plant.

Regardless of a site's data storage and retrieval methods, *Mines Safety Bulletin No. 120* reminds duty holders that complete and accurate classified plant records are a regulatory requirement to ensure that the equipment is safe to operate. The report also outlines typical reasons why classified plant records can be lost and how duty holders can manage the risks of potential data loss.

### DOZERS WORKING NEAR EDGES

Recent incidents involving dozers going over edges at Western Australian mines have led to the release of *Mines Safety Bulletin No. 121*. The bulletin identifies the importance of establishing and following safe operating procedures (SOPs) or safe work instructions (SWIs) when working near edges.

Basic safe work practices for working near edges are discussed, as well as the impact of changing conditions, awareness of surroundings, and the need to conduct risk assessments before starting work.

### TYRE INFLATION CAGES

Some mine operators rely on tyre inflation cages to control the risk of tyre burst when working on tyres. However, there are no Australian or international standards for the design, manufacture and testing of these cages. Many are purchased or built without comprehensive designer or manufacturer instructions.

*Mines Safety Bulletin No. 122* outlines the considerations for those using tyre inflation cages and provides recommendations on the safe inflation and deflation of tyres.

### RIGGING HAZARDS WITH COME-ALONGS

Unsuitable rigging practices involving come-alongs have been observed during the replacement of conveyor rollers at several mine sites. Poor rigging practices can result in the uncontrolled release of stored energy, with potentially serious outcomes for workers who are in the "line of fire" of lifting equipment under tension.

The need to use fit-for-purpose tooling and follow original equipment manufacturer's instructions when developing and reviewing existing work instructions is



highlighted in *Mines Safety Bulletin No. 123*. Further recommendations are provided with examples of poor lifting practices involving come-alongs, as well as resources that mine operators, supervisors and workers may find useful.

### MODIFICATIONS TO PLANT

The importance of understanding the implications when modifying plant is illustrated in two recent incident reports.

The first incident, described in *Mines Safety Significant Incident Report No. 215*, involved the rollover of a loaded stemming truck. A competent person had not recalculated the gross vehicle mass (GVM) of the truck, which had been modified by the supplier. Unintended overloading affected its stability.

The incident highlights the need for mine operators to ensure all equipment is supplied with the correct safe working loads, and that a competent person has approved modifications. Other plant duty holders are reminded of their legislative obligations.

*Mines Safety Significant Incident Report No. 225* outlines the further findings from an incident where a worker was dislodging a blockage in a stemming bucket. The worker had several fingers severed when the gate valve in the discharge outlet closed. A rubber guide hose over the discharge outlet had been removed, allowing the worker access to the outlet.

Recommendations include using a competent person to assess amended designs and inspect and test modified plant, developing work instructions to identify hazards and controls for each step, and requiring a supervisor to assess the job safety analysis (JSA).

### FIRE IN LABORATORY

*Mines Safety Significant Incident Report No. 216* was issued when a laboratory was destroyed by fire. A panel in the fume cupboard ignited during a lab process.

The importance of ensuring buildings and equipment meet fire regulations is discussed, as is the importance of maintaining equipment and developing and implementing safety management systems to standard.

### FATAL AND SERIOUS CRUSH INJURIES

Workers have the potential to be struck or crushed when working with machines and heavy components. Unfortunately, this common hazard, identified in both the fatalities and serious injuries reviews undertaken by the Department of Mines and Petroleum, is reflected in two incident reports.

*Mines Safety Significant Incident Report No. 217* was issued after a worker in a charge-up basket was crushed against the roof of a cross cut and fatally injured.

The report emphasises the need to recognise and address situations where there is the potential for workers to be crushed or caught between objects. Also discussed is the need to inspect all elevated work platforms (EWPs) to assess the potential for accidental activation of controls. Plant duty holders are reminded to consider the environment in conjunction with the design and construction of the EWP to not expose workers to hazards.

The incident reported in *Mines Safety Significant Incident Report No. 220* involved a road train driver who was crushed between a loader and his truck when it rolled forward. The driver received serious injuries.



The importance of traffic management plans, risk assessments, and inductions are discussed in the report. It also emphasised the role of training and supervision of workers in all loading and unloading activities, as well as workplace inspections.

### HORSING AROUND LEADS TO ACCIDENT

A worker was seriously injured when a rope thrown through the open window of an excavator (as a joke) lodged around the control stick of the machine. When the rope was pulled, the excavator slewed into a nearby worker causing serious injuries.

*Mines Safety Significant Incident Report No. 218* reminds employers to ensure workers understand their duty of care to themselves and others. Unauthorised deviations from site procedures should not be permitted.

### DETONATION OF EXPLOSIVE DURING INSPECTION

During a post-blast inspection, explosives in one of the shot's blast holes detonated close to two workers.

*Mines Safety Significant Incident Report No. 219* reminds operators that competent persons need to design the blast, and that changes to blast design parameters should have change management and risk assessment processes applied. Workers need to be vigilant when inspecting ground after a shot has been initiated.

### FALLING OBJECTS – FATAL AND SERIOUS INJURIES

Gravity acting on an object can generate forces with potentially serious consequences for those in the "line of fire" if it falls. The following reports illustrate the outcomes from these types of incidents. The second report covers the hazard of working under a suspended load, which is a commonly recognised hazard listed in the Department's fatalities and serious injuries reviews.

*Mines Safety Significant Incident Report No. 221* was issued after an underground loader operator was fatally injured while watering down a rill. A rock rolled from the open stope and down the rill, striking the operator who was in front of the loader's bucket.

The report reminds mine managers to ensure procedures are available for the clearing of draw points, and risk assessments are undertaken to address the hazards of falling rocks.

*In Mines Safety Significant Incident Report No. 222*, a worker was seriously injured when the jib attachment he was working under detached from the integrated tool carrier (IT).

The importance of risk assessments and fit-for-purpose equipment is emphasised, as are not working in the line of fire and ensuring the correct operation of IT attachments.



### WORKER STUNG BY BEES

As a motor control centre was being moved, a worker, who was acting as a spotter, was repeatedly stung by a swarm of bees. This led to *Mines Safety Significant Incident Report No. 223*.

The report discusses the need to understand the faunal hazards associated with sites, and apply appropriate controls and measure their effectiveness. It also reminds mining operators to consider fauna in risk assessments and guard against the “normalisation of risk”.

### ARC FLASH AND BLAST

An electrician and fitter had fixed a control relay that had fused closed, tripping the control circuit breaker for a pump. On completing the work, the electrician switched on the main circuit breaker. There was a phase-to-phase arc fault that caused an arc flash and blast, injuring both workers.

*Mines Safety Significant Incident Report No. 224* reminds principal employers and responsible persons of the importance of monitoring and reviewing electrical design and electrical installation compliance to ensure they meet regulatory requirements. Minimising arc flashes using the principals of hierarchy of control is detailed.

### MOBILE PLANT COLLISIONS

Two incidents involving the collision of mobile equipment on Western Australian mine sites have been addressed with safety alerts.

*Mines Safety Significant Incident Report No. 214* describes how a light vehicle entered a single-lane controlled area without communicating its presence. The vehicle later collided with a haul truck and was pushed backwards about 40 metres.

The incident illustrates the importance of monitored and enforced safe system of work and traffic management systems that have design or engineering solutions to segregate vehicle.

The second incident, outlined in *Mines Safety Significant Incident Report No. 226*, involved the collision of a manned water cart and autonomous haul truck when the truck turned into the path of the water cart. The turnaround loop was in the control system but the intersection had not been delineated on the ground, nor its use communicated.

The report recommends using the principles of the hierarchy of control to minimise the interaction of manned and autonomous equipment.



## BLASTING INCIDENT – WHAT DO WE KNOW?

**In Mines Safety Significant Incident Report No. 219, released on 5 June 2015, there was discussion about a delayed detonation of explosives in a blast hole as shotfirers were conducting a post-blast inspection.**

The blast hole was loaded with a decked charge comprising two charges or columns of explosives separated by a deck of stemming material. All 194 holes in the blast were loaded in a similar configuration and no problems were reported with the other holes. Pyrotechnic or non-electric detonators were used in the blast.

The factors that led to the misfire are uncertain but readers involved in blasting have been keen to find out more so they can prevent similar incidents. The investigation and findings from the report have implications for any multi-decked holes – whether through multi-decking, seam blasting or stem charge pockets.

Mechanisms of post-blast detonation considered during the site's investigation included:

- long-burning delay element in the detonator
- reactive ground heating misfired explosives
- detonation of explosive gases
- unauthorised firing of a misfire
- heating of a misfired charge by hot gases from the detonated charge.

Based on evidence, the likely scenario was that the top (pocket) charge misfired in the initial firing of the shot (see Figures A to D). The bottom charge detonated with hot gases passing through and around the stemming material, causing the ammonium nitrate–fuel oil (ANFO) mix in the pocket charge to ignite. The ANFO burned through to the booster, which then started burning. The burn reached the detonator and continued until the temperature was sufficient to cause detonation of the detonator and any remaining booster material and ANFO explosive in the pocket charge.

The actual cause of the misfire is unknown. However, potential causes include:

- pre-blast quality checks did not identify the incorrect tie-in of the downhole detonator (i.e. human error)
- damage to the detonator signal tube caused during charging operations
- defective detonator
- detonator malfunction due to shock waves from adjacent blast holes or the bottom deck (i.e. “shock stop”).

Some other issues identified during the investigation are listed below.

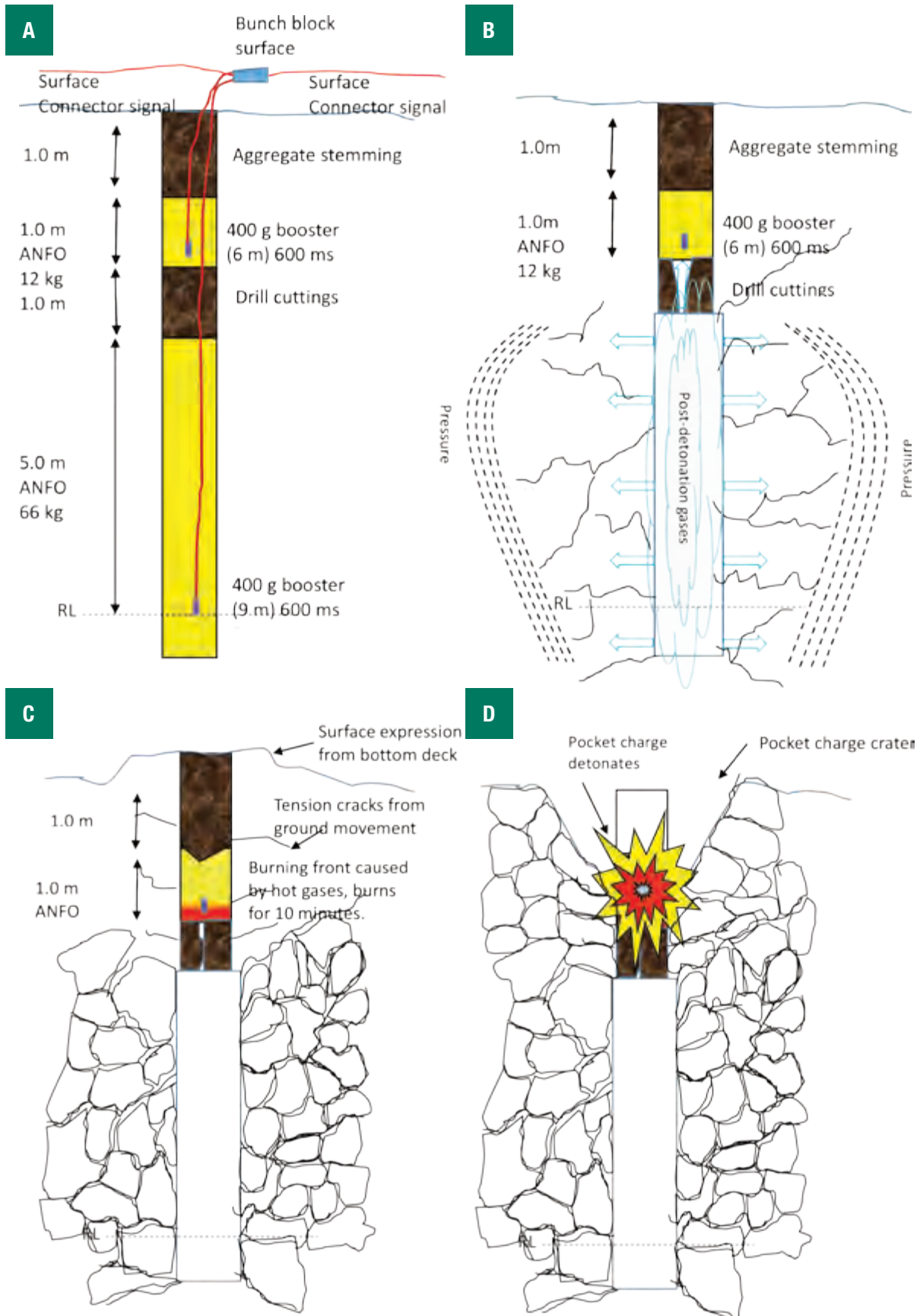
- The blast design process, including approval process, did not identify the shortcomings of the design parameters associated with the deck charge. The deck charge blast design was implemented without a formal change management process, including a risk assessment.
- The site risk assessment had not identified the risk of post-blast detonation associated with deck charges.
- Cavities were detected in several holes in the blast but not in the hole subjected to the post-blast detonation.
- The blasting procedure allowed the shot firer to re-enter the blast exclusion zone 5 minutes after the shot had been fired. The procedure did not specify modified re-entry times based on risk assessment (e.g. deck charges, time for dust or fumes to clear).

The significant incident report lists recommended actions.

### SAFETY TIPS

After a blast using deck charging:

- allow sufficient time for materials to cool in case there are misfired shots that have been subjected to excessive heat
- before entering the blast area, look for signs of unusual activity such as smoke emanating from a hole
- minimise the time and number of people in the blast area during the post-blast inspection.



Figures A to D show the likely sequence of events that led to the misfire (from site's investigation report)

# ADEQUACY OF INFORMATION SUPPLIED BY OEMS

**B**etween May 2014 and May 2015, the mines inspectorate identified a significant number of injuries and near misses resulting from maintenance personnel relying on or following inadequate information from original equipment manufacturers (OEMs).

In some incidents, workers deviated from OEM instructions. However, further investigation identified some common underlying factors:

- OEM literature may:
  - be deficient in clear work instructions (e.g. lack of suitable illustrations)
  - contain steps that are poorly written, out of order or missing
  - require speciality tools (e.g. not available on site)

- not reference speciality tools required to do the job safely
- hazards are not clearly defined in the OEM's maintenance procedures.

It is critical that hazards associated with plant are controlled or eliminated where possible. If not, safety information should be fully communicated before equipment is put into service and maintained.

The OEM instructions should be reviewed as part of the hazard identification process when undertaking a risk assessment, developing site-specific safe work procedures (SWPs) or completing a job safety analysis (JSA). The identified hazards and hazardous conditions need to be recorded in the site's hazards register. If the OEM information was found to be inadequate, feedback should be provided to the supplier and manufacturer so the information can be improved.

## SOME DUTIES OF DESIGNERS, MANUFACTURERS, IMPORTERS, SUPPLIERS, INSTALLER, EMPLOYERS, AND EMPLOYEES

### *Mines Safety and Inspection Act 1994*

- Section 9 Employers, duties of
- Section 10 Employees, duties of
- Section 14 Plant designers etc., duties of

### *Mines Safety and Inspection Regulations 1995*

- Part 6 Safety in using certain types of plant in mines, Division 2 – General duties relating to items of plant

Operation & Maintenance Manual

Operator's Manual





## PUBLIC HEALTH TOOL FOR CAMPS AND VILLAGES

**M**any mine sites in Western Australia are located in remote areas away from population centres. Because of the distances involved and the amount of time spent travelling to and from work, sites may have to provide workers with somewhere to live.

The Western Australian Department of Health has provided guidance on health considerations when designing employer-provided accommodation. The scoping tool discusses public health factors to consider in proposals such as:

- air quality, noise and light pollution (e.g. dust, smoke, ash, odours, buffers, traffic)
- water quality (e.g. potable, recycling water, waste water, recreational water bodies)
- land and hazard management (e.g. mosquito-borne diseases, pests, use of pesticides, contaminated sites, soil types)
- radiation
- workforce health
- communities.

*Scoping tool: Public health considerations for mine sites, exploration camps and construction villages is available from the publications section at [www.public.health.wa.gov.au](http://www.public.health.wa.gov.au)*

### ACCOMMODATION - WHAT ARE THE EMPLOYER'S OBLIGATIONS UNDER THE MINES SAFETY AND INSPECTION ACT?

Under their general duty of care obligations, the employer providing accommodation for workers must maintain the premises so the occupants are not exposed to hazards.

Find out more in the *Employer provided accommodation* pamphlet in the Mines Safety and Inspection Act series, available from the publications safety publications section at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)

### HOW DOES YOUR SITE'S MENTAL HEALTH STRATEGY CHECK OUT?

The best ways to help reduce work-related injuries and illness are by raising awareness of the issues and implementing policies and programs to address work-related factors.

Sites can assess their preparedness to support the mental health and wellbeing of their workforce by reviewing their systems using the checklist available at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)

The mental health checklist complements the site checklist for the prevention of bullying.

### ADDRESSING CONCERNS ABOUT UNCONTROLLED RELEASES OF AMMONIA

**In the last 12 months in Western Australia, there have been several uncontrolled releases of ammonia from storage and handling facilities. This corrosive and toxic gas is used primarily in refrigeration systems in cold storage facilities. Recent incidents and site inspections by dangerous goods officers have raised concerns about the safe operation and maintenance of some ammonia storage and handling facilities.**

One incident involved the release of pressurised ammonia gas in a cool room. One worker was hospitalised with life-threatening burns and extreme respiratory distress. Another five workers were treated in hospital for a range of less severe symptoms.

Common deficiencies identified from dangerous goods inspections are summarised in the table. Sites storing and handling ammonia are reminded to regularly review their equipment and risk management processes.

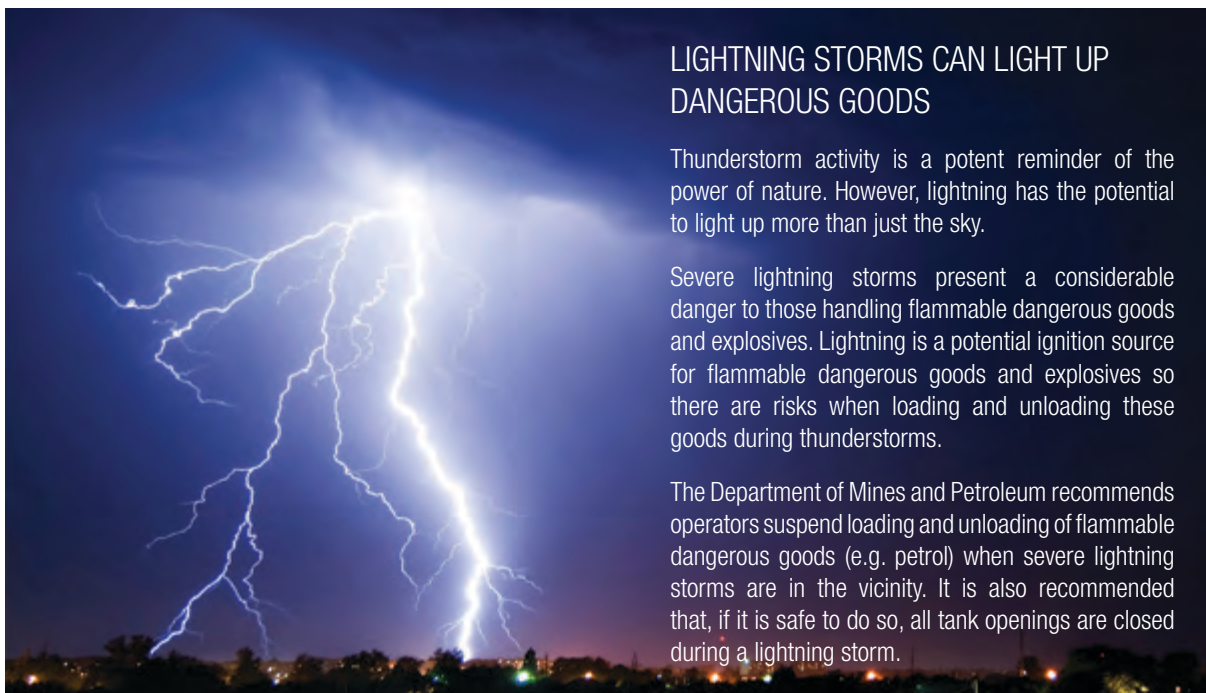
Chief Dangerous Goods Officer Ross Stidolph has announced that the Department of Mines and Petroleum will be inspecting ammonia refrigeration facilities throughout 2015 and 2016. Infringements will be issued where there:

- is non-compliance
- has been a failure to complete remediation actions from previous inspections.

Prosecution action may result from any significant failure to comply with the requirements of the *Dangerous Goods Safety Act 2004* and the Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007.

Resources supporting safe practices are available at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)

WorkSafe Victoria's publication on the *Safe Operation of Cold Storage Facilities*, available from [www.worksafe.vic.gov.au](http://www.worksafe.vic.gov.au), is also a useful reference.



#### LIGHTNING STORMS CAN LIGHT UP DANGEROUS GOODS

Thunderstorm activity is a potent reminder of the power of nature. However, lightning has the potential to light up more than just the sky.

Severe lightning storms present a considerable danger to those handling flammable dangerous goods and explosives. Lightning is a potential ignition source for flammable dangerous goods and explosives so there are risks when loading and unloading these goods during thunderstorms.

The Department of Mines and Petroleum recommends operators suspend loading and unloading of flammable dangerous goods (e.g. petrol) when severe lightning storms are in the vicinity. It is also recommended that, if it is safe to do so, all tank openings are closed during a lightning storm.

*Common deficiencies identified by dangerous goods officers during site inspections at ammonia storage sites and applicable regulation under Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*

Common deficiencies identified from inspections	Regulation
<b>Training</b>	
Poor training of operators and contractors on ammonia hazards and personal protective equipment (e.g. self-contained breathing apparatus or SCBA)	r. 81
<b>Risk assessment</b>	
Risk assessment unavailable, out-of-date or inadequate	r. 48
<i>Note: For guidance on conducting a risk assessment, refer to "Dangerous Goods Safety Guidance Note – Risk assessment for dangerous goods" or email <a href="mailto:ra@dmp.wa.gov.au">ra@dmp.wa.gov.au</a></i>	
<b>Emergency planning</b>	
Emergency management plan (EMP) unavailable, out-of-date or inadequate	r. 75
Site plan or manifest unavailable, out-to-date or inadequate	r. 78
Personal protective equipment not available or maintained (e.g. SCBA)	r. 74
Leak detection systems unavailable, faulty or alarm limit set is inaccurate	r. 74
<i>Note: For guidance on creating an emergency plan, refer to Dangerous Goods Safety Guidance Note: Dangerous goods emergency plans for small business"</i>	
<b>Ignition sources</b>	
Lighting and other electrical equipment including emergency ventilation not adequately rated for flammable hazards	r. 56
<b>Placarding and labelling</b>	
Placarding of packages and storage locations inadequate or insufficient	rr. 68-72
Pipe work carrying ammonia inadequately labelled	
<b>Fire protection</b>	
Fire protection measures insufficient	r. 73
<b>Licensing</b>	
Site storing above licensing quantities without a current dangerous goods site licence – above 500 L (water capacity) for a toxic gas	r. 25



# HOW MPUS USED ON MINE SITES MAKE PUBLIC ROADS SAFER

## THE CHANGING FACE OF CLASS 1 EXPLOSIVES

For baby-boomers, it may seem like only yesterday that cardboard boxes containing sticks of AN Gelignite '60' were hand-loaded into explosives magazines. However, gone are the days of mining explosives containing dangerous nitro-glycerine. Most of the packaged explosives used in the past have been replaced by bulk explosives.

There are two types of Class 1 bulk explosives:

- ANFO, which is an ammonium nitrate and fuel oil mixture
- water-based ammonium nitrate mixtures, which are more effective, versatile and waterproof, and are replacing ANFO for most blasting situations.

Most water-based Class 1 explosives are manufactured in bulk "on the bench" by mobile processing units (MPUs) from precursors that are not explosives. These precursors are classified internationally as UN 3375 – *ammonium nitrate emulsion or suspensions or gels, intermediate for blasting explosives* (Division 5.1 oxidising agents).

Most mine sites now have MPUs to meet their blasting needs so low hazard precursors have greatly reduced the transport of hazardous Class 1 explosives on public roads.

## TRANSPORT CYCLE OF UN 3375 PRODUCT

Typically, UN 3375 mixtures are transported by a road tank vehicle or in composite intermediate bulk containers (CIBCs) on public roads from their manufacturing plant to a mine site.

For sea transport, it is an international requirement to use portable tanks (or isotainers).

*Note: UN 3375 mixtures are Division 5.1 dangerous goods, and vehicles transporting them must carry the corresponding emergency information panels (EIPs).*

On arrival at site, the UN 3375 mixtures are pumped into large storage tanks. The mixtures are transferred as required from the storage tanks to MPUs, which are specially designed to blend various sensitisers into the UN 3375 mixtures to convert them into Class 1 explosives in the blast hole.

## EXPLOSION RISK OF UN 3375 MIXTURES

The explosives industry ensures the explosion sensitivity of ammonium nitrate mixtures is extremely low by confirming that mixtures meet the Test Series 8 requirements in the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria. If test results are negative, these substances are classified as an UN 3375 product belonging to Division 5.1.

The properties of UN 3375 mixtures make them:

- *insensitive to friction, impact and sparks*  
Their shock sensitivity is at least four times lower than for low-density ammonium nitrate prill. Even the most energetic traffic collision will not result in an explosion.
- *resistant to heating under confinement*  
Their heat resistance is higher than for solid ammonium nitrate.

There are two potential causes of an explosion involving UN 3375 mixtures:

- decomposition of a contaminated load, with confinement of the resulting gases followed by a pressure explosion
- engulfment in a vehicle fire leading to decomposition, confinement of gases and an explosion.

The first possibility has a relatively low risk due to Australian manufacturers' attention to quality control during manufacture, and industry's use of dedicated tankers so non-compatible materials are not introduced during transport.

Being involved in a fire would be the most likely cause of an explosion. Experiments involving fire impingement on transport tanks of emulsions show that steel tanks can experience a pressure explosion when decomposition gases cannot be adequately vented. Emulsion oozing on to the fire increased the intensity of the fire until it was fully decomposed. It is unlikely that UN 3375 mixtures would be involved in a devastating detonation explosion, but it cannot be ruled out on the basis of these experiments.

However, it is not until most of the water is driven off through the pressure relief device on the tank that there is the potential

for an explosion following a tank vehicle fire. This means there is time for emergency services to evacuate the surrounding area.

*Note: The accident record for transporting UN 3375 mixtures is still unblemished after 50 years – there have been no documented accidental explosions during transport.*

## SAFETY MEASURES TO PREVENT A VEHICLE FIRE

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

Potential causes of fires include:

- *traffic collisions and single vehicle crashes*  
Any issues contributing to such accidents need to be addressed. It will require close attention to the roadworthiness of the vehicles, especially tyres and brakes, as well as the driver's health and fitness, and measures to avoid driver fatigue.
- *poor vehicle maintenance*  
Wheel fires are usually caused by seized bearings, "dragging" brakes and overheating tyres. Electrical faults may also lead to fires.

## SAFETY MEASURES TO MINIMISE THE ADVERSE CONSEQUENCE OF A FIRE

Transporters need to provide the driver with the ability to fight small vehicle fires in an effective way by making sure:

- fire extinguishers are fit for purpose and meet the minimum requirements of Table 12.1 of ADG7.3
- vehicles loaded with tanks or portable tanks have a 10B dry powder extinguisher in the cabin and either one 60B dry powder extinguisher or two 30B dry powder extinguishers for each trailer, maintained in accordance with Australian Standard AS 1851 *Routine service of fire protection systems and equipment*

- the driver has been trained and is competent in the use of fire extinguishers and emergency response procedures for ammonium nitrate
- the vehicle's cabin contains the required emergency information inside a special emergency information holder, as prescribed in Chapter 11 of ADG7.3
- the required emergency information consists of an emergency procedure guide (EPG) for a vehicle fire and a separate procedure to address spills and fires involving UN 3375 mixtures
- the driver understands the need to evacuate to a safe distance in the case of a fire that is not able to be controlled with a fire extinguisher. If the fire involves only the trailer, and it safe to do so, the driver should unhitch it and drive the prime mover to safety.

## EMERGENCY RESPONSE

Transporters need to regularly review their procedures and practice their emergency response. Good communication between transporter, driver and emergency services is essential for a fast and effective response.

If there is an accident or fire, the EIP, transport document and EPG provide critical information to emergency services. The EIP must list the telephone number of a competent emergency advisor, whose service is available at all hours.

Emergency services have a difficult decision to make whether to fight a fire or withdraw to a safe distance from a potential explosion.

SAA/SNZ HB 76:2010 *Dangerous Goods – Initial Emergency Response Guide* contains the required emergency procedure guide. *Guide 51 – Ammonium Nitrate Emulsion, Gel or Suspension (UN 3375)* recommends, in the case of a large fire, considering an initial evacuation distance of at least 1,000 m. To completely protect against a detonation explosion, an evacuation distance of 1,600 m is required.

### FORMULATION AND COMPOSITION OF UN 3375 MIXTURES

UN 3375 mixtures consist of two types of ammonium nitrate water-based mixtures.

#### Ammonium nitrate suspensions and gels

- Solids are suspended in a thickened aqueous solution of ammonium nitrate and other oxidisers.
- The solids are fuels (self-explosive or not), often with crystals of oxidisers. Dissolved or liquid fuels may be present.
- The thickener is usually a natural starch.
- At the blast hole, the string-like starch molecules are chemically cross-linked to form well-structured water-resistant Class 1 explosives.

#### Ammonium nitrate emulsions

- The extremely viscous, porridge-like water-in-oil emulsion typically has around 70% ammonium nitrate and 15% water, with the balance being hydrocarbon-based materials.
- The emulsion contains sub-microscopic droplets of supersaturated ammonium nitrate dispersed evenly in an emulsifier-stabilised oil matrix without any solid particles.

Suspensions and gels have been largely replaced by emulsions, which were introduced in the mid-1980s. Emulsions represent 150 years of improvements in explosives technology seeking safer products, cost-effectiveness, water resistance, and the flexibility to be tailored to suit any possible blasting condition and rock type.

### PORGERA GOLD MINE EXPLOSION

On 2 August 1994, there was an explosion at the Porgera gold mine in Papua New Guinea following the severe fire impingement of stored UN 3375.

A detonation following an accident (a primary explosion that killed 11 workers) caused severe fire impingement to two emulsion storage tanks for about 75 minutes. The fire was fed by large volumes of burning process oil located near the emulsion.

This resulted in a larger secondary detonation of about 90 tonnes of emulsion. However there were no casualties in the secondary event as survivors of the initial blast had already evacuated the area.

## FOUR TYPES OF EFFECTIVE CONTAINMENT SYSTEMS FOR TRANSPORTING UN 3375 MIXTURES



**Road tank vehicles** carry most of the UN 3375 mixtures on public roads. They are made from steel or aluminium complying with Parts 1 and 4 of Australian Standard AS 2809 *Road tank vehicles for dangerous goods* and have effective pressure-relief devices.



**Mobile processing units (MPUs)** are mainly found on mine sites. Licensed MPUs have the dual purpose of transporting UN 3375 mixtures, ammonium nitrate prill, and sensitising agents in separate steel or aluminium compartments and then converting the UN 3375 mixtures into Class 1 explosives at the bench. They are permitted on public roads when transporting non-Class 1 ingredients.



**Composite intermediate bulk containers (CIBCs)** consist of a rigid inner plastic container and an outer protective rigid steel-mesh casing conforming to the Intermediate Bulk Container (IBC) Design Code 31HA1.



**Multimodal portable tanks or isotainers** are internationally approved steel tanks with effective pressure-relief devices. They are twist-locked onto road and rail platforms, and carry about 20 kilolitres of product.

### WHAT TO LOOK OUT FOR

**B**uildings and structures are "workplaces" that are often the longest lived structures on a mine site, answering the needs of the mining operation from start-up to closure. Whether newly designed or inherited from previous operators, duty holders need to control the risk of exposure to hazards at all stages of the structure's life-cycle – be it design, modifications or maintenance.

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This is the first in a regular series raising awareness of structural integrity issues associated with workplaces and plant. Look at the photo below to see if you can spot the risks as seen through the eyes of an inspector. Do you have this scenario at your site? If so, raise the issue with management.

#### SHINING A LIGHT ON LARGE WORKING STRUCTURES

The Mine Safety Matters pamphlet *Large working structures* provides a guide to good practice to maintain the structural integrity of shiploaders, reclaimers, stackers and other large structures.

The publication outlines the common types and causes of structural failure, safe work practices and the role of safety management systems.

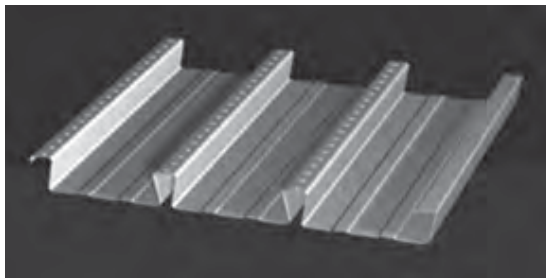
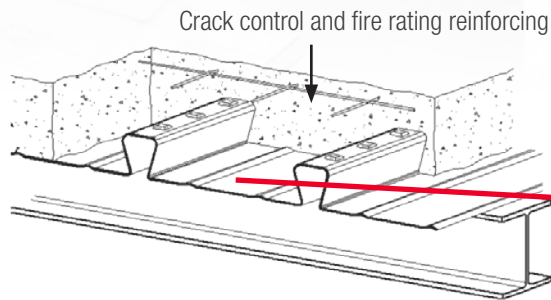
Download the pamphlet from the safety publications section at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)

**What problems can you see?**





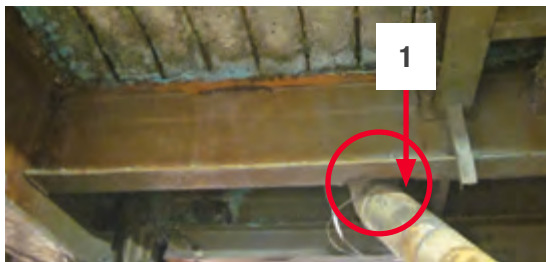
**Corrosion and loss of structural integrity**



The permanent shuttering or "decking" under the slab has corroded away. The slab is at risk of collapse if it experiences additional imposed loading.

Decking usually provides the "reinforcing" in the slab. The thinner mesh inside the slab is mainly for crack control or fire-rating. There is often no additional reinforcing in concrete, which means the structural integrity of the decking is critical.

**Modifications that have not been designed and assessed by competent person can introduce risk**



1. The notched beam adjacent to the pipe should be assessed by a competent person.

The notch in one side of the bottom flange of the beam reduces the beam's strength and produces an unsymmetrical stress path. This beam requires assessment by a competent person (e.g. structural engineer).



2. Were these lifting points suitably designed? Are they rated?

The added rigging and hanger points introduce more loading. Were they appropriately designed? Was the manufacture quality controlled? Do they have a rating? Were the effects of torsion to the beam (left hand side of photo) considered?



## ELECTRICAL SUPERVISORS AT EXPLORATION CAMPS

**M**ines inspectors who specialise in electrical matters are regularly asked if an electrical supervisor must be appointed at exploration camps.

There are two observations that apply to the answer:

- exploration camps are regarded as mines in terms of the *Mines Safety and Inspection Act 1994* and the *Mines Safety and Inspection Regulations 1995*
- generators are typically used to supply electricity an exploration camp.

This means an electrical supervisor must be appointed in accordance with regulation 5.10. The duties of the supervisor are detailed in regulation 5.11.

The supervisor does not have to be a direct employee. Many exploration camps have a contractor as their appointed electrical supervisor. Nor does the supervisor have to be at

the camp full time, provided visits are made with sufficient regularity to ensure compliance with regulation 5.11, including:

- testing and tagging of portable electrical equipment
- regular checking of residual current devices (RCDs)
- supervision of electrical work at the camp and associated facilities
- ensuring the safe use of electrical equipment
- maintaining the site's electrical log book.

The appointment of an *electrical supervisor* should not be confused with the appointment of a *nominee for an electrical in house installing work licence*. These are separate appointments made under different legislation.

The supervisor is appointed in accordance with regulation 5.10 of the *Mines Safety and Inspection Regulations 1995*, whereas the nominee is appointed in accordance with regulation 37 of the *Electricity (Licensing) Regulations 1991*. However, it is useful and convenient for both appointments to be held by the supervisor.

## UNLICENSED ELECTRICAL WORK



### What is “electrical work”?

Electrical work is defined in the Electricity (Licensing) Regulations 1991 as work on:

- electrical machines or instruments
- an electrical installation
- electrical appliances or equipment

to which electricity is supplied or intended to be supplied at a nominal pressure exceeding 50 volts alternating current (AC) or 120 volts ripple-free direct current (DC).

### What does this mean?

Electrical work covers tasks such as installing a new light fitting or power outlet, replacing an existing light fitting or power outlet, altering the location of a light fitting or power outlet, replacing a light fitting with a ceiling fan, or repairing an appliance such as a heater or toaster.

It does not include fitting or replacing 240 volt plugs and sockets, the replacement of lamps, or the replacement of batteries in smoke alarms.

It is not unlawful to purchase electrical accessories, equipment or materials that are intended for hard-wired connection. However, they must be connected by a licensed electrical contractor.

### What can happen if an unlicensed person does their own electrical work?

It is unlawful and potentially dangerous for unlicensed persons to perform electrical work.

There is a danger for both the unlicensed person who performs the work, and others who use or come into contact with the work, including workmates and colleagues.

The latent nature of some electrical faults means that the danger may not be immediately apparent, and can develop over time. For example:

- an incorrect circuit connection may result in safety switches not operating as designed and therefore providing no protection
- failure to maintain the required clearances from thermal insulation material or insulating foil may lead to a fire
- the incorrectly installation of electrical equipment in wet areas is a common cause of electric shocks.

In addition, insurance policies may be invalidated and significant fines may be imposed when unlicensed electrical work is detected.

***Electrical work must always be performed by a licensed electrician, employed by a licensed electrical contractor.***

### Find out the latest electrical news

Sign up to EnergySafety's Energy Bulletins to receive the latest technical and safety news for electrical workers.

For example, EnergySafety issued two orders to owners and operators of high voltage (HV) installations with oil-insulated HV combined-fuse switches following the fatal explosion at the Morley Galleria Shopping Centre on 3 February 2015. *Energy Bulletin 70* (April 2015) describes the second order.

On Tuesday 24 March 2015, EnergySafety issued a second order (02-2015). While the first order only related

to Long & Crawford Manchester switchgear (later GEC Alstom), the second order applies to all HV oil-insulated combined-fuse switches.

As well as banning the opening of the lid, the new order prohibits the commencement of any electrical work on this type of equipment, including operation of the switching or earthing mechanisms, where an HV fuse has operated.

For more information, visit [www.commerce.wa.gov.au/energysafety/subscribe-energy-bulletin](http://www.commerce.wa.gov.au/energysafety/subscribe-energy-bulletin)

*Note: The first EnergySafety order and its application to mining operations were discussed in the last issue of Resources Safety Matters.*



## RECOGNISING INNOVATION

**T**he 2015 Chamber of Minerals and Energy (CME) Safety and Health Innovation Awards were presented at the Innovation Awards Dinner on Monday 27 July 2015, as part of the annual CME Safety and Health Conference.

Open to all Western Australian-based resource companies, operations and contractors, the awards showcase the best in creativity and ingenuity with the goal of improving safety and health outcomes at all workplaces. This year, ten finalists competed for top honours in three categories as well as the industry choice award. The judges also awarded a special commendation.

### ENGINEERING CATEGORY AND INDUSTRY CHOICE AWARD WINNER

#### Winner

**BHP Billiton: Mining Area C – conveyor belt replacement improvement**

Designing a module that can be bolted on to a conveyor's structure has led to safer and more efficient conveyor belt replacements using existing site equipment. Turning frames are now used to change the way shorter conveyor belts are replaced. The innovation has been implemented in four BHP Billiton Iron Ore mines.

#### Finalists

- Rio Tinto Dampier Salt Ltd – The arc flash elimination project
- Alcoa of Australia – The bund safe trailer

### SYSTEMS CATEGORY

#### Winner

**Fortescue Metals Group Ltd – unmanned aerial system (UAS) for Cloudbreak Mine Site**

The UAS uses a mounted camera within the plane to gather spatial information for stockpile surveys. This significantly reduces the survey team's exposure to health and safety risks. Other benefits include an increase in productivity and efficiency in survey and mining team activities, and increased accuracy in data reporting. Other FMG operational areas are now using unmanned aerial vehicles to inspect high risk work areas.

#### Finalists

- BGC Contracting – Safety Achievers Award
- Bis Industries – VOICE (Virtual, Operational, Insight, Control, Environment)

### PEOPLE CATEGORY

#### Winner

**Downer Mining – Enhancing workforce health program**

This holistic occupational health program responds to the risks posed by poor health poses to employee safety. A commercial research partnership with Queensland University of Technology's Institute of Health and Biomedical Innovation gave Downer Mining the opportunity to work with internationally recognised experts. This has seen the development of a diversified and continuous-improvement approach to managing its priority health risk areas – obesity and nutrition, musculoskeletal disorders and mental health.

*Special commendation: Rio Tinto Iron Ore – FIVE – Rio Tinto and Disability in the Arts, in partnership with Disadvantage in the Arts WA (DADAA) Mental Health Project*

#### Finalists

- Rio Tinto Iron Ore – A targeted risk-based approach to improving health and wellbeing on a fly in-fly out site: Yandicoogina
- BGC Contracting – Don't just change the way you drink, change the way you think

## CME SHARES LESSONS LEARNED AT MAY FORUM

The factors behind vehicle and mobile plant interactions and how industry can improve safety outcomes was part of CME's Sharing Safety Lessons Learned Forum held on 18 May 2015.

Various causation factors to these incidents were identified and discussed, including:

- breakdown or lapse in communications
- instances of complacency engendered by the day-to-day routine (e.g. vehicle maintenance)
- procedural ownership by frontline supervisors may not be fully embedded and can lead to instances of non-compliance
- need to improve road and intersection designs so they are well planned and controlled.

Pathways identified as improving safety outcomes included:

- leading by example and fostering effective teams with a commitment to safe work

- taking the opportunity to promote individual and team accountability for safety and health
- auditing schedules and processes to ensure procedures and policies are being appropriately applied
- consulting with employees when developing or reviewing procedures
- understanding the site's risk profile by investigating not only serious incidents but also the near misses where there was a potential for serious injury — further analysis of these types of incidents can help industry to understand more about causal and contributory factors
- looking at all levels of the hierarchy of control to mitigate risk and deal with the root causes of incidents
- identifying opportunities for continuous improvement (e.g. traffic management plans, segregation of vehicle types and pedestrians where practicable).

The forum noted the opportunities to collaborate with the Department of Mines and Petroleum, as the safety regulator, on good practice for mobile plant and traffic management, as well as using departmental resources to meet the need for further quantitative information to inform decision-making and continuous improvement.

## GUIDANCE AVAILABLE AT [WWW.DMP.WA.GOV.AU/ RESOURCESSAFETY](http://WWW.DMP.WA.GOV.AU/RESOURCESSAFETY)

Resources Safety has a four-part mobile equipment audit covering management system, site operations, drilling and other field activities and traffic management.

The recently released code of practice for safe mobile autonomous mining in Western Australia may assist when developing a traffic management plan for autonomous operations.

There are also toolbox presentations on topics relevant to traffic management.



## MINING FAMILY MATTERS AND WESLEY LIFEFORCE UNITE TO PROMOTE SUICIDE PREVENTION

**A**ustralian workers in mining, oil and gas are being armed with information to help prevent suicide as part of a new partnership between Mining Family Matters and Wesley LifeForce Suicide Prevention Networks.

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Mining Family Matters founder Alicia Ranford says that the Rock Solid Suicide Prevention Program aims to build emotional resilience and help prevent suicide among workers in the resources sector. The program also provides families with practical strategies to survive the challenges of working away or shift work.

“Wesley Mission has been a leader in the suicide prevention field for many years, establishing Lifeline in 1963 to counsel people in crisis by phone 24/7,” Mrs Randford says. “It also established Wesley LifeForce in 1995 to provide suicide prevention services that educate and empower local communities and support people most at risk.

“At Mining Family Matters we have always been convinced that the mental health of workers should be considered every bit as important as physical health and safety.

“That’s why we’re proud to be working with the suicide prevention team at Wesley LifeForce to bring their considerable expertise to the mining and resources industry, particularly given the additional pressures on fly-in fly-out workers and their families.”

The CEO of Wesley Mission, the Reverend Dr Keith Garner says that although there is no specific research about the rate of suicide among workers in mining and resources, experts agree that fly-in fly-out (FIFO) and drive-in drive-out (DIDO) workers have greater exposure to risk factors that can contribute to deaths by suicide.

“Risk factors for people who work away include social isolation, family and relationship stress and being exposed to high-risk on-the-job activities such as underground mining and blasting,” Dr Garner says.

Wesley LifeForce has trained more than 20,000 Australians in suicide prevention in workshops in urban, regional and remote communities.

Under the Rock Solid collaboration, the workshops teach simple, effective interventions aimed at reducing the cost of workplace stress, saving lives and helping to eliminate the impact of losing a staff member to suicide. Key issues addressed include:

- why people take their own life
- risk and protective factors
- commonly held beliefs about suicide
- how to help someone going through a tough time
- barriers to suicide intervention
- how to build individual resilience
- implementing the See Ask Listen Tell (SALT) intervention strategy.



As part of the collaboration, Mining Family Matters released the second edition of its award-winning *Survival Guide for Mining Families*, featuring more comprehensive information on the emotional wellbeing of workers as well as practical, professional strategies to keep relationships strong and happy.

Chapters in the guide include:

- identifying stress and depression
- overcoming stress, anxiety and sadness
- building workplace resilience
- knowing your mental health first aid
- helping children to cope when you work away
- simple ways to stay connected.

In South Australia, the Mining and Quarrying Occupational Health and Safety Committee (MAQOHSC) is funding a Rock Solid Suicide Prevention Pilot Program within the state's mining and quarrying industry. MAQOHSC is specifically funded by South Australia's mining and quarrying industry to make workplaces safer.

For more information about the Rock Solid Suicide Prevention Program, the updated Survival Guide or South Australia's MAQOHSC pilot program, contact Alicia Ranford at [alicia@miningfm.com](mailto:alicia@miningfm.com)

### CHAMBER RELEASES ITS BLUEPRINT FOR MENTAL HEALTH AND WELLBEING

The Chamber of Minerals and Energy of Western Australia (CME) has produced a blueprint to help the resources sector create mentally healthy workplaces. The mental health blueprint is based on a document developed by the Minerals Council of Australia and is tailored to suit the Western Australian context.

The guide provides an overarching framework for promoting the wellbeing of the workforce as well as reducing the risks and impacts of mental illness. It identifies directions for industry and recommends evidence-based strategies that can be applied at company and site levels.

For further information, contact the CME at [chamber@cmewa.com](mailto:chamber@cmewa.com)



*Norton Gold Fields participating in the 2015 Surface Mine Emergency Response Competition*

## EMERGENCY RESPONDERS PUT TO THE TEST

**The team from Norton Gold Fields took top honours in this year's Chamber of Minerals and Energy of Western Australia (CME) Surface Mine Emergency Response Competition.**

The 2015 competition saw eight teams from across the Eastern Goldfields and Murchison tackling emergency scenarios and a theory exam aimed at testing emergency response skills.

Focus Minerals again hosted this year's competition, which was held at the Three Mile Hill gold mine just outside Coolgardie.

Representatives from the Department of Mines and Petroleum's Resources Safety Division were on hand to provide support for the competition.

"This year, the Department sponsored the HazChem event, provided adjudicators for the incident management scenario, and compiled a photographic record of the competition," Resources Safety Executive Director Simon Ridge said. "Such

competitions are an important test of industry's emergency response capabilities."

Mines and Petroleum Minister Bill Marmion said that Western Australia has recognised the importance of such events for more than 100 years.

"They give invaluable experience, especially for the teams who also provide vital emergency response capacity in Western Australia's remote and regional communities," Mr Marmion said.

CME 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," Mr Howard-Smith said. "The event prepares teams to respond to any emergency situation, while sharpening the skills they hopefully will never have to put to use."



## HONOUR BOARD

<b>1st best team</b>	Norton Gold Fields
<b>2nd best team</b>	Sandfire Resources
<b>3rd best team</b>	La Mancha Resources
<b>Best captain</b>	Jake Benson, Norther Star Resources
<b>Best new team</b>	KCGM
<b>Best new captain</b>	Marcus Day, Norton Gold Fields
<b>Theory</b>	Sandfire Resources
<b>Theory individual</b>	Anthony Scharf, La Mancha Resources
<b>Team skills</b>	Sandfire Resources
<b>Vehicle extrication</b>	Sandfire Resources
<b>HazChem</b>	La Mancha Resources
<b>Rope rescue</b>	Sandfire Resources
<b>Fire fighting</b>	Norton Gold Fields
<b>Confined space rescue</b>	Northern Star Resources
<b>First aid</b>	Saracen Gold Mines
<b>Team safety</b>	Norton Gold Fields
<b>Incident management scenario</b>	Justin Colwell, Sandfire Resources
<b>Overall breathing apparatus (BA) skills</b>	Norton Gold Fields
<b>Best scenario (voted by competing teams)</b>	Team skills
<b>Chief Adjudicators' award for event management</b>	Team skills

## COMPETING TEAMS

Granny Smith, Gold Fields Australia  
 Kalgoorlie Consolidated Gold Mine (KCGM)  
 La Mancha Resources, Kalgoorlie Operations  
 Metals X, South Kalgoorlie Operations  
 Northern Star Resources, Kalgoorlie  
 Norton Gold Fields  
 Sandfire Resources  
 Saracen Gold Mines

KCGM

SH



Left to right: Amirell Dubney, Garry Oliver and Sean Monaghan at the Three Mile Hill gatehouse

## POPULAR CHOICE FOR HARRY STEINHAUSER AWARD 2015

The Harry Steinhauser Award is presented by the Mine Rescue Committee of the CME's Eastern Regional Council to a member of the mining community for their outstanding contribution to mine rescue and emergency response. Once a worthy recipient is agreed upon, the award is bestowed at a competition presentation evening.

Amirell Dubney received the 2015 award for his tireless work in mine rescue in the Goldfields since 1994. His roles have included team member, team manager, trainer and adjudicator.

He has also pursued qualifications to support his practical mine rescue focus.

Amirell has put his competition mine rescue experience into action at a variety of accidents, some with fatalities. He has fronted up to vehicle crashes, rock falls, helicopter crashes and other mine site emergencies.

The audience agreed that Amirell was a well-deserving recipient of this prestigious award.



2013 Underground Mine Emergency Response Competition  
TYC



2014 Underground Mine Emergency Response Competition  
TYC

What happens  
behind the scenes?

**THEORY** – THE FUN STARTS  
ONCE THE PAPERS ARE  
HANDLED IN



**TEAM SKILLS** – TIME FOR  
SOME LAST-MINUTE CHECKING  
(AND RELAXATION) WHILE  
WAITING FOR THE NEXT TEAM



**VEHICLE EXTRICATION** –  
CONFIRMING THE CAR IS  
PROPERLY PARKED AND ALL IS  
GOING TO PLAN



**HAZCHEM** – ALL READY FOR  
ANOTHER DAY'S EXCITEMENT



**FIRE FIGHTING** – THE ONE  
EVENT THAT CAN COPE WITH  
COLD STARTS TO THE DAY



## What happens behind the scenes?

**ROPE RESCUE** – KEEPING AN EYE ON THE INCIDENT WEATHER



**CONFINED SPACE RESCUE** – IT'S IMPORTANT TO GET SOME FRESH AIR AND SUNSHINE EVERY SO OFTEN WHEN YOUR SCENARIO IS DARK AND SMOKY, AND THERE'S NOT MUCH ROOM TO MOVE



**FIRST AID** – IT'S ALL ABOUT HANGING AROUND TO SEE HOW THE TEAM DEALS WITH CASUALTIES



**INCIDENT MANAGEMENT SCENARIO** – EVERYONE NEEDS TO STAY ALERT AS THE SCENARIO ADAPTS ACCORDING TO THE COMPETITOR'S RESPONSES AND REQUESTS



**THE CONTROL ROOM** – WHERE RESULTS ARE COLLATED AND DISPUTES SETTLED



**The life of a competition casualty** – be prepared for long waits, getting wet, lying on the ground, hanging in the air, sticky make-up and the application of assorted equipment



# 2015 SURFACE MINE EMERGENCY RESPONSE COMPETITION



# 2015 SURFACE MINE EMERGENCY RESPONSE COMPETITION



## PROSECUTIONS

### DANGEROUS GOODS

#### Perth racing fuel supplier fined

In March this year, auto-mechanic business and racing fuel supplier R.P.W. Pty Ltd, trading as RPW Service Centre, was fined \$50,000 in the Perth Magistrates Court after the company pleaded guilty to storing more than 50 times the legal amount of fuel at its Osborne Park workshop.

The charges were laid after an inspection by dangerous goods officers discovered the stockpile of fuel.

Ross Stidolph, Director Dangerous Goods and Petroleum Safety at the Department of Mines and Petroleum, said that the case highlighted the importance of appropriate fuel storage as part of dangerous goods safety.

“The amount of fuel being stored at the workshop could have led to a major if not catastrophic explosion. Although the company had some safety measures in place, the controls were entirely inadequate for the large amount of fuel being stored.”

There were a number of potential ignition sources, limited ventilation and no way of containing the fuel in the event of a spill.

“This was a high-risk situation and created the very real potential for a catastrophic incident, particularly as there were

no firewalls to prevent the spread of a fire,” Mr Stidolph said. “The storage of this fuel presented a threat not only to RPW Service Centre, but also neighbouring businesses and the public.

“Emergency response personnel were also at increased risk due to the lack of exterior signage warning them of the dangerous goods within the workshop.”

Following the inspection by the Department, the fuel was seized and moved to an off-site, purpose-built dangerous goods warehouse.

“In this case we were able to act and ensure the fuel was moved and stored safely,” Mr Stidolph said.

“However, it is absolutely vital that businesses address the risks associated with storing and transporting dangerous goods. Ignorance is not a defence, so if businesses are unsure of any requirements, they should contact a dangerous goods officer on 9358 8001 or go to the Resources Safety website at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for guidance.”

Mr Stidolph noted that RPW Service Centre had worked cooperatively with the Department.

“The business has actively worked to improve safety and minimise risks from dangerous goods on site,” he said.

### OVERVIEW OF 2014 REPORTABLE SITUATIONS AND INCIDENTS

This report describes dangerous goods and explosives incidents that happened in Western Australia in 2014, which are required to be reported to the Department of Mines and Petroleum under the Dangerous Goods Safety Act 2004 and associated regulations.

The report also compares the 2014 incident data with data collected since 1995.

There were no fatalities in 2014. Several injuries received were serious but the majority were minor.

View the report in the safety publications section at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)





## MINES SAFETY

### Serious crush injuries lead to court appearance

After pleading guilty earlier in the year, Agnew Gold Mining Company was fined \$75,000 in the Perth Magistrates Court on 28 April 2015 for failing to provide a safe working environment following an incident that seriously injured three workers at a Goldfields mine. The incident happened on 10 January 2012 at Agnew's Waroonga underground mine, 23 km west of Leinster.

The charges were laid following an investigation by the Department of Mines and Petroleum.

Doug Barclay, Regional Inspector of Mines based in Kalgoorlie, said that the workers were injured when sheets of steel mesh leaning against a wall in the underground mine fell onto them.

"Two of the workers were crushed and one was struck by the steel mesh when it fell," Mr Barclay said. "Seventy-four sheets of steel mesh fell with a combined weight of almost three tonnes."

The two workers crushed by the mesh both suffered multiple pelvic fractures, while one also suffered rib fractures and a lacerated liver.

The worker who was struck suffered a compound fracture to his right leg.

"The way the mesh was stacked was contrary to the company's own safe work procedures and counter to a 1999 recommendation by the State Coroner," Mr Barclay said.

The recommendation stemmed from a 1998 fatality at another Western Australian mine site, when a worker was crushed by 15 sheets of mesh that had been leaning up against a wall.

Mr Barclay said the Coroner's recommendation had been highlighted by the Department and the risks were known.

"This was a potentially deadly incident and it should not have occurred," Mr Barclay said. "I hope this decision sends a strong message to industry about the importance of following safe work procedures and minimising risks."

### *MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 179*

#### **Serious crush injuries caused by falling mesh sheets**

Issued 24 April 2012

### Failure to address fall risk results in fine

Mt Gibson Mining Ltd was fined \$30,000 in the Perth Magistrates Court on 27 July this year. The company had pleaded guilty a month earlier to failing to provide a safe working environment.

State Mining Engineer Andrew Chaplyn said that the charges were laid after an investigation by the Department of Mines and Petroleum revealed a lack of enforcement of suitable safety standards for employees working at height.

"Our investigation found the company had permitted work where a significant fall risk existed without proper safeguards in place," Mr Chaplyn said. "The work required risk assessment, working at height permits, fall arrest equipment and supervision, but none of this was carried out by the company."

In imposing the fine, Magistrate Paul Alan Roth took into account the remedial actions taken by the company and an early guilty plea.

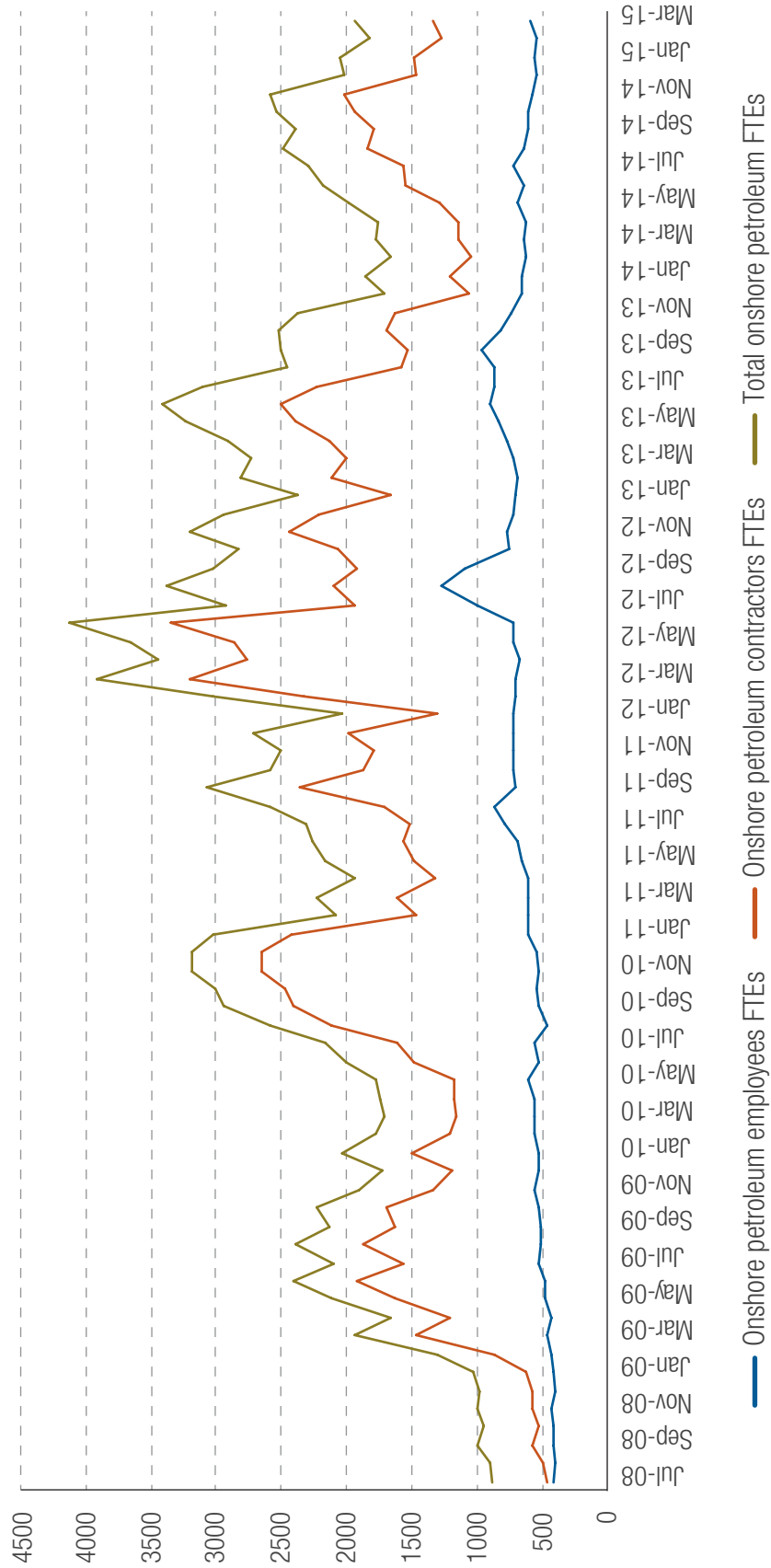
"This decision sends an important message to the resources industry about the importance of not just having safe systems of work and procedures in place, but ensuring they are followed and workers are supervised," Mr Chaplyn said.

"However, it is also important that companies continue to look for ways to climb the hierarchy of control towards engineering solutions, isolation and elimination of hazards, as personal protective equipment and procedures can only provide so much protection."



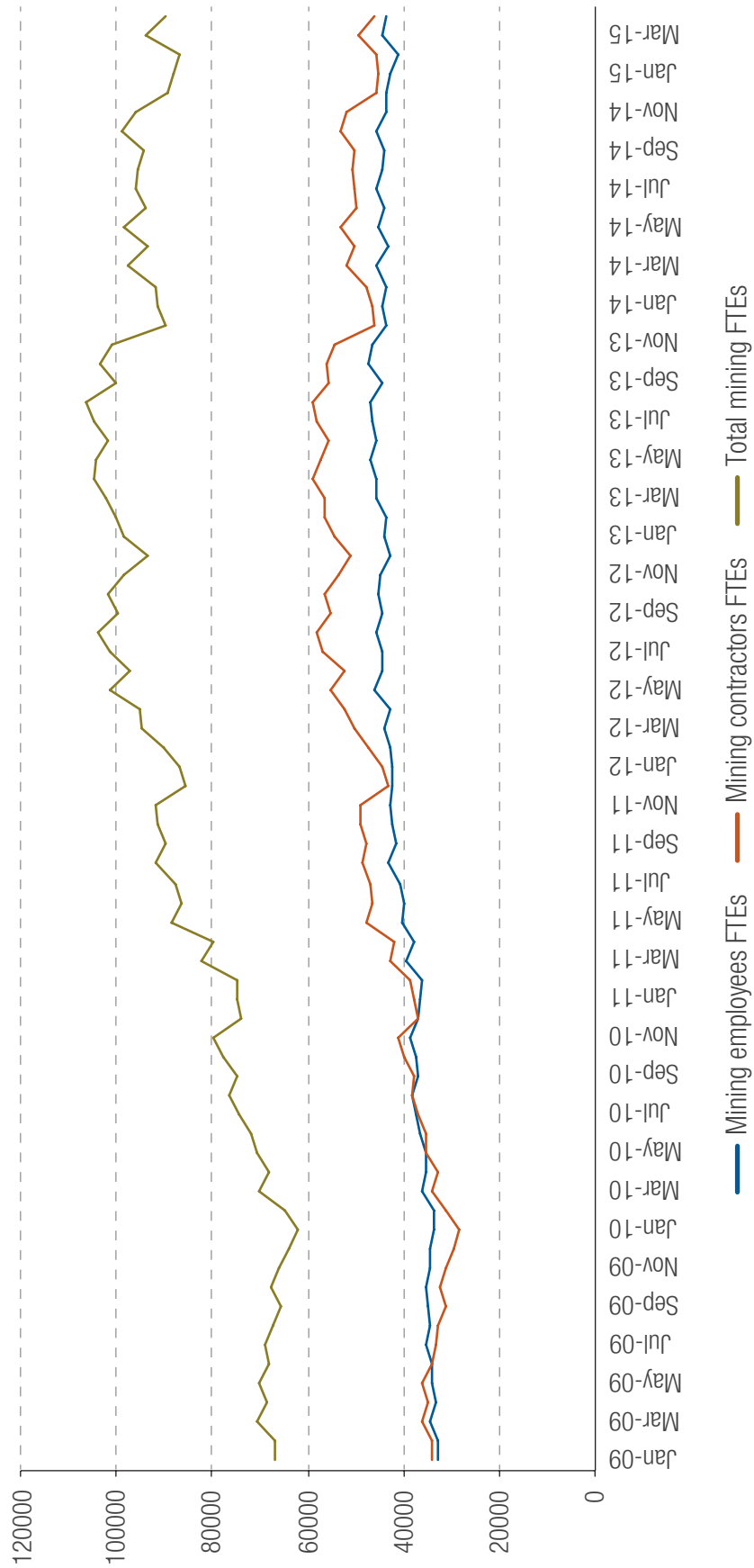
## WA'S MONTHLY ONSHORE PETROLEUM WORKFORCE (MARCH 2015)

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

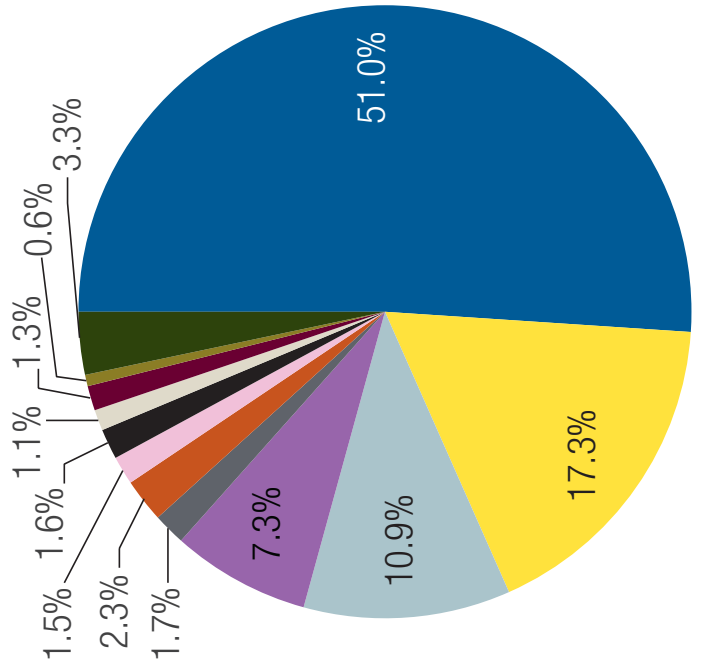


# WA'S MONTHLY MINING WORKFORCE (MARCH 2015)

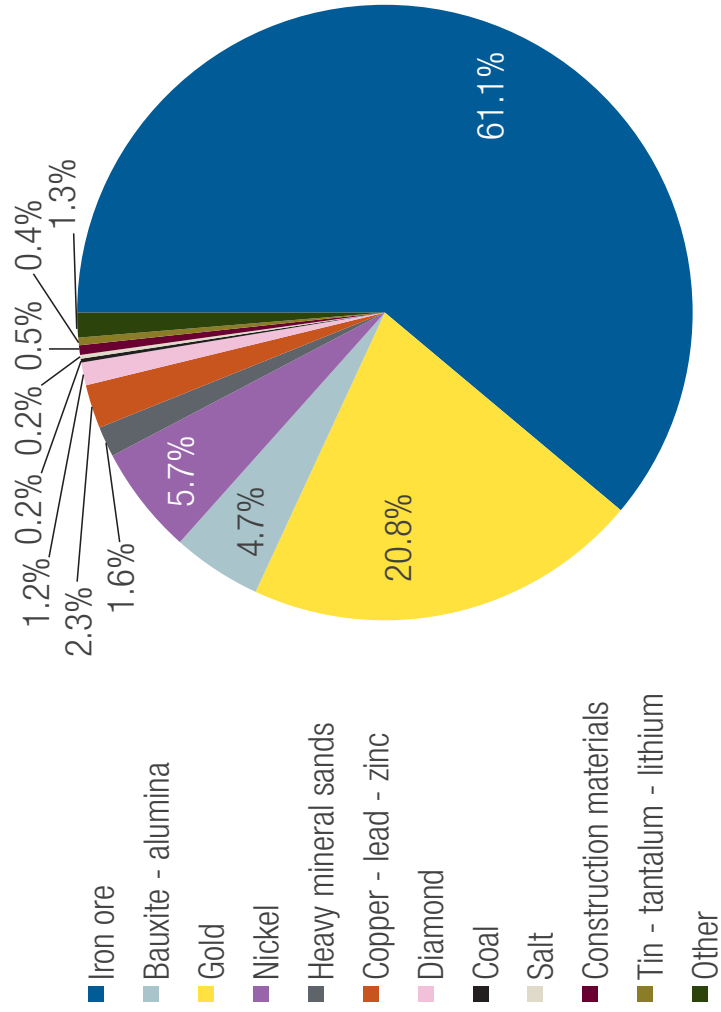
NOTE: From 1 July 2009, monthly mining workforce figures are plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year



WA'S MINING WORKFORCE – PERCENTAGE BY COMMODITY (MARCH 2015)



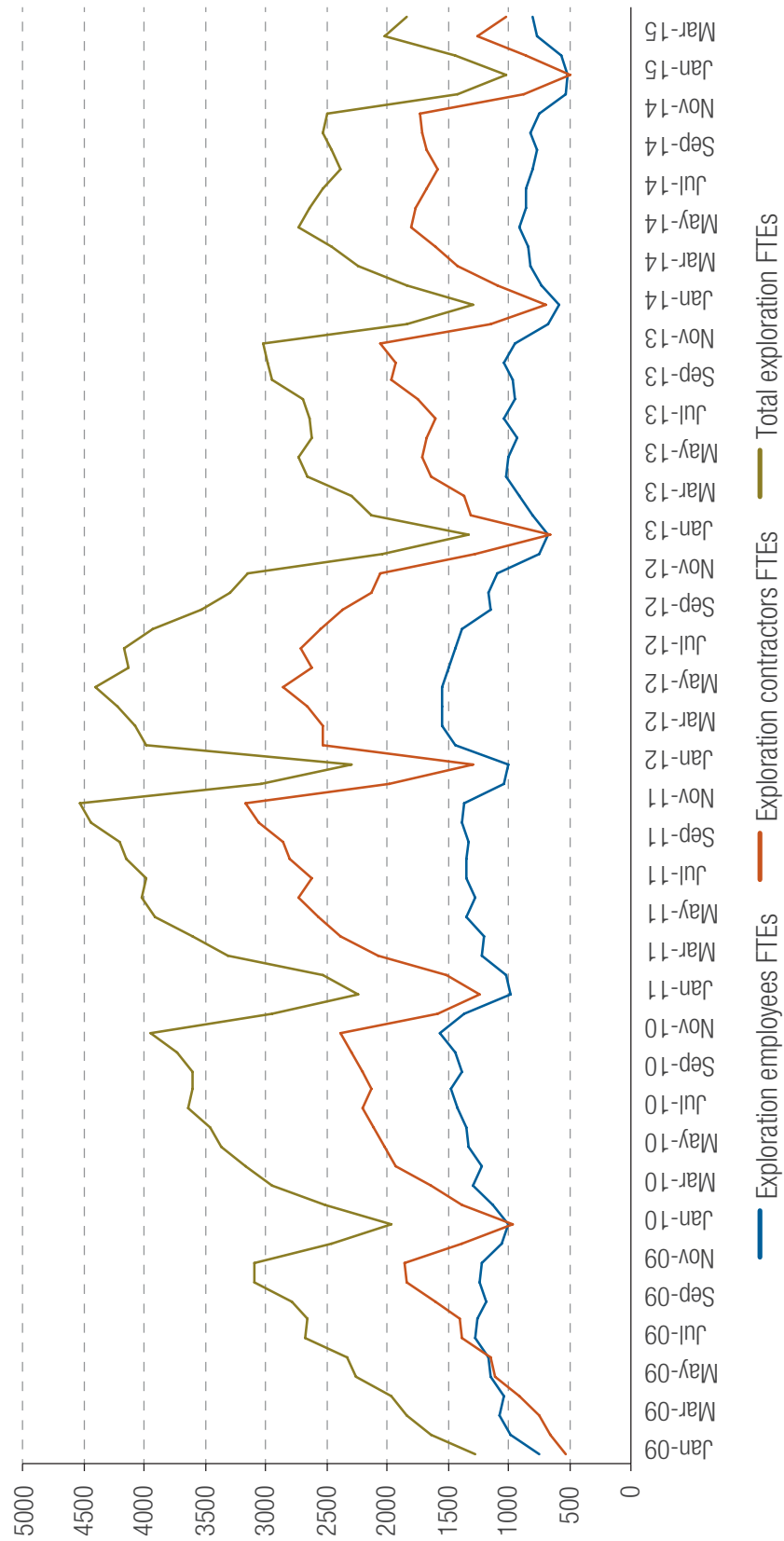
Mining employees FTEs



Mining contractors FTEs

# WA'S MONTHLY MINERAL EXPLORATION WORKFORCE (MARCH 2015)

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



## IS INDUSTRY LEARNING FROM ITS MISTAKES?

*In 2014, as part of the requirements for a Master of Occupational Health and Safety at Curtin University, Queensland-based Nathan Willows completed a research project on the prevention of injuries in the mining industry. His report "Has the Australian mining industry failed to learn from past mistakes with regards to the prevention of certain types of workplace injuries?" is summarised here.*

**N**on-fatal permanent disabling injuries make up the largest proportion of workplace injury costs in Australia over the past 20 years, accounting for an average of 86 per cent of all workplace injury costs in Australia. The number of non-fatal permanent disabling injuries has also increased relative to the increase in Australian workforce numbers. Between 2009 and 2013, the Western Australian mining industry had one in 144 miners permanently disabled while in Queensland the figure was one in 219 miners.

This increase was mainly attributed to several interacting mining industry misconceptions in:

- the application of Heinrich's and Bird's Incident Triangles (e.g. focus majority of safety resources on minor injuries that may not have an impact on more serious injuries higher up the triangle)
- focusing on unsafe acts and human error models (e.g. an investigation based on this model may focus heavily on the actions of the individual, with the majority of corrective actions based on this selective focus)
- overlooking key aspects of Heinrich and Weaver's Domino Theories (e.g. in an incident investigation, preceding organisational and management system failures have a tendency to be overlooked).

As an outcome of the findings of this research, a Triage Preventative Focus Model was developed for use by the mining industry to assist with the prevention of workplace injuries and combating misconceptions.



The three distinctive preventative focus areas are summarised below.

### LAGGING PROACTIVE

- Proactively analyse current lagging injury trends and sort by injury type.
- Develop safety interventions specific to relative direct costs and days lost for each type of injury.
- Dedicate sufficient time, energy and safety resources in proportion to each analysed injury.

### LAGGING REACTIVE

- Utilise quality incident methodology (e.g. ICAM methodology) for investigations.
- Ensure the key focus of incident investigation is the identification of organisational and management system failures.
- Devise corrective and preventative actions that focus on organisational and management system failures as an investigative outcome.

### LEADING INDICATOR

To improve the organisational and management system safety culture, the organisation should:

- have management commitment
- engage staff to encourage interdependent cooperation and commitment
- develop consistency and resist complacency.

For further information on this research, please contact Dr Janis Jansz, Curtin University:

Phone: 08 9266 3006  
Email: [J.Jansz@curtin.edu.au](mailto:J.Jansz@curtin.edu.au)



## SAFE WORK AUSTRALIA PUBLISHES RESEARCH REPORTS

Safe Work Australia has a variety of research reports on its website that raise potential implications for work health and safety policy. The findings of the reports are summarised below.

The reports are available in the publications and resources section at [www.safeworkaustralia.gov.au](http://www.safeworkaustralia.gov.au)

**Perceived causes of work-related injury and illness in Australia** shows individual factors, like being careless and not thinking, continue to be highly ranked perceived causes of injury and illness. However, the study also suggests that other highly ranked factors, such as manual tasks, pressure or stress, and safety procedures, provide the rationale for addressing the root causes of workplace injuries and illnesses through improved work design.

According to **Sources of work health and safety information in Australian workplaces**, the media and internet are the primary sources of work health and safety information for Australian businesses and workers. These present the most effective ways to target businesses, industries and categories of workers with accurate and practical information that best meet their needs.

**Mindfulness of work health and safety in the workplace** shows that, despite a high degree of mindfulness of work health and safety among Australian businesses and

workers, there is still a tendency to approach work health and safety prevention reactively (like treating a near miss as useful information) rather than proactively (like spending time to actively look for possible failures).

**Work productivity loss in young workers** highlights the high prevalence of back or neck pain in 23-year-old workers (Raine Study birth cohort) and the associated loss in productivity through absenteeism (around \$139 million each year). This finding may require a review of work health and safety practices for young workers and their employers if the productivity losses from these health issues, when manifested over a career, are to be addressed. The research also highlights the significant productivity loss of young workers generally from absenteeism and presenteeism (estimated to be around \$3.8 billion each year).

**Transport industry: synthesis of research findings** examines the current state of knowledge on work health and safety within one of the priority industries in the Australian Work Health and Safety Strategy 2012-22. There was a two- to three-fold increase in the level of acceptance by employers of risk-taking and rule-breaking behaviours in order to complete work when compared to employers in other priority industries. This suggests that cultural issues within the industry may need to be addressed simultaneously with external factors.

# QUEENSLAND CORONER CALLS FOR AUSTRALIAN CRANE STANDARDS TO BE AMENDED

*"The applicable Australian Standards are silent as to the issue of free fall functions and how they can or should be locked out... This crane was evidently being utilised across state and other jurisdictions and it would seem appropriate that the regulation of free fall functions and safety features on cranes should be consistent ... It may be best to regulate this issue through amendments to the Australian Standard ..."*

**This was one of the recommendations made by Mr John Locke, Queensland's Deputy State Coroner, on 9 February 2015 as part of the coronial investigation into the death of Michael James Cameron, who was killed on 1 March 2012 when a load fell while being lifted by a crane.**

Mr Cameron was employed as a rigger and crane driver on a project erecting power line towers in Jimbour West, Queensland. On the morning of the incident, a section of a new high voltage electricity transmission tower was being lifted by a 20 tonne rough terrain hydraulic mobile crane. Mr Cameron was under a section of the tower being lifted when the load suddenly fell on him.

Evidence from a number of co-workers at the inquest confirmed Mr Cameron's extensive experience in the industry and his constant adherence to safety principles. Based on that evidence, the Coroner considered "... it is probable that Mr Cameron found himself momentarily and likely inadvertently under the tower when it was being lifted."

The Brisbane Coroners Court heard from the person who inspected the crane after the incident as part of the Office of Fair and Safe Work Queensland (OFSWQ) investigation. The crane was found to be fitted with a free-fall facility with respect to both the main and auxiliary winches. The lock-out bar on the free-fall toggle switches had been attached to the wrong side of the switches. The bar locked the switches into the "Free" position, not the "On" position, thus engaging the free-fall function for both winches.

*Note: "On" denoted the clutch was on and effectively braking the free fall.*

Also, the green indicator light, which is supposed to indicate when the switches are in the "On" position, was not working for the auxiliary winch but was for the main winch.

The person inspecting the crane concluded that the crane controls were therefore locked into free-fall mode such that activation of either the main or auxiliary winch brake pedals could engage free fall in the winches. Also, the crane operator was likely unaware that the crane was in free-fall mode, and would not have had time to apply the brake pedal prior to the falling load striking Mr Cameron.

Though the evidence was unclear as to the precise mechanism that brought about the catastrophic consequences of the load going into free fall, the Coroner found that "... a causal relationship to the installation of the lock out bar and the incident cannot be ruled in or out."

The OFSWQ investigations identified that the crane had undergone a number of both major and minor inspections and repairs by various companies both in Australia and New Zealand, and the issue of the placement of the bar was never identified. The Coroner concluded that testing associated with the last inspection "... should have considered the efficacy of and tested the deactivation of free fall function."

## QUEENSLAND CORONER'S RECOMMENDATIONS

As part of his recommendations, Mr John Lock said:

"The applicable Australian Standards<sup>15</sup> are silent as to the issue of free fall functions and how they can or should be locked out. By comparison the *Qld Mobile Crane Code of Practice* makes specific reference to the need for the free fall facility to have a keyed lock out. This crane was evidently being utilised across state and other jurisdictions and it would seem appropriate that the regulation of free fall functions and safety features on cranes should be consistent, despite our Federal/State complexities. It may be best to regulate this issue through amendments to the Australian Standard rather than leaving it open to various State voluntary Codes of Practice."



"... I recommend to Australian Standards that its committee dealing with the mobile crane standards review the standards to consider if any amendments should be made to include, but not limited to:

- how free fall mechanisms can most effectively be made inoperative and should this be included in the Standard;
- if free fall capability is to remain on a particular crane, as to how the functions can be unambiguously signed and locked out when not in use; and
- the provision of appropriate certification by relevant experts that such functions are now safe and adequate."

#### FURTHER INFORMATION

The full Coroner's Report, including details of the findings and recommendations, is available at [www.courts.qld.gov.au](http://www.courts.qld.gov.au)



*Post-incident photograph from Coroner's Report*

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 214

### HAUL TRUCK COLLIDES WITH LIGHT VEHICLE IN A DESIGNATED CONTROLLED AREA

ISSUED: 28 APRIL 2015

#### Summary of incident

While heavy vehicles were relocating a stockpile during a night shift, a light vehicle entered the designated controlled mining area without following the correct process for entry. This resulted in the light vehicle colliding with a haul truck that was travelling at about 20 kilometres per hour.

After an empty haul truck passed through the single-lane controlled area, supervisors in the light vehicle assumed it was safe to enter the area and conduct a brief inspection. As they were leaving the dump site via a ramp, a loaded haul truck collided with the light vehicle. The light vehicle became entangled with the haul truck's emergency ladder and was pushed backwards about 40 metres down the recently watered ramp.

The haul truck only stopped when radio contact was established by the occupants of the light vehicle, who alerted the truck operator to the incident. Fortunately, no physical injuries were sustained during the collision.



#### Probable causes

##### Direct

- A light vehicle entered a designated controlled area where heavy vehicles were operating.
- The light vehicle occupants did not contact the senior operator in control of the area by two-way radio before entering the designated controlled area.

##### Contributory

- The site's single-lane traffic management system increased the potential for a collision as it did not segregate light vehicles from heavy vehicles in the designated controlled area.
- Compliance with the safe system of work controlling the area was not monitored or enforced.
- The light vehicle occupants failed to recognise the potential collision risks when they entered the work area.
- The safe system of work did not specify separate requirements for supervisors entering the controlled area for inspection purposes.
- A procedure for accessing controlled areas had been created but had not been implemented.

#### Actions required

Mine operators are reminded of the importance of developing safe work procedures that identify hazards and ensure adequate risk controls for work in controlled areas.

They should:

- monitor the effectiveness of, and compliance with, safe systems of work, and ensure all personnel understand the hazards and risks involved with vehicle movements on site (e.g. through training)
- remove single-lane traffic management systems, where practicable
- implement engineered traffic management solutions to segregate heavy and light vehicles, where practicable.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 215

### OVERLOADED STEMMING TRUCK ROLLS OVER

ISSUED: 11 MAY 2015

#### Summary of incident

A loaded stemming truck was being driven at low speed through a right hand turn to enter a drill pattern. As the stemming truck turned, it rolled onto its left hand side, resulting in the load of stemming spilling out and also injuring the passenger. The emergency response team was mobilised to provide medical assistance and secure the scene.

The investigation determined that there had been after-market modifications to the truck. Instead of a competent person recalculating the truck's gross vehicle mass (GVM), the new GVM was estimated by the supplier, who was not the truck's original equipment manufacturer (OEM), based on a similar stemming truck used at another site.

At the time of the rollover, the loaded truck's mass was actually 4.5 tonnes overloaded despite being 2.1 tonnes less than the estimated GVM.

*Note: GVM is the maximum permissible operating mass of a vehicle, and includes the chassis, body, fuel, accessories, driver, passengers and load.*

#### Probable causes

##### Direct

- The GVM estimated by the supplier was 6.66 tonnes greater than the design GVM calculated by engineering consultants after the incident.
- The stemming truck had been overloaded as the GVM provided was incorrect.

##### Contributory

- Full operating manuals, drawings and engineering sign-off were not provided by the supplier of the modified stemming truck.



Front and rear views of rolled stemming truck

- The truck, which was hired, was not subjected to the same approvals process as purchased vehicles.

#### Actions required

##### Mine operators

- Ensure equipment, whether hired or purchased, is supplied with the correct safe working loads.
- Ensure competent persons approve any modifications.

##### Suppliers, importers, manufacturers, modifiers and designers

Suppliers, importers, manufacturers, modifiers and designers have obligations under section 14 of the *Mines Safety and Inspection Act 1994* and Part 6 of the *Mines Safety and Inspection Regulations 1995*, including:

- ensuring the design and construction of plant for use at a mine does not expose persons to hazards
- providing safety information as specified by the relevant Australian Standards.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 216

### FIRE IN PROCESSING PLANT LABORATORY

ISSUED: 18 MAY 2015

#### Summary of incident

A processing plant laboratory was destroyed by fire when a fume cupboard panel failed and ignited.

Fortunately, no one was injured in the incident.

#### Probable causes

##### Direct

- Continuous use of the fume cupboard did not allow for scheduled maintenance of the chemical resistant surface of the panel.
- Deterioration of the fire-retarding gel coating on the rear wall panel of the fume cupboard exposed the underlying

glass reinforced plastic (GRP) panel. This led to resin degradation and subsequent ignition during an acid digestion process. Figure 1 shows an example of chemical staining and degradation of fire-resistant panels in a fume cupboard.

##### Contributory

- Maintenance of the fume cupboard, as recommended by original equipment manufacturer (OEM), was not undertaken.
- Inspections by the certified service provider did not identify the fire hazard of the damaged gel coating on the rear wall panel.
- Risk assessments did not identify fire risks associated with acid digest processes.
- There was no fire collar installed between the exhaust vent and laboratory wall.
- The laboratory building was of a sandwich foam construction, with no fire retardant properties, and no fixed, fire-suppression system in place.



## Actions required

Mine operators and supervisors are reminded of the importance of maintaining safe systems of work in laboratories, including the use of fume cupboards. Recommended actions include:

- Developing and implementing a laboratory safety management system based on AS/NZS 2243.8 *Safety in laboratories – Fume Cupboards*.
- Developing and implementing safe systems of work for operating and maintaining equipment, including fume cupboards in laboratories, which refer to, and comply with, OEM recommendations.
- Ensuring service providers engaged to inspect and service fume cupboards are competent.
- Ensuring workers are trained in the safe systems of work.
- Ensuring workers are trained to identify and report hazards, such as equipment degradation, and that reported hazards are adequately addressed and managed.
- Ensuring installation of equipment meets fire regulations.
- Ensuring buildings are fit-for-purpose and meet fire regulations.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 217

### UNDERGROUND WORKER CRUSHED BETWEEN CHARGE-UP BASKET AND ROOF – FATAL ACCIDENT

ISSUED: 21 MAY 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 knowledge and understanding at the time of writing.*

An underground worker using an elevated work platform (EWP) was fatally injured when the chargeup basket he was in moved upwards, crushing him against the roof of the cross-cut. It appears he was leaning over the front of the basket when he accidentally activated the control stick for raising and lowering the basket.

An offsider was working in front of the basket to help guide the charge-up hose into the blast holes.

After the accident, the control stick was found to be bent forward (i.e. in "raise basket" position).



*Charge-up basket near the roof of the cross-cut*

#### Probable causes

##### Direct

- The worker was leaning over the front of the charge-up basket, in a restricted working space, when the basket moved upwards.

##### Contributory

###### *Nature of task*

- Work from a charge-up basket is often undertaken at the front of the basket, so the worker can reach the charge-up hose.
- Rill slopes can restrict forward movement of the charge-up basket and result in the basket being close to the roof.

###### *Design of basket controls*

- The control panel is located at the front of the basket.
- Pushing the control stick forward raises the charge-up basket.
- The fail safe switch for the controls is located on top of the control stick, so that a downward force on the top of the control stick can activate the fail safe switch and allow the control stick to move forward.

###### *Procedural*

- The operating procedure did not identify the potential crush hazard.
- At this mine, charging-up was typically carried out by a single person.
- The offsider assisting at the time of the accident had not been tasked with spotting, and was not trained to use the EWP.

## Actions required

The actions recommended below should prevent similar incidents.

### Mine operators

- When undertaking work involving EWP, ensure the potential for workers to be crushed between the basket and adjacent structures is identified and addressed.
- Inspect all EWPs used on the mining operation to assess the potential for accidental activation of controls.
- Ensure those involved in work using EWPs are familiar with their operation and the use of emergency controls.

### Suppliers, importers, manufacturers, modifiers and designers

Ensure the design and construction of EWPs for use on mine sites do not expose workers to hazards. Consider:

- how and where they will be used
- where the controls are located
- prevention of accidental activation of controls
- suitable protection structure for the operator.

## Further information

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for information on occupational safety and health in the resources sector, including the following Mines Safety Bulletins and guideline:

- Mines Safety Bulletin No. 116 *Use of mobile elevated work platforms (MEWPs) within or adjacent to structures with restricted access* (December 2014)  
This bulletin refers to incident reports received by the Department of Mines and Petroleum involving the use of mobile elevated work platforms (MEWPs) within or adjacent to structures with restricted access.
- Mines Safety Bulletin No. 114 *Compliance requirements for multi-purpose mobile plant* (September 2014)  
The crush hazard of using work baskets underground also exists for baskets fitted to multipurpose equipment and not just dedicated EWPs.
- Working at height in underground mines – guideline  
This guideline highlights "... 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."

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **218**

### HORSEPLAY AT A MINING OPERATION RESULTS IN A SERIOUS INJURY

ISSUED: 28 MAY 2015

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#### Summary of incident

A dogger and an excavator operator were test lifting a polypipe spool (tee piece) and valve assembly. A worker not related to the activity entered the work area from behind the excavator and threw a rope through an open window of the excavator. This startled the operator. When he asked the rope-throwing worker what he was doing, the worker pulled strongly on the rope, which caught on the excavator's control stick, causing the excavator and its load to slew to the left.

The operator tried to remove the rope from around the control stick. However, the other worker pulled on the rope again, causing the excavator and its load to slew left a second time. The load swung into the dogger's leg, injuring him.

The Royal Flying Doctor Service flew the dogger from site to Perth for medical attention. He later had an operation to repair a crushed artery.

#### Probable causes

##### Direct

- Horseplay caused the excavator and its load to slew unexpectedly.

##### Contributory

- The lift area was not adequately barricaded to prevent unauthorised entry.
- The dogger was in the line of fire.

#### Actions required

- Under section 10(1) of the *Mines Safety and Inspection Act 1994*, employees must not adversely affect the safety or health of any other person through any act or omission at work.
- Employers must ensure that workers understand their duty of care to themselves and others, and supervisors must not permit unauthorised deviation from site procedures, whether by act or omission.



# MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 219

## DELAYED DETONATION OF EXPLOSIVES IN A BLAST HOLE DURING POST-BLAST INSPECTION BY SHOTFIRERS

ISSUED: 5 JUNE 2015

### Summary of incident

One hundred and ninety-four blast holes had been loaded with a decked charge comprising two column charges separated by a deck of stemming material, and pyrotechnic or non-electric detonators.

During the post-blast inspection of the open pit shot, about 10 minutes after the shot was fired and soon after the shotfirer had given the "all clear" for the shot, explosives in one blast hole detonated close to two blast crew personnel performing the inspection.

Fly rock from the unexpected detonation landed close to the shotfirer, who was 15 metres from the blast location, and close to the shotfirer's assistant, who was recovering the spent firing line about 30 metres from the blast.

Fortunately, no-one was injured.

### Probable causes

#### Direct

- The pocket (top) charge misfired during the initial firing of the blast.
- It appears that hot gases from detonation of the bottom charge heated the ANFO in the pocket charge to the point at which the remaining explosives detonated.

### Contributory

#### *Misfire and post-blast detonation*

The factors that led to the misfire are uncertain. However, the following observations were made and appear to have contributed to the post-blast detonation.

- The blast design process, including approval process, did not identify the shortcomings of the design parameters associated with the deck charge. The deck charge blast design was implemented without formal change management processes, including risk assessment.
- The site risk assessment had not identified the risk of post-blast detonation associated with deck charges.
- The length of stemming material between the pocket and bottom charges was insufficient and allowed hot gases to penetrate through to the pocket charge after detonation of the bottom charge.
- The stemming material used between the charges was drill cuttings, which is not as effective as crushed aggregate.
- Cavities were detected in several holes in the blast but not in the hole that detonated post-blast.

#### *Entry into blast area*

- The blasting procedure allowed the shotfirer to re-enter the blast exclusion zone 5 minutes after the shot had been fired. The procedure did not specify modified re-entry times based on risk assessment (e.g. deck charges, time for dust or fumes to clear).

### Actions required

Mine operators are reminded of the importance of developing safe systems of work that identify hazards and manage risks associated with blasting operations on mine sites.

- Competent personnel need to design the blast parameters by considering site-specific conditions, sound blasting practices and advice, and input from appropriate technical experts, including explosives suppliers and manufacturers.

## *Mines Safety Significant Incident Report No. 219 continued*

- Apply rigorous change management and risk assessment processes to any changes to blast design parameters. Also examine operational procedures associated with blasting (e.g. impact on exclusion zones and re-entry periods).
- Implement quality control processes at both the design stage (e.g. blast design approval and sign-off) and tie-in stage (e.g. blast hole tie-in checks).
- Engage competent persons for all activities associated with drilling and blasting operations. Where less experienced personnel are used, increase the supervision, monitoring and checking of work performance.
- Shotfirers need to be vigilant when approaching blast holes and after blasting when inspecting for signs of misfires, signs of heating (e.g. smoke), presence of hazardous substances (e.g. dust, noxious gases) and potential for other hazards (e.g. voids).

### **Further information**

- State Law Publisher, [www.slp.wa.gov.au](http://www.slp.wa.gov.au)  
Dangerous Goods Safety (Explosives) Regulations  
2007
- Australian Standards, [www.standards.org.au](http://www.standards.org.au)  
AS 2187.2 *Use of explosives*

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 220

### DRIVER SERIOUSLY INJURED WHEN CRUSHED BETWEEN PRIME MOVER AND LOADER

ISSUED: 8 JUNE 2015

#### Summary of incident

A road train, incorporating a prime mover, lead trailer and dog trailer, was loaded at a quarry while on a 5.5 per cent slope. Its wheels were in loose sand with firm compacted ground underneath. The road train remained stationary while being loaded.

When loading had finished, the road train driver went to collect the loading docket from the loader driver, who had parked his loader in front of the road train. The road train rolled forward as it overcame the resistance provided by the loose sand, crushing the driver against the ladder on the loader.

The recovery team, reversing the road train to release the injured driver, found that the park brake had not been applied.

The driver's serious crush injuries included broken bones.

#### Probable causes

##### Direct

- No parking brake was applied while the road train was parked on the slope.
- The driver was in the line-of-fire of the moving road train.

#### Contributory

There was:

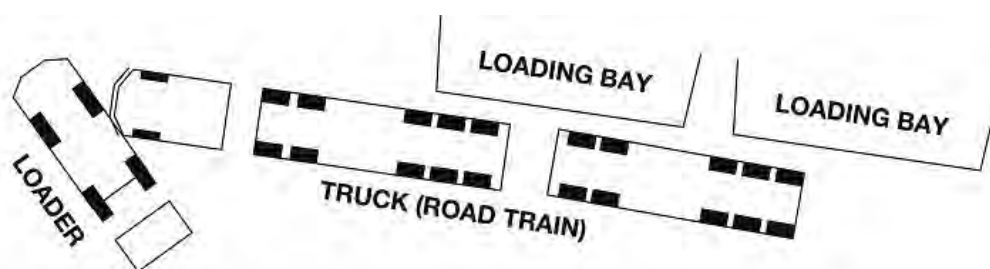
- no warning signal in the cabin to remind the driver to apply the park brake before leaving the vehicle
- no written loading procedure based on a formal risk assessment
- no written procedure or controls for preventing a runaway vehicle.

#### Actions required

Before relinquishing control of mobile plant, operators should ensure it is correctly parked.

Managers and supervisors are reminded to implement site procedures to maintain safe working conditions for workers and contractors involved in loading operations. Specifically, they should:

- perform risk assessments for loading and unloading operations to identify hazards, and develop and implement safe work procedures
- prepare a traffic management plan covering all aspects of the operation of surface mobile equipment on site, including the interaction of heavy and light vehicles with pedestrians
- provide induction, training, instructions and supervision of operators, including road train drivers, in all loading and unloading activities
- conduct workplace inspections to verify compliance with site standards and legislation.



## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 221

### OPERATOR STRUCK BY ROLLING ROCK AT STOPE DRAW POINT – FATAL ACCIDENT

ISSUED: 11 JUNE 2015

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#### 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 knowledge and understanding at the time of writing.*

A load-haul-dump (LHD or bogger) operator was fatally injured when he was struck by a rock weighing about 700 kg that rolled from an open stope. The LHD was parked in the stope access drive and the driver was on foot in front of the loader bucket.

There was a substantial gap between the brow and the rill at the stope draw point. The rill extended well into the draw point. The rock appears to have rolled down the rill and struck the operator, who was using a hose to water down the rill.

#### Probable causes

##### Direct

- There was a large open stope with the hazard of falling rocks.
- The LHD operator was working outside the cabin at the base of the rill.

##### Contributory

- Any rocks that fell inside the open stope could drop and eject from the stope. A small bund was in place but it did not prevent the rock from rolling down the rill with sufficient momentum to strike the operator.
- Loading operations were almost complete for the day and the brow was open.
- There was no written procedure for clearing stope draw points that were blocked or hung up.

- The procedure for loading at stope draw points allowed free bogging to a location where the top edge of the loader bucket was below the stope brow. This allowed a gap of several metres between the brow of the draw point and the rill.

#### Actions required

- Mine managers should ensure that written procedures are available for the clearing of any chute, pass, millhole or stope draw point, as required by r. 10.31 of the Mines Safety and Inspection Regulations 1995.
- A detailed risk assessment should be undertaken to address the hazard of a rock falling from the backs or walls of open stopes, and rolling and hitting workers at the draw point. The actions recommended below should prevent similar incidents.
  - Where bunds are used as protection, they should be designed and positioned to catch any rocks that are ejected from the stope into areas where workers could be present.
  - In large open stopes with a history of rock falls, set the loading limit so that free bogging ceases when the brow cracks (opens) and natural free rilling ceases. Remote bogging should commence at this time or the next ring should be blasted.
  - Develop a procedure to protect workers at stope draw points where they could be struck by falling, rolling or bouncing rocks from the stope.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 222

### WORKER SERIOUSLY INJURED BY FALLING JIB ATTACHMENT ON INTEGRATED TOOL CARRIER (IT)

ISSUED: 12 JUNE 2015

#### Summary of incident

An integrated tool carrier (IT) with a jib attachment was being used to lift a boat from a trailer into the water. The operation required the telescopic jib section to be extended manually by the offsider, but a build-up of fine material in the jib segments caused the jib to jam. In an attempt to dislodge the fine material, the operator of the IT raised the attachment with the jib angled downwards while the offsider struck the jib with a hammer.

The offsider was beneath the jib when the jib attachment detached from the IT and fell. His injuries included fractured vertebrae, broken ribs and a punctured lung.

#### Probable causes

##### Direct

- The offsider was positioned beneath the raised jib.
- It appears that the IT was being operated while the jib attachment locking pins were not fully engaged.

##### Contributory

- The hazards associated with unjamming the jib attachment had not been identified through either a risk assessment of the task or consulting the manufacturer's instructions.
- The design and configuration of the IT and jib attachment did not allow for visual confirmation of engagement of the locking pins. There was also no mechanical or electronic indicator fitted to confirm that the hydraulic pins were fully engaged.
- The IT with a jib attached was not fit-for-purpose.
- The operator had not been trained and assessed as competent to operate the IT with the jib attached.



Left: IT with jib angled down. Right: Jib attachment with locking pins not engaged.

*Mines Safety Significant Incident Report No. 222 continued*

## **Actions required**

Supervisors and workers are reminded of the importance of conducting detailed risk assessments for work conducted with ITs and attachments. Recommended actions include:

- conducting risk assessments before performing any task
- using fit-for-purpose equipment for a task
- ensuring jib attachments (including quick hitch components) for IT carriers are periodically inspected and maintained by competent persons
- ensuring significant damage to jib attachments is assessed by a competent person and, when necessary, the jib is repaired, inspected and tested by competent persons or replaced
- ensuring workers are competent to safely operate the equipment and attachments
- ensuring the correct operation of attachments on ITs, including the positive engagement of locking pins, before the equipment is used
- ensuring areas that could be in the line-of-fire from suspended loads are clearly identified and workers do not enter such areas.

## **Further information**

- Australian Standards, [www.standards.org.au](http://www.standards.org.au)
  - AS 1418.5 *Cranes, hoists and winches – Mobile cranes*
  - AS 1418.8 *Cranes, hoists and winches – Special purpose appliances*
- Resources Safety, Department of Mines and Petroleum, [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)
  - Mines Safety Significant Incident Report No. 194 *Crush injuries sustained from working with a suspended load – fatal accident*
  - Mines Safety Bulletin No. 114 *Compliance requirements for multi-purpose mobile plant*

# MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 223

## WORKER STUNG BY SWARM OF BEES DURING REHABILITATION OPERATIONS

ISSUED: 20 JULY 2015

### Summary of incident

As part of environmental rehabilitation operations on a mine site, a motor control centre (MCC) mounted on a pontoon required moving, after standing idle for six years.

An inspection of the MCC identified bees in the area, and a pest controller was called in the day before the scheduled move to spray the MCC. Three hives were identified and sprayed, including the area around a small hole near the base of the pontoon.

A few bees were seen near the MCC on the morning of the move. Later in the day, a worker positioned himself on the ground to act as a spotter for the MCC move. As the structure began to move, bees swarmed from the pontoon and repeatedly stung the worker.

He sought shelter in a light vehicle but bees quickly filled the vehicle's interior through an open door. The worker then tried to escape the swarm by running along the haul road. He was picked up by a vehicle travelling to the job and transported away from the swarm.

The worker was admitted to hospital with almost 90 stings to his head and upper body. Ongoing medical treatment was required before he could return to normal duties two weeks later.

Fortunately, the individual was not allergic to bee stings otherwise the outcome could have been much worse.

### Probable causes

#### Direct

- Failure to identify the presence of a fourth colony of bees during pest treatment or afterwards.
- Movement of the MCC caused the bees to attack in response to a perceived threat.

#### Contributory

- The mine site, situated in a wildflower area, had identified bees as a moderate risk in the site's risk register. There had been 61 incidents over 13 years, some involving medical treatment and lost time injuries. However, control measures:
  - did not include formal documented procedures or processes based on research
  - relied on chemical spraying without determining its effectiveness.
- The job safety analyses (JSAs) and field-level risk assessments completed for the task did not adequately assess the risk posed by the bees. Redundant equipment had been moved previously without incident so there was a reduced perception of risk.
- The JSA prepared on the day of the incident did not mention bees as a hazard and not all workers involved in the job signed onto the JSA.
- It was not possible to see inside the hole in the casing of the pontoon, making it difficult to identify the number of hives and verify the effectiveness of the pest treatment. A few bees were observed earlier in the day and at the time of the move but the presence of bees was deemed to be a normal sight and did not trigger further investigation.
- The personal protective equipment (PPE) and clothing worn did not provide adequate protection against bee stings.

*Mines Safety Significant Incident Report No. 223 continued*

## **Actions required**

Mine operators are reminded of the importance of identifying hazards associated with fauna on site and developing safe systems of work to manage the risks. The following actions are recommended.

- Risk assessments should consider the potential for faunal hazards given site-specific environment and circumstances. Historical information (e.g. incident data) should be used where available.
- The controls measures selected should:
  - be based on an understanding of the hazard and appropriate controls
  - consider the hierarchy of controls, including habitat control and prevention, formal procedures and work processes, training of employees and provision of appropriate PPE
  - be verified and monitored for effectiveness.

- Mining operators need to guard against the “normalisation of risk” where workers accept a certain level of risk as standard, and therefore miss opportunities to identify warning signs and take action to prevent unwanted events.
- Site emergency plans and resources should consider medical emergencies related to hazardous fauna. Importantly, relevant information should be available regarding workers’ allergies and medical conditions.
- JSAs and field-level risk assessments should be properly completed and involve management in their preparation and approval.
- All personnel should sign onto the JSA for the task and fully understand the hazards and control measures involved.

## **Further information**

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for information on occupational safety and health in the resources sector.



## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **224**

### UNDERGROUND WORKERS INJURED BY ARC FLASH AND BLAST FROM A MOTOR CONTROL CENTRE (MCC) CUBICLE

ISSUED: 24 JULY 2015

#### Summary of incident

An electrician and mechanical fitter investigating water-overflow issues at an underground mine found that a 90 kW submersible pump supplied from a 415 V motor control centre (MCC) had faulted. The electrician started investigating the pump control cubicle. He identified that a control relay contact had fused in the closed position and a control circuit breaker had tripped. The electrician replaced the control relay for the main contactor and, after examining the cubicle, reset the control circuit breaker.

The electrician closed the cubicle door but without properly securing it. He then switched the main circuit breaker to the "ON" position. At that instant, there was an arc flash and blast, which blew open the door of the cubicle. The electrician received first degree burns to his neck, face and ears, while the fitter received a minor facial injury.

The subsequent investigation revealed that the main circuit breaker had suffered a phase-to-phase arcing fault. The arcing fault started within the main circuit breaker terminal on the line side of the blue phase, and then transferred to a three-phase fault.

#### Probable causes

##### Direct

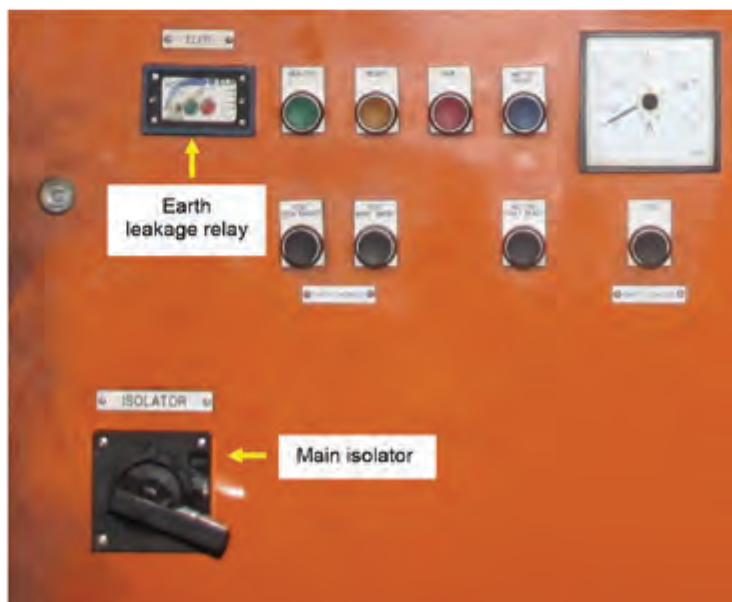
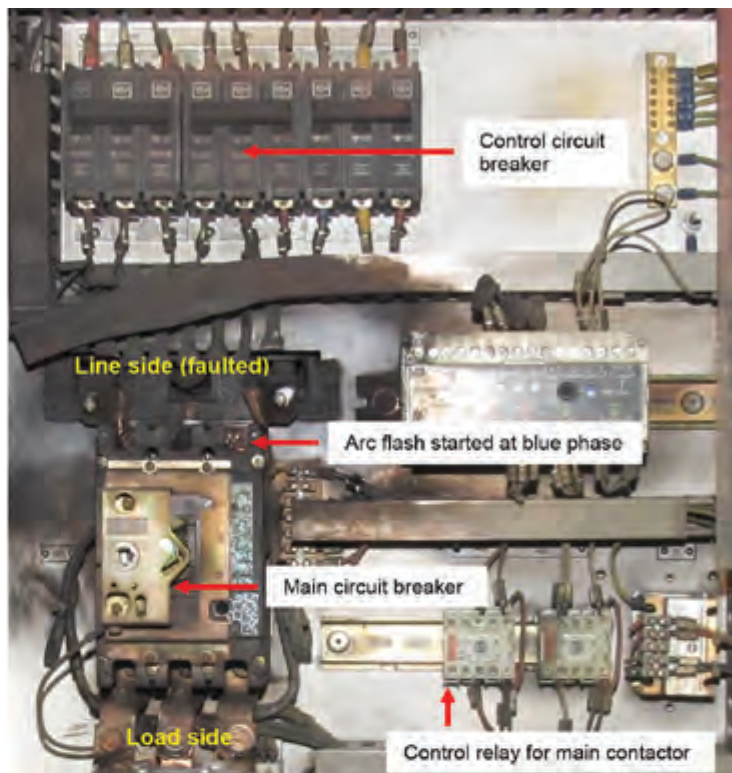
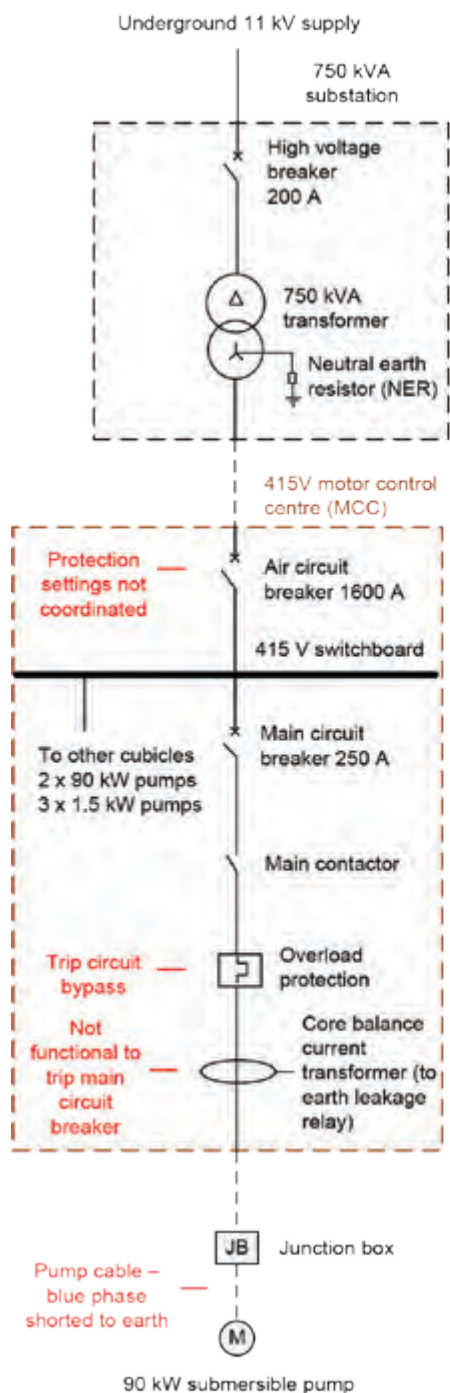
- The pump supply cable blue phase was shorted to earth (as confirmed by an insulation resistance test after the incident).
- The electrical circuit was not designed to automatically disconnect the main circuit breaker under an earth leakage or earth fault.
- The protection settings were not coordinated correctly, therefore the upstream air circuit breaker connected to the 415 V MCC busbars failed to operate. The high voltage circuit breaker connected on the primary side of the 750 kVA transformer cleared the arc fault current of about 9.5 kA in more than 1 second.

##### Contributory

- The pump cable was not tested for insulation resistance prior to energising at the cubicle.
- The drawings did not match the electrical installation. Specifically, the trip circuit of the motor overload protection had been bypassed, allowing the pump to operate under overload conditions.
- The pump was designed to automatically start or stop depending on the status of the float switch. As soon as the electrician turned the main circuit breaker to the "ON" position, the high water level in the tank was detected by the float switch and energised the main contactor.
- The inspection and maintenance processes for testing functionality of protective devices were inadequate and had not detected the issue with the protection settings not being coordinated.
- The cubicle door was not secured correctly prior to switching on the main circuit breaker.
- The potential for arc flashing was not identified and the workers were not wearing adequate facial protection.

# SIGNIFICANT INCIDENT REPORTS AND SAFETY BULLETINS

Mines Safety Significant Incident Report No. 224 continued



Conditions that contributed to the incident are indicated in red on the overall single line diagram for the electrical installation. The photographs show the MCC cubicle and damage.

## Actions required

Principal employers and responsible persons are reminded of the importance of monitoring and reviewing electrical design and electrical installation compliance to ensure that they meet the Mines Safety and Inspection Regulations 1995.

So far as reasonably practicable, the potential for arc flash should be minimised by using the hierarchy of control as a guide. The following measures are recommended.

### Elimination or substitution

- Where reasonably practicable, based on the fault levels of the electrical installation, consider remote switching of electrical equipment.

### Engineering controls

- Ensure that electrical installations are designed, inspected, installed and tested according to Australian Standard AS/NZS 3000 *Electrical installations* (known as the Australian/New Zealand Wiring Rules) and are adequately protected against thermal overload and short circuit protection (earth and phase faults).
- Conduct protection coordination studies to provide the best possible fault clearance times to limit arc flash energy levels arising from a fault.
- Consider manufacturer's recommendations when designing electrical installations to eliminate known hazards.

### Administrative controls

- Ensure electrical drawings are updated and correctly reflect the installation.
- Consult electrical installation drawings as part of the risk assessment process to identify hazards and implement adequate control measures before undertaking maintenance tasks.

- Develop safe work procedures (SWPs) to safely conduct electrical maintenance tasks.
- For preventative maintenance systems:
  - conduct preventative maintenance of electrical equipment based on manufacturer's recommendations and guidelines
  - ensure the systems include periodic testing and verification of protective devices for their intended operation.
- Ensure faulty electrical equipment is not returned to service until fully investigated and adequately tested (e.g. offline insulation resistance test) for compliance.
- Ensure adequate levels of supervision and engineering assistance are provided for electrical work being conducted on site.

### Personal protective equipment (PPE)

- Ensure adequate PPE (i.e. rated for arc flash) is worn when working on switchboards or distribution boards where there is the potential for arc flash.

### Further information

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for information on occupational safety and health in the resources sector.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 225

### WORKER SERIOUSLY INJURED BY MOVING PARTS IN A MODIFIED STEMMING BUCKET

ISSUED: 10 AUGUST 2015

#### Summary of incident

*Note: This report builds on the findings of Significant Incident Report No. 204 "Worker seriously injured by moving parts", released on 30 July 2014.*

Drill holes in an open pit were being backfilled using a stemming bucket attached to an integrated tool carrier (IT). During the process, a worker from the drill and blast crew noticed that the backfill material had stopped flowing from the stemming bucket into a drill hole.

After using hand signals to communicate with the IT operator, the worker attempted to dislodge the blockage by placing his hand in the discharge outlet at the base of the stemming bucket. The hydraulically actuated gate valve, which controls the flow of material through the discharge outlet, closed and severed several of his fingers.

A subsequent investigation revealed that the rubber guide hose provided by the original equipment manufacturer (OEM) to fit over the discharge outlet, and guide the flow of material into drill holes had been removed. This allowed the worker to access the discharge outlet.

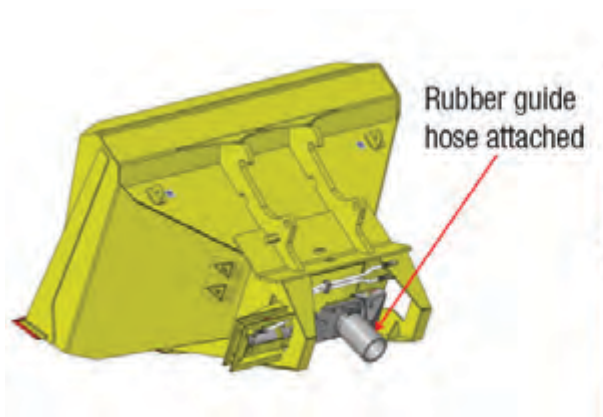
#### Probable causes

##### Direct

- The worker's hand was exposed to moving parts.

##### Contributory

- The plant was not isolated while attempting to dislodge the blockage.
- Despite regular blockages, there was:
  - no mechanism to prevent oversized material from blocking the discharge outlet
  - no risk assessment for clearing blockages
  - no safe work procedure (SWP) or safe work instruction (SWI) for clearing blockages.
- A rubber guide tube attached to the discharge outlet of the stemming bucket had been removed, modifying the OEM's design. No risk assessment was conducted after the stemming bucket was altered.



## Actions required

The following actions are recommended to support safe systems of work for tasks carried out using energised plant such as stemming buckets.

### Employers

Implement safe systems of work such that when the design of plant is altered, or plant is modified, a competent person:

- assesses the amended design for potential exposure to hazards
- inspects and tests the modified plant before it is returned to service to verify it has been altered in accordance with the design specifications.

### Managers and supervisors

Ensure:

- practicable measures are taken (e.g. guarding) to reduce the exposure of workers to potential pinch points
- SWIs or SWPs are available that:
  - identify the hazards and controls for each job step
  - highlight the potential for hazards to be masked (and therefore not adequately controlled)
- workers are trained to recognise sources of hazardous energy and have access to, and comply with, suitable control measures (e.g. lock out or isolation)
- before a job starts, workers complete a job hazard analysis (JHA) or job safety analysis (JSA) and the supervisor assess its adequacy.

### Workers

- Follow the approved safe system of work when performing a task, and do not commence work without understanding the job steps and hazard control measures that apply.
- Report damaged plant (e.g. missing parts) to the supervisor.

## Further information

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for information on occupational safety and health in the resources sector.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 226

### COLLISION BETWEEN AN AUTONOMOUS HAUL TRUCK AND MANNED WATER CART

ISSUED: 11 AUGUST 2015

#### Summary of incident

Autonomous trucks were hauling mine waste on night shift at an open pit mine. The control room operator directed an autonomous haul truck to turn right at an intersection and perform a loop so it could be positioned under an excavator bucket on the pit floor. The intersection and turnaround loop existed in the control system but the intersection was not physically signposted or marked on the ground to alert manually operated vehicles.

A manned water cart was travelling in the opposite direction when the autonomous truck was about to turn to right. The water cart driver was not aware of the autonomous truck's assigned path and, on recognising it, tried to take evasive action. The two vehicles collided, resulting in significant damage to the autonomous truck. The water cart driver received minor injuries.

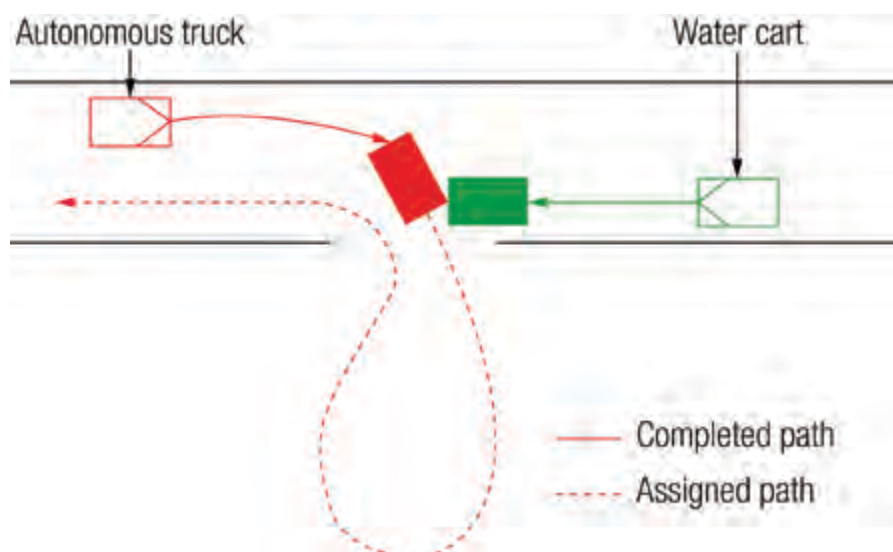
#### Probable causes

##### Direct

- The travel paths of the autonomous truck and water cart intersected.
- The turnaround loop for the autonomous truck was released for use in the control system but the corresponding intersection was not delineated on the ground, nor its intended use communicated.
- On detecting the water cart in its assigned path of travel, the autonomous truck's speed (about 40 km/hr) and response time meant it could not prevent the collision.

##### Contributory

- The change management processes for planning and assigning roads in the control system were inadequate.
- An awareness system was set up in the water cart to allow the driver to monitor the autonomous truck's path. However, at the time of the collision, the water cart driver was not fully aware of the intended path of the autonomous truck.



## Actions required

Principal employers and responsible persons at mine sites using autonomous mobile equipment are reminded of the importance of identifying, monitoring and reviewing hazards associated with the interaction of manned and autonomous mobile equipment.

So far as reasonably practicable, the potential for interactions should be minimised by using the hierarchy of control as a guide. The following actions are recommended.

### Elimination

- Where possible, eliminate manned activities within the autonomous mining area.

### Substitution

- Where manned activities are unavoidable within the autonomous mining area, identify opportunities to mitigate potential interactions between manned and autonomous equipment.

### Engineering controls

- The collision awareness system used by autonomous mobile equipment should detect and react to mobile equipment outside its assigned path of travel in a sufficient time to prevent a collision.
- Ensure awareness systems within manned mobile equipment effectively monitor and alert drivers of potential collisions with autonomous mobile equipment.
- When calculating appropriate speed limits for the autonomous mobile equipment, consider the time required for object detection and response.

## Administrative controls

- Implement robust traffic management procedures to manage the risks associated with manned and autonomous interactions.
- Implement comprehensive change management processes to ensure traffic management controls are appropriate and verified on the ground before changes are made in the control system.
- Ensure control room operators and pit supervisors are competent in the operating processes and change management procedures for the control system.
- Ensure personnel working in the autonomous haulage area receive suitable training in traffic management standards and are deemed competent to operate within the autonomous haulage area.

## Further information

Mines Safety Bulletin No. 110 *Seeking safe mobile autonomous equipment systems*

## MINES SAFETY BULLETIN NO. 119

### HAZARDS ASSOCIATED WITH LOADING OPERATIONS AT THE BASE OF STOCKPILES

ISSUED: 26 MAY 2015

#### Summary of hazard

Stockpiles and other loose materials are generally loaded onto trucks by front-end loaders. Faceshovelers are also used to load blasted or loose materials in pits, quarries and larger stockpiles, and work the stockpile similar to front-end loaders.

At a given height and environmental conditions, stockpile materials will vary in strength and overall stability. They usually remain stable if they rest at their natural slope angle. However, if stockpiles are oversteepened or undercut during loading operations, they may slump or collapse, and strike or bury loader operators and other workers and equipment.

There have been several recent incidents on Western Australian mining operations involving the failure of stockpile faces.



*Note: A stockpile face is “undercut” when the toe or base is advanced more than the overall face or slope. A face may also be undercut if loaders push materials at the base of the stockpile along, rather than towards, the face. Early warning signs of failure include visible cracking of the crest or top edge of the pile, and small rocks or particles rolling down the face.*



*An undercut face showing overhang (diagram from Mine Safety and Health Administration, 2001)*

While the design, construction and operation of stockpiles or other loose materials may differ between mines, the groups of workers that may be affected by unstable stockpiles include:

- loader and dozer operators
- supervisors and safety representatives carrying out inspections
- surveyors carrying out measurements or mapping
- geotechnical engineers carrying out inspections
- geologists and grade controllers
- maintenance crews
- other workers who, by the nature of their job, find themselves at or around stockpiles.

#### Contributory factors

Factors that contribute to the failure of stockpiles include:

- improper design, construction and operation of stockpiles
- inadequate assessment of material properties and environmental conditions, and their influence on stability
- inadequate and inappropriate equipment working on stockpile faces higher than the equipment’s reach
- lack of hazard awareness and insufficient risk assessments that address identified hazards
- inadequate systems of work that expose operators and other employees to hazards
- inadequate supervision and deficient workplace inspections
- inadequate task-specific training.



## Actions required

Mine operators are reminded of their duty to provide and maintain workplaces, plant and systems of work that do not expose workers to hazards.

Recommended actions include:

- engaging a competent person to assess material properties and produce design, construction and operation recommendations that clearly convey safe work practices
- designing, constructing and operating stockpiles at the lowest practicable height and natural slope angle
- providing clearly demarcated exclusion zones
- as required, providing a combination of appropriate equipment with sufficient separation distances
- developing safe working procedures for a range of stockpile material conditions
- regularly assessing risks and identifying workers likely to be affected
- providing adequate supervision to focus on safe loading
- providing adequate and relevant training to operators
- developing and implementing simple and effective observational techniques or tools that help identify early warning signs of failure and trigger a response action or plan.

## Further information

- [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)  
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- Terzaghi, K., Peck, R.B., and Mesri, G., 1996, Soil Mechanics in Engineering Practice, 3<sup>rd</sup> edition: John Wiley and Sons, Inc., New York, 549 pp.
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## MINES SAFETY BULLETIN NO. 120

### PREVENTING LOSS OF CLASSIFIED PLANT RECORDS

ISSUED: 2 JUNE 2015

#### Background

Regulation 6.25 of the Mines Safety and Inspection Regulations 1995 requires duty holders to maintain records of the inspection, testing, commissioning or alteration of certain types of plant, particularly registered classified plant.

Duty holders may also be requested by an Inspector of Mines to provide other documentary evidence of compliance with any Part 6 regulations.

Although it is not specified that such records must be stored in hard copy form, there is an expectation that they are readily accessible on site to be available:

- to any employee or safety and health representative in accordance with regulation 6.25(3)
- for transfer on sale of the plant, as required by regulation 6.25(4)
- for inspection or seizure of copies by any visiting Inspector of Mines, pursuant to section 21 of the *Mines Safety and Inspection Act 1994*.

For itinerant classified plant that is not owned by or permanently located on the mine site, sufficient records should be readily available on site (or with the plant) to provide evidence of compliance.

Replacing paper-based filing systems with electronic record storage and management systems, including “cloud-based” systems where information is stored on servers owned and controlled by others, has resulted in issues for some duty holders.

The failure of a national asset integrity services company in 2014 resulted in clients losing access to their cloud-based classified plant management system. In some cases, the electronic records stored on the service provider's cloud server were not backed up with hard copies or other electronic storage controlled by the client mine site. Consequently, essential classified plant records became unavailable when the service provider went into receivership.

#### Summary of hazard

As part of any safe system of work, complete and accurate classified plant records are required to ensure that the equipment is safe to operate.

Permanent or temporary loss of access to such records may directly or indirectly increase the risk of personnel being exposed to a hazard. Such information is necessary to enable the plant's servicing and operating history to be monitored.

#### Contributory factors

Typical reasons for loss of classified plant records include:

- lack of secure records management system
- failure of document control and filing procedures due to lack of training, inadequate systems or poor supervision
- confusion associated with sale or transfer of the business entity, change of business ownership, or corporate restructure
- changes to records management systems, information technology systems, or computer system upgrades
- confusion due to frequent changes of personnel or unclear responsibilities of personnel
- documentation not transferred upon sale or relocation of the equipment. This is common for equipment obtained through used equipment dealers
- fire or water damage and failure to maintain duplicates in a secure location
- accidental deletion and failure to maintain back-up copies.

## Actions required

When designing a records management system for classified plant records, duty holders should consider how they will manage the risks of potential data loss.

Regardless of the storage and retrieval methods used for classified plant records, the following actions will assist duty holders to maintain records as required under legislation.

- For paper-based records kept on site, keep duplicate copies in a secure fire-proof, weatherproof, vermin proof facility, or back up records electronically on a secure server.
- For records stored on a local hard drive or server controlled by the duty holder, ensure the hard drive or server is backed up daily and the back-up drive is kept at a secure location.
- For records stored on cloud servers not owned or controlled by the duty holder, ensure a backup system is available, either hard copy or electronic, to protect the duty holder from permanent loss of the service.

## Further information

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for information on occupational safety and health in the resources sector.

## MINES SAFETY BULLETIN NO. 121

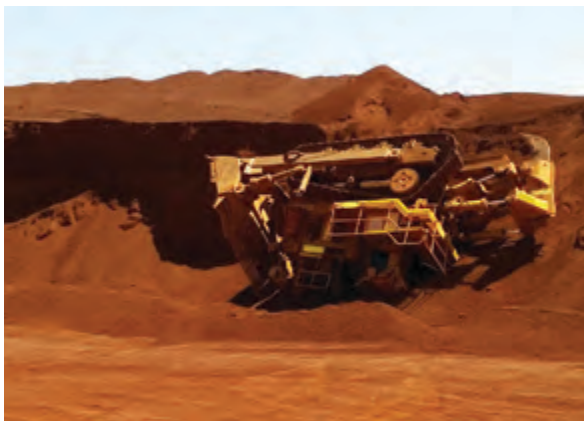
### HAZARDS ASSOCIATED WITH DOZERS WORKING NEAR PIT AND DUMP EDGES

ISSUED: 2 JUNE 2015

#### Summary of hazard

Recent incidents involving dozers going over edges at Western Australian mines have had the potential to seriously injure the dozer operators. Some of the incidents are described below.

- A dozer operator was attempting to push down an overhung and undercut face when the edge collapsed, causing the dozer to slide down the face and roll onto its side. The dozer had been tramming parallel to the face when the face collapsed.



- A dozer was pushing material over an edge to create an access ramp to the pit floor when the rill of material below the dozer slumped. Mud at the bottom of the rill was pushed out, creating a circular slip failure of the slope. The dozer slid over the edge. It remained upright and stopped about half way down the slope with its blade facing down.



- While pushing down a face, the side of a dozer blade caught on a rock and the dozer rotated. It slid sideways about 2 metres down the face before coming to rest.
- An operator travelling an unplanned route misjudged his surroundings and reversed the dozer over the edge of a 4 metre flitch. It slid down the slope, coming to rest on its side.

#### Contributory factors

Factors that contributed to dozers going over the edge in these incidents include:

- a failure to follow safe operating procedures (SOPs) or safe work instructions (SWIs)
- supervisors and operators not conducting adequate workplace inspections before and during work activities to identify hazards and implement appropriate control measures
- not re-assessing the effects of changing conditions (e.g. undercut edges, wet or boggy ground)

- not fully understanding the layout and condition of the work area (e.g. potentially unstable areas, surrounding environment).

## **Actions required**

Safe systems of work and operator vigilance are critical when operating dozers. The following measures are recommended:

- management and supervisors should
  - establish safe systems of work (e.g. SOPs, SWIs), for tasks involving dozers, including work near edges
  - ensure operators are competent to conduct the task
  - provide adequate supervision and address any deviations from the SOP or SWI
- supervisors and operators should
  - conduct a task risk assessment, such as a job safety analysis (JSA), before commencing work, and review it if work conditions change (e.g. wet conditions following heavy rainfall)
- operators should
  - always be aware of their surroundings and any hazards in the immediate work area
  - follow the site's SOP or SWI for the task.

Basic safe work practices when working near edges include:

- maintaining a full blade of material between the dozer blade and the edge when pushing material over a face
- always working up and down a slope, never across the slope
- regularly inspecting working edges for signs of instability such as cracks
- maintaining a safe distance from the edge of a face — if working at an elevated edge or travelling along the top of the face, the safe distances from the edge should be determined through a risk assessment process and geotechnical assessment.

Consider using remote control technology to perform the job if dozers are required to work near pit edges and there is a significant risk to the operator (e.g. high dumps, unstable ground).

## **Further information**

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for information on occupational safety and health in the resources sector.

## MINES SAFETY BULLETIN NO. 122

### USE OF TYRE INFLATION CAGES

ISSUED: 24 JULY 2015

#### Background

Some mining operators rely on tyre inflation cages to control the risk of a tyre burst when inflating (and testing) newly assembled light vehicle tyres and on-highway type truck tyres (up to 24 inch rim diameter). Many of these cages are of unproven or uncertified design, and lack comprehensive instructions.

There is no Australian or international standard for the design, manufacture or testing of tyre inflation cages for any size of tyre. However, tyre inflation cages are commercially available in Australia, for tyres with rim diameters less than 24 inches, that are engineer-designed, third-party tested and certified to manufacturer's standards.

#### Summary of hazard

The sudden depressurisation of a tyre can release a large amount of energy as a percussive shock wave. For tyre assemblies that have split wheels or multi-piece rims these components can become projectiles following a sudden depressurisation.

The risk of a tyre burst is particularly high during the first inflation of a tyre after assembly or mounting i.e. components (e.g. the bead) fail to engage properly, or the wheel or rim is not correctly assembled. This initial inflation is often undertaken in a workshop or maintenance area. The percussive shock wave and projectiles generated can damage equipment and be potentially lethal to personnel in the "line of fire".

#### Contributory factors

Many tyre inflation cages are purchased or manufactured without comprehensive designer or manufacturer instructions for their installation, operation, inspection and maintenance.

During installation, this can lead to mining operators:

- bolting tyre inflation cages to concrete floors or other structures. The bolts and nuts used, the concrete floor or support structure are usually not designed to withstand the forces generated during a tyre burst, and therefore may generate projectiles
- over-restraining the cage structure which reduces the capacity of the tyre inflation cage to deflect or deform and adsorb the energy of the tyre burst . Most tyre inflation cages are more effective if they are free-standing and should not be bolted down without consulting the manufacturer.

During use, this can lead to mining operators assuming that tyre inflation cages provide some degree of protection and will restrain projectiles if a tyre assembly fails catastrophically. This belief may:

- mislead personnel into having a false sense of security
- affect the perception of risk, which can lead to decisions that increase exposure to harm (e.g. reduce the size of exclusion zones, pneumatic pressure testing of tyres).

#### Actions required

##### Use of tyre inflation cages

Mine operators and maintenance supervisors who rely on tyre inflation cages as part of their safe system of work should consider their duty of care obligation. Recommendations include:

- use only fit-for-purpose and engineer-certified tyre inflation cages
- ensuring competent persons install, operate, inspect, and maintain tyre inflation cages in accordance with the designer's or manufacturer's instructions, as well as mining operation procedures

- consulting with the designers or manufacturers before bolting tyre inflation cages to concrete floors, footings or other restraining or supporting structures.



Example of engineer-certified tyre inflation cage after testing with a 22.5 inch tyre at 140 PSI. Image courtesy RLM Distributing.

## Recommendations for safe inflation or deflation of tyres

- The size of the exclusion zone should be established by competent persons using an appropriate risk assessment, including tyre and wheel (or rim) manufacturer's recommendations for the size and type of tyre assembly.
- Information from the risk assessment (e.g. exclusion zone, tyre size limits) should be included in safe work procedures (SWPs) and training.
- Before commencing any inflation, establish an adequate marked exclusion zone (e.g. signage, barricading, floor marking) as necessary.
- Never exceed the recommended cold inflation pressure without consulting the tyre manufacturer.

*Note: The practice of pneumatic pressure testing (inflating to beyond the manufacturer's recommended cold inflation pressure) should not be undertaken unless approved by the tyre manufacturer.*

- Respond to any popping or cracking sounds detected during inflation by stopping inflation and evacuating the area until the tyre can be deflated in a safe manner.

*Note: After inflation, tyres should be allowed to stand for a short period (typically 5 minutes) before approaching the tyre to disconnect the inflation line.*

- After storage, subsequent re-inflation should be undertaken in a tyre inflation cage, where practicable.
- Supervisors and service personnel are reminded to:
  - position themselves out of the "line of fire"
  - use remote inflation systems or an inflation system with sufficient hose length and clip-on
  - style chuck fittings to ensure that service personnel can stand at a safe distance
  - keep working areas free of loose objects and debris (the percussive shock from a tyre
  - burst can generate lethal projectiles from any loose rocks or objects nearby).

## Further information

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for information on occupational safety and health in the resources sector.

## MINES SAFETY BULLETIN NO. 123

### HAZARDS ASSOCIATED WITH RIGGING WHEN REPLACING CONVEYOR IDLERS AND ROLLERS

ISSUED: 10 AUGUST 2015

#### Background

Mining operations may require different rigging equipment for different tasks. Combining this gear to achieve the safest lifting outcomes requires an understanding of the forces involved and the limits of the lifting system (e.g. working load limit). These competencies also apply when using lever hoists or pullers (commonly called come-alongs) for rigging or dogging purposes.

A high risk work licence for dogging (class DG) is required by anyone who applies slinging techniques to a load, which includes:

- calculating the safe angle for sling or chain
- selecting the type of sling or chain to be used
- selecting the correct method to secure the load
- selecting the safe method to lift the load
- checking the conditions of lifting gear for wear and tear.

A high risk work licence for rigging is required for people undertaking work where decisions regarding slinging techniques are required. In all cases, the job needs to be risk assessed by supervisors or management before allocation of the work.

Inspectors have identified inappropriate or unsuitable rigging practices on several mine sites when come-alongs were used during the replacement of conveyor idlers. Poor rigging practices while conducting such work have resulted in serious injuries in the past, including a broken jaw.

#### Summary of hazard

The stored energy present in lifting equipment under tension is a known hazard in the resources sector, with the potential for fatal and serious injuries following the uncontrolled release of this stored energy. Falling or failing loads and lifting equipment can result in injury even when the worker is not directly under the load. Workers in the “line of fire” may be struck with extreme force by chain links discharging from the system.

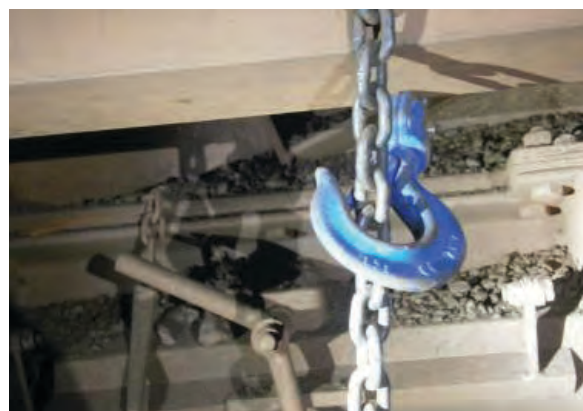
Lifting equipment can be damaged or deformed when placed under unnecessary strain by poorslinging and rigging practices. This reduces the breaking load of components (e.g. chain links, hooks). There is the potential for failure, placing workers at risk, even when the load is within the safe working load limit.

#### Contributory factors

Lifting equipment may be overloaded when changing conveyor idlers and rollers if work practices are inadequate or loads catch on fixed plant.

#### Examples of poor lifting practices when using come-alongs

- **Incorrect seating of the chain in the hook**  
This can lead to damage and failure of the lifting equipment, with the chain releasing under pressure through the safety latch of the hook.





- **Incorrect installation**

Lifting equipment can be damaged or fail if the correct slings or attachments (e.g. appropriately rated shackles) are not used. A hook can be damaged if it is used directly on a load.

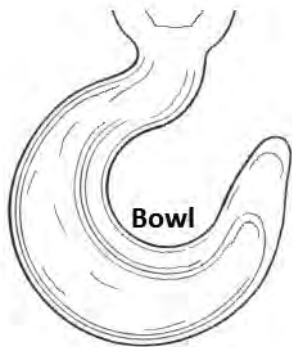
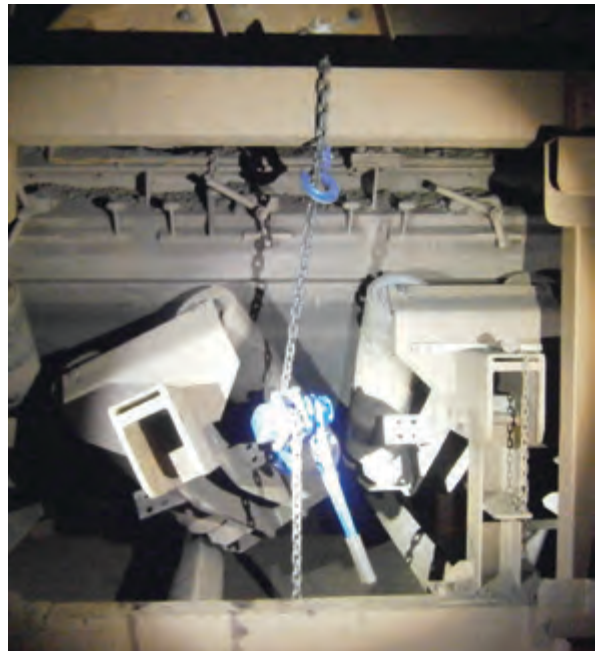


chain and back hooking is sometimes used instead of slings, but this stops the hook swivelling, which means any twists in the chain are not removed.

*Note: Back hooking is not permitted by the original equipment manufacturers (OEMs) of comealongs. Always use an approved and correctly rated sling or other lifting accessory in accordance with the competent person's directions.*

- **Load not supported through centre of hook**

Hooks are designed to support the load in the centre of the bowl. Wedging or forcing the hook tip into a lifting point can result in the hook deforming.



- **Choke hitched or back hooked with the main chain**

The chain used in a come-along has a finer tolerance on the pitch than a sling chain so it can couple with the pockets in the hoist mechanism. Chain links can be bent or stretched if the chain is misused by loading it across an edge or it is backhooked. Wrapping the main



Mines Safety Bulletin No. 123 continued

## Contributory factors for poor lifting practices when using come-alongs

Factors that contribute to poor rigging practices when changing conveyor idlers and rollers using come-alongs include:

- adequate tooling not readily available for the work to be conducted (e.g. belt lifters or other speciality tools that mitigate the requirement for rigging work)
- inadequate systems of work exposing employees or other operators to hazards (e.g. procedures that require the use of belt lifters when this equipment is not available to workers)
- failure to follow safe work procedures (SWPs) or safe work instructions (SWIs)
- inadequate job hazard analyses (JHAs) that do not sufficiently detail the rigging requirements or steps for roller removal
- JHAs signed off by supervisors who do not understand the task or hazards involved
- supervisors and operators not conducting adequate workplace inspections before and during work activities to identify hazards and implement necessary controls
- workers conducting rigging or dogging activities without
  - holding the correct licence
  - being assessed as competent
- workers not understanding the correct use of the tools provided by the employer (e.g. comealongs)
- task-specific training for removing the roller and idler types used on site is not done or is inadequate.

## Actions required

Mine operators and supervisors of maintenance activities who rely on come-alongs to assist with dogging or rigging activities are reminded of their duty of care obligations. The use of come-alongs should be reviewed to confirm that a safe system of work is in place.

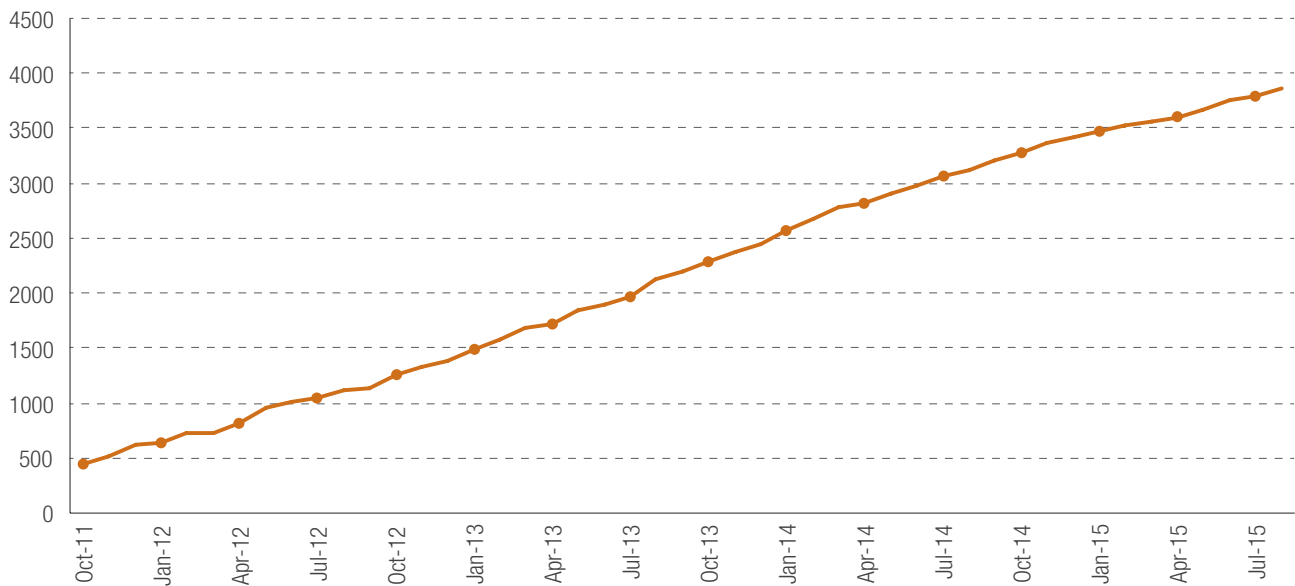
Recommendations include:

- providing adequate specialised tooling for workers to conduct their assigned tasks (e.g. are there safer tools that can be purchased such as belt lifts so that come-alongs and qualified doggers are not required?)
- following the original equipment manufacturer's (OEM's) instructions and observing warnings when writing the site's SWPs and JHAs
- reviewing SWPs and JHAs for completeness and adequacy
- confirming supervisors who authorise JHAs understand the job steps and have visited the task or have other competent personnel review the system
- confirming, before work commences, that workers conducting dogging and rigging activities are competent and hold the relevant high risk work licence
- verifying that workers tasked with using come-alongs are competent in their use
- conducting task-specific training for the removal of conveyor idlers and rollers
- monitoring compliance with site work standards by planning supervisor visits or inspections to coincide with high risk tasks such as dogging and rigging activities.

## Further information

- Resources Safety, Department of Mines and Petroleum, [www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)
  - *Frequently asked questions on dogging and rigging – information sheet*
  - *Know your hazards – Raising the issues (video series covering centre of gravity, friction, tensile strength)*
- Australian Standard, [www.standards.org.au](http://www.standards.org.au)
  - AS 1418.2 Cranes (including hoists and winches) – *Serial hoists and winches*

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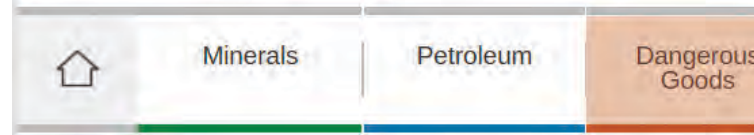


FIND OUT WHAT IS HAPPENING AT RESOURCES SAFETY

The Department of Mines and Petroleum is on track to have 4,000 subscribers to its safety news alerts by the end of the year. Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) to subscribe and receive the latest news about publications, significant incident reports and safety bulletins, events and safety reform progress.



NEW WEBSITE COMING



After a period of user acceptance testing, the new Departmental website is a step closer to release.

“The way people access information online has changed in the six years since the current website was launched,” Director General Richard Sellers said. “The new website will be more intuitive and better reflect the way our stakeholders want to use the site.”

For Resources Safety customers, this includes the facility to:

- quickly access transactional areas (e.g. licensing applications and submissions) and report accidents and incidents through quick link options

- easily access safety guidance and information about legislative requirements
- search web pages, publications and safety alerts
- join mailing lists
- access material to help raise public safety awareness (e.g. prospecting safety, transporting dangerous goods in vehicles).

The new website design and navigation increases interconnectivity between areas to provide an encompassing and user-friendly way for the Western Australian resources sector to interact with the Department.

DANGEROUS GOODS AND SAFETY LANDING PAGES ON NEW DMP WEBSITE – WHAT DO THE PICTURES LEAD TO?

Dangerous goods landing page	Topic	Safety landing page
Find information on the safety legislation that applies to dangerous goods in Western Australia	 <b>Legislation and compliance</b>	Find information on the safety legislation that applies to minerals and workers in the Western Australian resources sector
Find safety information about dangerous goods	 <b>How do I...</b>	
	 <b>How do I...</b>	Find safety and health information about dangerous goods and working in the resources sector

Geological Survey	Environment	Safety	Investors	Community & Education	About Us & Careers
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Dangerous goods landing page	Topic	Safety landing page
Find out how to apply for and renew a dangerous goods licence, including office opening hours and using the self-service kiosk	 <b>Licensing services</b>	
	 <b>Safety alerts</b>	Find bulletins and reports about workplace accidents and incidents in the resources sector
Find out what is happening in safety regulation in Western Australia, including information about events and latest releases, and invitations to provide feedback	 <b>Safety news and events</b>	Find out what is happening in safety regulation in Western Australia, including information about events and latest releases, and invitations to provide feedback
Find out what needs to be reported if something goes wrong	 <b>Accident and incident reporting</b>	Find out what needs to be reported if something goes wrong
Find guidance material that supports compliance with dangerous goods safety legislation and promotes safe practice	 <b>Guidance</b>	
	 <b>Publications and resources</b>	Find guidance material that supports compliance with safety legislation and promotes safe practice
Find safety information for the general public, including a schedule of fireworks events	 <b>Safety in the community</b>	Find safety information for the general public, including a schedule of fireworks events
Find out how to change your details for licences and subscriptions, and subscribe to our weekly safety news alerts and safety magazine	 <b>Stay in touch</b>	Find out how to change your details for licences and subscriptions, and subscribe to our weekly safety news alerts and safety magazine

## 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 and fireworks**

**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)  
rdspsatial@dmp.wa.gov.au (dangerous goods pipelines enquiries)

## CRITICAL RISKS

**including petroleum pipelines and operations, major hazard facilities and geothermal energy**

**Telephone:** +61 8 9358 8002

**Facsimile:** +61 8 9358 8000

**Email:** CriticalRisksPS@dmp.wa.gov.au (petroleum safety enquiries)  
CriticalRisksMHF@dmp.wa.gov.au (major hazard facility enquiries)

## SAFETY COMMUNICATIONS

**including publications, events and *Resources Safety Matters* subscriptions**

**Telephone:** +61 8 9358 8154

**Facsimile:** +61 8 9358 8000

**Email:** RSDComms@dmp.wa.gov.au

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If you have moved or changed jobs and are not receiving *Resources Safety Matters*, or wish to be added to the mailing list, please contact:

Safety Communications  
Resources Safety Division  
Department of Mines and Petroleum  
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**Telephone:** +61 8 9358 8154

**Facsimile:** +61 8 9358 8000

**Email:** RSDComms@dmp.wa.gov.au

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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)  
 mineshrebs@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)

## NORTH INSPECTORATE

**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 8079  
**Email:** north.inspectorate@dmp.wa.gov.au

## EAST INSPECTORATE

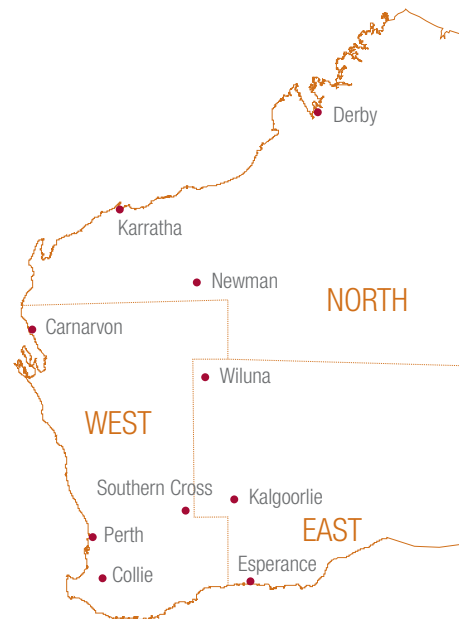
**Street address:** Cnr Broadwood and Hunter Sts, Kalgoorlie WA 6430  
**Postal address:** Locked Bag 405, Kalgoorlie WA 6433  
**Telephone:** +61 8 9021 9411  
**Email:** east.inspectorate@dmp.wa.gov.au

## WEST INSPECTORATE

**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 8079  
**Email:** west.inspectorate@dmp.wa.gov.au

OR

**Street address:** 66 Wittenoom St, Collie WA 6225  
**Postal address:** PO Box 500, Collie WA 6225  
**Telephone:** +61 8 9734 1222  
**Email:** west.inspectorate@dmp.wa.gov.au



## 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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*Resources Safety Matters* Editor  
Resources Safety, DMP  
Mineral House, 100 Plain Street  
East Perth WA 6004

**Editor:** Dr Susan Ho  
**Enquiries:** 08 9358 8149  
**Email:** RSDComms@dmp.wa.gov.au

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

## LIST OF CONTRIBUTORS (FROM DMP UNLESS OTHERWISE INDICATED):

John Ahlin	Adrian Jurg
Colin Boothroyd	Adrienne LaBombard, CMEWA
Jim Boucaut	Mark La Brooy
Doug Brown	Ian McKay
Tse Yin Chang	Mike McKay
Andrew Chaplyn	Russell Miners
Dean Crouch	Bec Moore
Iain Dainty	Beau Pearson
Sabrina Davies, Mental Health Commission	Lew Pritchard
Conor Doherty	Marcus Rader
Peter Drygala	Alicia Ranford, MFMatters
Steve Emery	Simon Ridge
David Eyre	Angela Rizk, Drug & Alcohol Office
Louise Fogarty	José Sanchez
Chris Gamble	Ankit Shah
Faye Hajjialiakbar	Richard Shedlock
Marius Hanekom	Ross Stidolph
Andrew Harris	Michael Telford
David Harvey	Amanda Thomson
Philip Hine	Michael Wolter
Su Ho	Peter Xanthis
Alan Holmes	Henry Zuidersma

## PHOTO ATTRIBUTION:

DE = David Eyre  
ID = Iain Dainty  
MW = Michael Wolter  
SH = Su Ho  
TW = Tracy Wynands  
TYC = Tse Yin Chang

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