

Resources

Safety matters

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Government of Western Australia
Department of Mines, Industry Regulation and Safety
Resources Safety

INTRODUCING TOWARDS 2020

WHAT WILL THE
DEPARTMENT MERGER
MEAN FOR INDUSTRY?

RECOGNISING 50 YEARS
OF MENTAL HEALTH WEEK

INTRODUCING THE SAFETY
SNAPSHOT SERIES



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THE NEW REGULATORY PARADIGM

As the dust settles following the March 2017 election, a new paradigm is being created for safety in the resources sector.

Work is underway to amalgamate the Department of Mines and Petroleum with key divisions of the Department of Commerce to form the new Department of Mines, Industry Regulation and Safety.

The *Towards 2020* health and safety vision has been launched and endorsed by Minister for Mines and Petroleum Bill Johnston, and will provide a structured approach for both the new Department and Resources Safety going forward.

The new Department, which places safety front and centre in its name, will bring great opportunity for step-changes in the work of the regulators, particularly the safety regulators – Energy Safety, Worksafe and Resources Safety.

Bringing us together within the new Department and under one Minister, will allow collaboration and

cooperation covering diverse areas such as legislative change, IT platforms and training.

As we work to create the new Department, it will remain very much ‘business as usual’. We will continue to provide the services that industry expects, while identifying synergies and efficiency gains that the larger Department will provide.

This melding of the two departments is very much a meeting of equals that will facilitate a great learning opportunity for each. It is our intent to avail ourselves of the best from each so that we go forward on the journey outlined in the *Towards 2020* strategy better equipped and able to meet our aspirational targets.



Simon Ridge
Executive Director Resources Safety
30 August 2017



From left: Regional Inspector of Mines, Martin Ralph, Executive Director Resources Safety, Simon Ridge, Regional Inspector of Mines, Christina Folley, Director Mines Safety, Andrew Chaplyn, and Regional Inspector of Mines, Graham James

TYC



INTRODUCING THE NEW DEPARTMENT

As part of the State Government's statewide public sector reforms, the departments of Mines and Petroleum and Commerce amalgamated on 1 July 2017 to form the Department of Mines, Industry Regulation and Safety.

These structural changes are aimed at creating collaborative departments focused on whole-of-government objectives and delivering services more efficiently and effectively.

The aim during the transition is to minimise the impact of the change on the Department's stakeholders. For Resources Safety, this means continuing to execute proactive scheduled inspections and audits, and responding to serious incidents and occurrences in a timely manner.

An expected outcome of the merge of Mines and Petroleum and Commerce is that services will improve post-amalgamation through greater clarity of regulatory services. This may translate into more inspections and audits by inspectors and a modified approach to planning where resources are distributed to achieve a greater influence on safety and health performance in Western Australia.

Whatever changes occur as a part of these reforms, the ultimate goal of Resources Safety remains the same – to continue to support improvements in safety and health across Western Australia's resources sector.



INTRODUCING THE NEW MINISTER FOR MINES AND PETROLEUM

William (Bill) Johnston was elected to Parliament at the State Election in September 2008, for the newly created State Electorate of Cannington. Prior to entering State Parliament, Mr Johnston was the State Secretary of the Western Australian Branch of the Australian Labor Party for seven years.

Mr Johnston has also worked as an official of the Shop, Distributive and Allied Employees' Association, joining in 1989.

Mr Johnston was appointed as Shadow Minister for State Development; Energy in January 2012. He added responsibility for Mines and Petroleum in March 2013, and for Ports in June 2016.

At the recent 2017 State Election, Mr Johnston was re-elected to Parliament for the seat of Cannington. As a Minister and key member of Mark McGowan's team, Mr Johnston is responsible for the portfolios of Mines and Petroleum, Asian Engagement; Electoral Affairs; Commerce and Industrial Relations.



INTRODUCING THE NEW DIRECTOR GENERAL

David Smith, Director General of the Department of Mines, Industry Regulation and Safety, brings a wealth of experience to his new role heading up the transition to the new Department.

Mr Smith was a member of the Commonwealth public service for more than 20 years, including the Department of the Prime Minister and Cabinet and an overseas posting with the Department of Foreign Affairs and Trade. He has also worked with a private economic consultancy in London.

Before taking his current role, David Smith was the Acting Director General of the Department of the Premier and Cabinet (DPC), a role he had held since August 2016. Prior to this, he was also the DPC Deputy Director General.

Before his time at the DPC, Mr Smith was a member of the Corporate Executive of the Department of Treasury and Finance (DTF), with responsibility for economic policy. This built on 12 years of experience within the DTF in a variety of positions.

Commenting on his new role, Mr Smith said, "This is a very exciting time, which I am sure will also present challenges, but I look forward to making the transition as easy as possible for all of us across both agencies".

Towards 2020

Regulatory strategy for Resources Safety



RESOURCES SAFETY INTRODUCES ITS 20-20 VISION FOR THE RESOURCES SECTOR

The drive to continuously improve the health and safety regulation of Western Australia's resources sector is behind the development of Towards 2020 – a regulatory strategy. Covering all legislation administered by the Resources Safety Division, it outlines the Department's vision for a safe and healthy resources sector.

Officially launched by Mines and Petroleum Minister Bill Johnston at the Minesafe International 2017 conference, Towards 2020 describes the goals that underpin the regulator's vision – world-leading regulation, smarter systems and well-informed industry. The strategy also outlines focus areas and measures of success for safety and health initiatives undertaken by the regulator.

Towards 2020 is the first of a series of high-level, three-year rolling strategies. This live, online resource is easily accessible and will be updated as emerging issues and trends are identified.

Executive Director Simon Ridge said *Towards 2020* will guide the Division's efforts to raise awareness and seek compliance in the Western Australian resources sector

"It's important that we are measuring our performance and success, to confirm resources are being applied appropriately," Mr Ridge said.

"This enables us to become a more efficient organisation and better utilise our resources in working with industry to achieve improved safety outcomes."

When launching the strategy, the Minister said the safety and health of workers in the resources industry is a high priority for the government.

"Towards 2020 will foster a shared safety and health vision, and how it can be achieved," Mr Johnston said.

"It will help Resources Safety effectively engage with all of its stakeholders, and share important information on health and safety."

DEVELOPMENT OF THE REGULATORY STRATEGY

Making zero harm an aspirational goal was a driver in the development of the regulatory strategy.

"While we are unable to control everything in a workplace guaranteeing zero harm, we have had significant periods of time where we have not had any fatal accidents," Mr Ridge said.



A safe and healthy resources sector

This included an almost two-year period where no fatalities occurred on Western Australian mine sites.

“There is a whole suite of tools – technology, training, systems, processes, supervision – all of these things come together,” Mr Ridge said.

The importance of effective stakeholder engagement and a well-informed industry in achieving the vision was acknowledged by Mr Ridge.

“Working together produces better outcomes,” Mr Ridge said.

“If we’re not working together, then achieving those outcomes becomes a lot harder.”

“The factors that contribute to safety outcomes can be extremely broad. This means zero harm will be hard to achieve – but it has to be our aspirational goal. We just have to get there one step at a time.”

DATA-DRIVEN DECISION MAKING AND SMARTER SYSTEMS

The effective, systematic analysis of data will play an important role in achieving the Department’s *Towards 2020* vision. This strategy recently involved collaboration with independent experts from local universities which has led to a number of research projects.

“Using tertiary institutions like Edith Cowan, University of Western Australia, and Curtin will help find previously hidden gems of knowledge,” Mr Ridge said.

“It is only through increasing our knowledge that we are able to make better decisions.”

Increasing the use of data to drive decision-making is an area that Mines Safety Director Andrew Chaplyn is equally passionate about.

“It really is the backbone of what we are trying to do in Mines Safety,” Mr Chaplyn said.

“We collect so much information – it is important we use that data to improve our understanding.”

Mr Chaplyn points to the evolution of the Safety Regulation System (SRS) as an example of how the Department is doing this.

“SRS is able to turn information around very quickly,” he said.

“It can paint a clearer picture of what is happening and what the causes of these incidents might be.”

While data is important, both Mr Chaplyn and Mr Ridge agree that inspectors in the field are still critical.

“The analysis of data gives you a chance to develop accurate predictions,” Mr Ridge said.

“However, you need inspectors out there in the field, feeling the pulse on the ground.”

WANT TO FIND OUT MORE?

To find out more about *Towards 2020*, go to www.dmp.wa.gov.au/Towards2020

GOING ONLINE IN THE SAFETY REGULATION SYSTEM

The Safety Regulation System (SRS) is the online system used by Resources Safety and industry stakeholders to conduct a range of regulatory activities and lodge and manage documents and data. SRS continues to be enhanced with the objective of improving safety and health outcomes, as well as supporting digital transactions and increasing efficiency and effectiveness.

FUTURE ENHANCEMENTS

Work is progressing on the development of SRS functionality to support:

- updates to notifications of incidents and injuries to include simplified viewing of completed notifications and injury coding by industry, and the ability to export notification summaries to Excel
- notification of the election of safety and health representatives
- technical submissions
- site visits for a company or site not yet registered in SRS
- increased functionality for health and hygiene (hygiene management plans).

These enhancements are expected to be delivered in 2017–18.

RECENT ENHANCEMENTS

Notification of appointments

Sites are now able to manage statutory appointments within SRS, streamlining the notification process and reducing administration.

This functionality applies for the following statutory positions.

Positions that must be notified or advised to the Department

- registered manager
- alternate registered manager
- underground manager
- alternate underground manager
- quarry manager
- alternate quarry manager
- ventilation officer
 - surface
 - underground
- exploration manager
- exploration activity manager
- radiation safety officer

Positions that may be communicated to the Department

- deputy registered manager
- deputy underground manager
- deputy quarry manager
- electrical supervisor
- high voltage operator
- authorised mine surveyor
 - quarry
 - underground

COMING SOON

Notification of the election of safety and health representatives (SHREPs)

This functionality will allow sites to manage SHREP appointments within SRS. Other benefits include:

- SHREPs being able to nominate preferred contact details
- automatic provision of information to newly appointed SHREPs
- reminders for periods of election and training to be managed through SRS.

Health and hygiene

Following the successful implementation of health and hygiene sampling in May 2017, further functionality is planned to integrate health and hygiene management plans into SRS, including:

- online submission of health and hygiene management plans for review by the relevant inspector
- definition of similar exposure groups (SEGs) according to similar exposures to agents
- sites being able to define their quota of samples by the quarter to be allocated per SEG.

Feedback provided during implementation of health and hygiene sampling into SRS is also being considered, and enhancements will be made to address areas of need.

KEEP UP TO DATE

When new external user functionality is released, the Department provides support to industry including training, instructional videos and technical assistance.

To receive updates on SRS releases, including information about workshops, visit www.dmp.wa.gov.au/ResourcesSafety to subscribe to the weekly news alert.

NEW EXPLOSIVES RESERVE FOR WESTERN AUSTRALIA

In 2005, the Western Australian Government commissioned LandCorp to relocate and decommission the Baldivis Explosives Reserve to facilitate the urban development of the 'Karnup District'.

The Department has been working closely with LandCorp since then to identify a suitable site for the replacement reserve, and to design and build the new facility.

Construction at the new reserve site, McLarty Reserve, commenced in July 2017. The target date for closure of the Baldivis Reserve is August 2018. Companies will have progressive access to the new site from November 2017, allowing time for the construction of manufacturing and storage facilities so Baldivis lessees can relocate without disrupting to business activities.

McLarty Reserve was chosen by an inter-departmental taskforce after an exhaustive consideration of options to find a location free from foreseeable development pressures that did not impinge on surrounding land uses. That process, and subsequent statutory approvals to legally establish the reserve, involved consultation with local government and community members. This stakeholder engagement will give confidence for explosives companies to invest in long-term infrastructure, particularly for explosives manufacture.

The new reserve will be developed in two stages, and initially has capacity for six manufacturing sites, the storage of 16,000 tonnes of ammonium nitrate, 30 explosives magazines and eight on-site offices. Land adjacent to the site will enable a doubling of capacity if required.

The new facility will have an emergency evacuation system and firefighting systems at all manufacturing and ammonium nitrate storage areas. Site security will include a manned gatehouse, razor wire fencing, camera surveillance and swipe card entry control. These measures are additional to the stringent regulatory requirements that facilities already have to meet. All internal roads will be sealed and all sites will be powered. The reserve has a perimeter road for checking fences and emergency services access.

Current lessees at Baldivis, and the explosives industry generally, have been consulted in detail regarding this development, and interest in take-up of sites at the new reserve has been strong. It is hoped that the reserve will ultimately provide permanent employment for up to 30 people.

Enquiries from prospective lessees should be directed to the Manager Dangerous Goods Safety on 08 9358 8026 or SEFLeases@dmirs.wa.gov.au

WHAT DOES AN EXPLOSIVES STORAGE FACILITY LOOK LIKE?



Main gate and gate house



Security fencing



10 tonne relocatable magazines



50 tonne magazine



Magazines showing separation and mounds



Magazines showing separation and mounds



Ammonium nitrate storage and security camera



Ammonium nitrate emulsion manufacturing site



JUDGING UNDERWAY FOR SAFETY AND HEALTH RESOURCES SECTOR AWARDS

In March 2017, the Department took on responsibility for the Safety and Health Innovation Awards from the Chamber of Minerals and Energy WA. The rebadged Safety and Health Resources Sector Awards recognises individuals, teams and companies that have developed a new or original solution to specific safety and health problems in the workplace.

The awards aim to promote safety and health innovation across the Western Australian resources sector to encourage continuous improvement in health and safety.

Resources Safety Executive Director Simon Ridge said a large part of the awards was sharing industry successes.

"I am looking forward to the judging process with great anticipation. I have been a judge for the former Chamber of Minerals and Energy WA process and it has always been exciting to see how innovative the industry is," Mr Ridge said.

"We go into the process without any preconceptions. Innovation can take many forms, so we cannot afford to narrow our thinking as to how this might be demonstrated."

Applications are now closed and preliminary judging of applications is underway.



The Department has received **25 entries** for the 2017 Safety and Health Resources Sector Awards for the three categories – safety representatives, systems and people, and engineering.

WANT TO ATTEND THE AWARDS FOR EXCELLENCE?

The Awards for Excellence ceremony will be held on Thursday 26 October at the Parmelia Hilton Hotel. Tickets for the ceremony are \$60 and can be purchased online at <https://goo.gl/KXLjvT>. Bookings close Thursday, 19 October.



WHAT ARE THE JUDGES LOOKING FOR?

Applications received are being judged against the following criteria:

Problem

- A brief description of the specific problem, outlining how it was identified and the potential safety and health consequences.
- If the innovation was not designed in response to a specific problem, a description of how the safety and health initiative or improvement opportunity was identified or developed.

Solution

A description of:

- strategies and initiatives developed to address the problem
- methods used to assess the risks relating to the problem, assisting development of the solution
- how the solution has been implemented across the site or organisation
- approach and involvement of the site's resources and employees
- how the solution was trialled and tested
- whether an assessment has identified new hazards since implementation of the solution and subsequent management strategies
- how the hierarchy of control has been applied, where relevant.

Benefits and/or effects

- A description of the safety and health benefits or outcomes.
- A description of the factors affecting its use and effectiveness.
- Provision of supporting data demonstrating the benefits and effects achieved.

Transferability across industry

A description of:

- the potential for the innovation to be applied, modified or transferred to other settings or industries
- any key learnings from the development and implementation of the innovation which can be shared with broader industry to promote safety and health.

Innovation

- The application of creative thinking to address the problem or initiative.



LICENSING AND REGULATION

A key aim of Resources Safety's Licensing and Regulation Branch is to constantly improve services to our customers in Resources Safety and the resources and dangerous goods sectors. Four service improvement projects are currently underway.

Resources Safety collects significant amounts of information on incidents and injuries. To ensure we get the greatest benefit from this rich information source, a data analysis unit has been established within the Branch.

This group not only helps produce routine outputs, such as the annual safety performance reports, but is able to do more detailed statistical analyses to look for underlying trends, incident clusters and potential causes. This includes the recent release of the safety snapshot series, which feature in this edition of *Resources Safety Matters*. These will help the Department target its efforts, and should enable industry to more effectively review and improve its safety performance. The hazardous manual tasks article in the last issue of *Resources Safety Matters* (vol. 5 no. 1; pages 74-75) is an example of the type of data interrogation possible and how the results can be applied.

In the dangerous goods licensing area, three projects are being implemented. Two focus on the wider Departmental initiative to move all payments online. This approach will not only be more convenient for customers, but also considerably increase efficiencies within the Department by reducing the

manual processing of payments and improving the reconciliation of accounts.

The first of these projects is the rollout of a payment portal for dangerous goods site licence annual payments. When payments are due, the licence holder will receive an email that directs them to a secure payment web page, with no logins or passwords required.

The second project applies to dangerous goods vehicle licence applications, where applications and payments can be made online through a simple system.

The third and final project is aimed at using a web search tool to make it easier to access information about dangerous goods storage sites. The Department receives hundreds of freedom of information requests every year relating to transfers of land, where information is sought about whether a site has ever been licensed to store dangerous goods and, if so, what goods. These requests cost \$30 to lodge and typically take up to a month to process. Up to 40 per cent of requests are for sites where there is no record of dangerous goods storage. The tool will allow anyone to search for a site anywhere in Western Australia, see the required information at a glance, and print off a report.

Philip Hine

Director Licensing and Regulation



DANGEROUS GOODS AND PETROLEUM SAFETY

As regulators, we are often asked for our perspective on industry and the effectiveness of the current regulatory regimes. This typically comes up at conferences and forums. Over the past few years, staff have presented at a variety of events on industry-relevant subjects, including:

- as low as reasonably practicable (ALARP)
- safety case approval issues
- human and organisational factors
- process safety management
- hazardous area management.

Attending such gatherings allows us to engage in a meaningful way with individual operators and industry. I am often struck by the genuine interest of some companies to better understand the regulatory environment, either on current or ongoing issues.

As a regulator, you are exposed to the variety of ways industry handles different problems. As much as possible, we encourage dialogue and learning between industry groups. We believe everyone has something to offer or share. Often the issues confronting a business may well have been dealt with by others. We encourage the sharing of examples of best practices identified during inspections or regular meetings, particularly those related to occupational health and safety.

As a regulator, we cannot be seen to either endorse or favour any particular industry event. However, we do encourage management to take an active interest in attending events relevant for their operations. By empowering personnel who attend, there may be learnings that can be applied to their own facility.

The Department presents at a variety of events and is often involved in event organisation committees. We encourage industry to do the same, especially if there are subjects that should be shared. In addition to the events it manages, the Department has supported other events including MineSafe 2017, ProSafe 2015-17 and Dangerous Goods Safety 2015-16. These have produced guidance material that sites may find relevant. Check out the toolbox presentations on the Department's website and sign-up for our email alerts to be informed of the latest releases and events.

We encourage management to review whether their organisations have attended any of these or similar events. Firstly to confirm they have explored and maximised any opportunities and, secondly, to identify any information that could be shared.

Ross Stidolph

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

Towards 2020

Regulatory strategy for Resources Safety



MINES SAFETY

ADOPTING A RISK-BASED APPROACH TO REGULATORY COMPLIANCE

Resources Safety has developed a risk profile system that enables a more targeted, risk-based approach to mines safety inspections.

The initiative, known as Assigned Resources Based on Risk (ARBOR), estimates the resources needed for proactive site-based regulation using objective risk assessments.

This proactive approach is in line with the Department's commitment to adopting a risk-based approach to regulatory policy.

RESPONSES TO DELOITTE REPORT

ARBOR addresses recommendations made in the *2016 Mines Safety Branch resourcing and funding independent assessment* by Deloitte to formalise risk assessment processes and use a defined set of criteria that enables a consistent regulatory approach across Western Australian mines.

A formalised inspection-scheduling module within the Safety Regulation System (SRS) based on risk is under consideration.

INCREASING TRANSPARENCY

Normal key performance indicators (KPIs) do not truly reflect the value of work done in reducing risk. Accounting for the performance of a risk control regulator is more about reporting how targets were chosen, what approach was adopted for projects, and how success was assessed. Ultimately, the regulator's work should help industry eliminate, reduce, mitigate, prevent or suppress a threat or harm.

TRACKING OUR PROGRESS

Appropriate targeting of proactive compliance and enforcement efforts (right resource, right place, right time) is one of the commitments identified in the *Towards 2020 regulatory strategy for Resources Safety*.

This commitment is focused on delivering data-driven decisions, and a balanced and integrated use of resources.

The prototype of the ARBOR system was tested in the first-half of 2017 with implementation into proactive field work planning from July onwards.

Progress on this *Towards 2020* regulatory strategy commitment will be reported annually. For more information on *Towards 2020*, visit www.dmp.wa.gov.au/Towards2020

INSPECTORATE ACTIVITY REPORTING

Building on our focus to increase transparency, from October 2017 the Department will be publishing key regulatory activity indicators for the mines safety inspectorate. This information will help highlight inspectorate activity (i.e. proactive versus reactive site visits) and enforcement actions.

To find out when the inspectorate activity reporting becomes available, sign up to our Resources Safety news alert at www.dmp.wa.gov.au/subscribe

Andrew Chaplyn

Director Mines Safety and State Mining Engineer

Driving the importance of traffic management

The 13th annual Mines Safety Roadshow will focus on the importance of traffic management and how safe systems, safe vehicles and safe people can contribute to a safe mining operation. The program showcases three new hazard videos, and provide update on what's happening in mines safety and health, as well as workshops on tackling troubling trends and dangerous goods transport.

To find a roadshow near you visit
www.dmp.wa.gov.au/events

Bunbury Cloudbreak Geraldton Kalgoorlie Karratha Leonora
Mandurah Newman Perth Port Hedland Tom Price



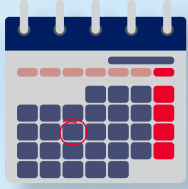
Register online at
www.starsevents.com.au/msr2017



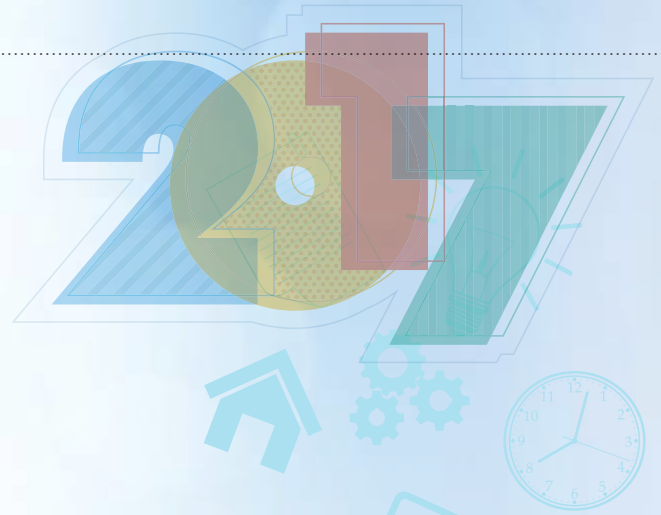
@DMIRS_WA



Department of Mines, Industry Regulation and Safety



MARK YOUR DIARY



SEPTEMBER

06 **NEWDEGATE MACHINERY FIELD DAYS**
6-7 September, Perth
www.nfdays.com.au

15 **PETROLEUM OPEN DAY**
15 September, Perth

OCTOBER

01 **SAFework AUSTRALIA MONTH**
All of October
www.safeworkaustralia.gov.au

08 **MENTAL HEALTH WEEK**
8-14 October
www.waamh.org.au

03 **2017 MINES SAFETY ROADSHOW**
3 October, Kalgoorlie
4 October, Leonora
10 October, Newman
11 October, Cloudbreak
12 October, Tom Price
17 October, Karratha
18 October, Port Hedland
24 October, Bunbury
25 October, Mandurah
31 October, Geraldton

17 **2017 RAIL SAFETY FORUM**
17 October, Perth

26 **2017 AWARDS FOR EXCELLENCE**
26 October, Perth

NOVEMBER

2 **2017 MINES SAFETY ROADSHOW**
2 or 3 November, Perth

3 **UNDERGROUND MINE EMERGENCY RESPONSE COMPETITION**
3-5 November, Kalgoorlie

24 **The MERC**
24-26 November, Perth
www.themerc.com.au



The events listed are either presented by the Department of Mines, Industry Regulation and Safety or involve Resources Safety staff as presenters or exhibitors.

Departmental events are provisional until registration details are released. Visit www.dmp.wa.gov.au/Safety/What-is-happening-16167.aspx for the latest information.

AOG

AUSTRALASIAN OIL & GAS
EXHIBITION & CONFERENCE
22-24 FEB 2017
PERTH CONVENTION EXHIBITION CENTRE



Principal Inspector On Shore, Gerardo Osorio (left)

2017 AUSTRALASIAN OIL AND GAS EXHIBITION AND CONFERENCE

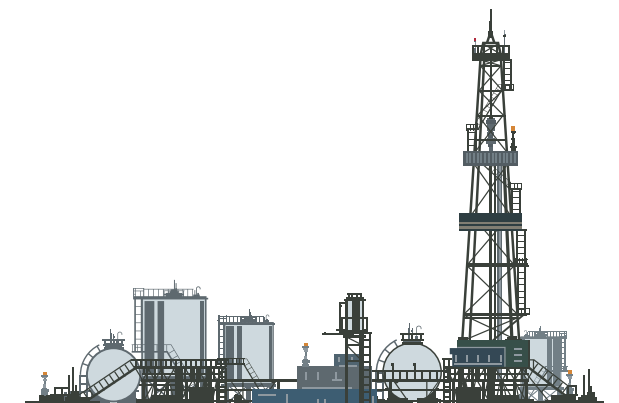
In February, the 37th annual Australasian Oil and Gas Exhibition and Conference (AOG) gave Resources Safety's Critical Risk and Dangerous Goods Safety staff an opportunity to engage with industry and provide face-to-face safety expertise.

AOG is the biggest oil and gas event in Australia and showcases new products, technology and techniques for the oil and gas sector.

Dangerous Goods Team Leader Erin James attended the three-day event and was impressed by the number of people from industry who stopped by the booth to discuss safety with representatives from the Department.

"Over the three days we had more than 200 people visit the booth to discuss safety in the oil and gas sector as well as exploration and the development of the State's resources," Ms James said.

"Our presence at the event was worthwhile, with industry representatives clearly valuing the opportunity to discuss their specific safety issues with the Department."





THE FORUM GAVE CONSULTANTS AN OPPORTUNITY TO MEET WITH THE DANGEROUS GOODS AND PETROLEUM SAFETY TEAM, AND ALSO NETWORK WITH THEIR FELLOW CONSULTANTS.

– LAWRY LIM



FORUM FOCUSES ON DANGEROUS GOODS

Accredited dangerous goods consultants gathered for the Department's annual Dangerous Goods Consultants Forum on 3 May 2017.

Principal Dangerous Goods Officer Lawry Lim said the annual event is for consultants who have been approved by the Department's Chief Dangerous Goods Officer to review and endorse dangerous goods storage and handling proposals.

"The forum gave consultants an opportunity to meet with the Dangerous Goods and Petroleum Safety team, and also network with their fellow consultants," Mr Lim said.

"More importantly, it was an opportunity to hear about the latest learnings and observations from incidents and inspections conducted by the Department."

The forum also featured presentations from industry and the Department of Fire and Emergency Services. There were updates on regulatory changes, safety codes and standards, and technical presentations to assist consultants in their role.



Resources Safety staff at the 2017 Minesafe International Conference
Photo courtesy AusIMM

SHARING THE LEARNINGS AT THE MINESAFE INTERNATIONAL CONFERENCE

The inaugural Minesafe International *The Resource Industry Health and Safety Conference* was held in Perth from 1-3 May.

Re-established by the Australasian Institute of Mining and Metallurgy (AusIMM) in conjunction with the Chamber of Minerals of Energy and the then-Department of Mines and Petroleum, the conference was an opportunity for Australian and international health and safety practitioners to discuss the latest research, network, and share achievements and challenges.

Resources Safety Executive Director Simon Ridge was part of the organising committee and said it was important for the Department to participate in such events.

“The Minesafe conference has an emphasis on health and safety across the resources industry,” Mr Ridge said.

“To be an effective regulator, we need to attend these events and work with industry to ensure we continue to focus on advancements in health and safety in the resources sector.”

Regional Inspector of Mines Martin Ralph said the calibre of presentations at the conference was exceptionally high, with a range of topics covered.

“Presentations spanned safety topics such as mine risk assessment and traffic management, and health-related issues such as nano diesel particulates and psychosocial hazards,” he said.

“The conference provided an abundance of opportunities for learning and sharing experiences with fellow mining safety and health professionals from around the State, Australia and across the world.”

As principal sponsor, representatives from Resources Safety presented at the conference and chaired the Jim Torlach Memorial Session.

Resources Safety's presentation outlined the Department's recent work within the human and organisational factors field and how it related to the State's resources sector.

DEPARTMENT'S EFFORTS RECOGNISED BY INDUSTRY

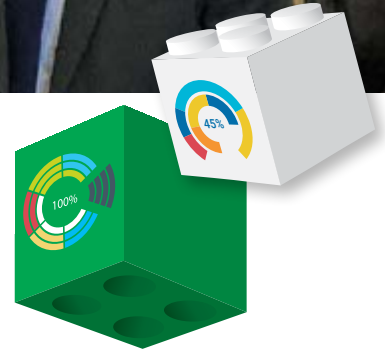


Andrew Chaplyn and Ronny Ladner
Photo courtesy AusIMM

Andrew Chaplyn, State Mining Engineer, Ronny Ladner, Founder of the Keil Centre, and Gareth Pickering, former Inspector of Mines, presented the paper “A change in focus from safety culture to human factors – proposed ‘top 11’ human factor topics for the Western Australian mining industry”. The paper was awarded the best paper at the conference.



Dr Marcus Cattani, Mines and Petroleum Minister Bill Johnston and Mines Safety Director Andrew Chaplyn at the launch of the Injury Alarm tool



DATA AT THE FOREFRONT OF WORLD DAY FOR SAFETY AND HEALTH AT WORK

As part of the World Day for Safety and Health at Work, the International Labour Organization (ILO), an agency of the United Nations, called on countries around the world to optimise the collection and use of occupational safety and health (OSH) data.

ILO Director-General Guy Ryder said reliable OSH data facilitates priority setting and gives the basis for measuring progress.

“It is indispensable for the detection of new hazards and emerging risks, the identification of hazardous sectors, the development of preventive measures, as well as the implementation of policies, systems and programmes,” Mr Ryder said.

“With good data, prevention strategies can be honed and the design of OSH legislation enhanced. Additionally, there can be more effective social dialogue on OSH issues among stakeholders including government, employers’ and workers’ organisations.”

In response to the call from the ILO, a Western Australian-developed web tool, Injury Alarm, has been released.

The tool analyses safety data to identify the likelihood of incidents and injuries occurring in a workplace. It was developed by Dr Marcus Cattani, who has worked in the field of injury prevention for 25 years.

Dr Cattani has teamed up with Edith Cowan University colleague Professor Russell Jones to address injury prevention and management.

“It’s a good partnership. My work is to do with educating senior leadership teams and others about how to prevent injuries,” Dr Cattani said.

“Russell’s work is about what to do when injuries aren’t prevented.”

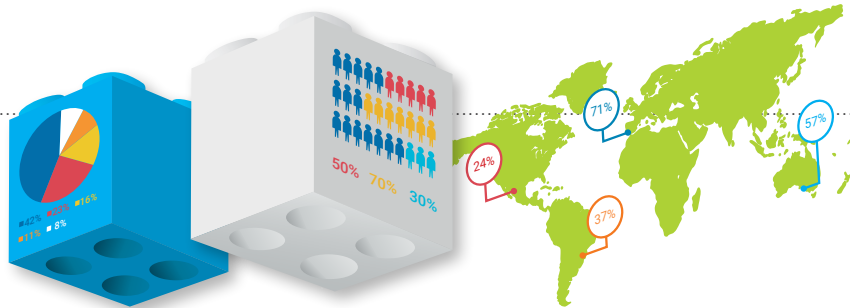
As Professor of Clinical Education in the School of Medical and Health Sciences, Professor Jones has been involved in emergency management for many years.

“Marcus and I share a concern that we are seeing the same sorts of patients, with the same sorts of injuries, and the same sorts of tragic stories, time and time again,” he said.

When it comes to emergency management, Professor Jones said there is still a lot to be learned in order to speedily and successfully get injured workers the attention they need.

“The faster the attention, and the higher the quality of the attention, the greater the chances that the patient will make a full recovery or, at the very least, won’t lose their life,” he said.

While emergency management is still critical to the resources industry, there is hope that will change in the future with the increased focus on prevention.



"It is fantastic to team up with Marcus, who has a really good concept of how to reduce the number of occasions where my skills in emergency management will be needed," Professor Jones said.

"There will be a lag time before Injury Alarm can hugely reduce the number of injuries.

"We really see this as moving towards eliminating or at least reducing a lot of the workload within emergency management and a lot of the suffering that occurs as a consequence of injury."

Critical in the work of Dr Cattani and Professor Jones has been injury data from industry and the Department of Mines, Industry Regulation and Safety (DMIRS).

"The data from DMIRS is terrific from an emergency management perspective because it is real data and we can analyse it to identify exactly what types of injuries occur, where they occur and what frequency," Professor Jones said.

Dr Cattani said he has been using the data to create risk profiles.

"My part of the process develops this risk profile and then compares that profile across the timespan of data that we have," Dr Cattani said.

"If you imagine that a risk profile is made up of say 15 or 20 different variables that DMIRS has given us, we can then have a look and see what is the most significant of those variables."

It is this research that led to the development of the Injury Alarm tool and, since it was launched, 115 organisations have registered to be involved.

The organisations input data, which is analysed using an algorithm and a customised report produced.

"The report provides organisation with the top two or three recommendations across several categories regarding risks," Dr Cattani said.

It also has the potential to help organisations become more efficient.

"Incidents cost a lot of money – the SafeWork Australia estimation is \$60 billion a year in a variety of different costs," Dr Cattani said.

"Injury Alarm has the potential to reduce the burden on industry and the burden on the nation."

DMIRS Mines Safety Director Andrew Chaplyn helped launch the Injury Alarm on 28 April this year and said he can see benefits for the regulator as well.

"There is an old adage, what you can measure is what you can control," Mr Chaplyn said.

"It's important we are able to see emerging safety trends. This technology has the potential to help direct our regulatory effort to where it is needed most – to where the hazards are.

"Then we can work with those companies to make sure they have the right things in place to control those hazards."

Collaboration with DMIRS, the CSIRO and industry has played an important role in the development of Injury Alarm.

Professor Jones said continued collaboration and feedback, particularly from industry, was crucial for future development.

"While we have some ideas, we want industry to tell us what it is they would find most useful," Professor Jones said. "How best to mine the incredible amount of information we have received."

For Dr Cattani, the call for feedback includes robust constructive criticism.

"There is the potential for this research to be quite disruptive," Dr Cattani said. "Forecasting injuries and responding effectively with emergency management is a different way of thinking about safety in the resources industry.

"We are quite interested in a bit of scepticism and people challenging us, as long as people are interested in constructive, scientific criticism."

While it is still early days for Injury Alarm, the both Dr Cattani and Professor Jones see the tool's potential.

"We are optimistic about the use of Injury Alarm to make a difference to workplace safety," Dr Cattani said.

"We have come up with a good idea, we are testing it, and we want to collaborate with people because all of the signs are that we have come up with something that can make a difference."

Go to www.injuryalarm.com for more information about Injury Alarm.



RECOGNISING 50 YEARS OF MENTAL HEALTH WEEK

The WA Association for Mental Health (WAAMH) is the peak body for community mental health in Western Australia. Recognising its platform, WAAMH continues to advocate for the human rights of those impacted by mental health conditions, for systemic advocacy and development, to ensure Western Australian are equipped with the resources and support for mental wellbeing and recovery.

Over the years, its commitment to social and emotional wellbeing in the general and business community has unified key stakeholders. Channelling this united effort, WAAMH and its partners continue to promote social and emotional wellbeing through a range of community events, including Mental Health Week.

Now in its 50th year, Mental Health Week is one of the longest standing and most recognised campaigns associated with health promotion and illness prevention in Western Australia. To be held 7-14 October, Mental Health Week aims to educate the community about how to protect mental health, connect with mental health services and reduce stigma. The week allows us to reflect and take some positive steps towards highlighting the importance of mental wellbeing.

The official theme for Mental Health Week this year is “Connect with nature, connect with community, connect with self for mental wellbeing”. The aim is to encourage everyone to take action to protect and enhance their mental health and wellbeing by engaging with leaders within the community to make a difference. The 50th anniversary is of particular significance as it highlights the substantial strides taken to reduce the stigma associated with mental health. It also provides us with an opportunity to reflect and look to the future.

In 2017, The World Health Organisation named depression as the leading contributor to the overall global burden of disease. Not only is it a leading cause of illness worldwide, it has relevance close to home in the Western Australian resources sector. Individuals who work within the sector are statistically more vulnerable to mental health difficulties due to the population demographic that they typically fall into – male between the ages 25 and 55. The challenges associated with the unique working environment of the resources sector are further exacerbated by isolation and associated physical challenges. Given this context, we need to do as much as possible to protect all Western Australians from ill health.

Together, we hold the responsibility to create mentally healthy and resilient communities.

RESOURCES AND SUPPORT SERVICES

The Department’s website lists a selection of the many online resources and support services related to mental health and wellbeing. Visit goo.gl/bYBw2r for more information.



HELP FOR YOU

www.mhc.wa.gov.au

The **WA Mental Health Commission** is responsible for a network of mental health and drug and alcohol treatment services and programs. The website offers a variety of resources aimed at producing and supporting positive mental health.

www.mhc.wa.gov.au/about-us/our-services/alcohol-and-drug-support-service/alcohol-and-drug-support-line

The **WA Alcohol and Drug Support Service**, which sits within the WA Mental Health Commission, provides a confidential, non-judgemental 24/7 helpline to support individuals using alcohol or other drugs to cope with work-related stress.

Call 9442 5000 (country callers 1800 198 024) for anyone concerned about their own or another person's alcohol or drug use.

www.lifeline.org.au

Lifeline provides 24-hour access to crisis support and suicide prevention services. Call 13 11 14 for 24/7 crisis support or use the online one-on-one crisis support service available.

HELP FOR THE WORKPLACE

www.headsup.org.au

Heads up is a web-based platform providing businesses and individuals with the tools required to create and support a mentally healthy workplace.

www.matesinconstruction.org.au/mining/

MATES in Mining (MIM) is a program initiative based on the successful MATES in Construction program. MIM aims to prevent suicide by delivering community developed programs on site, and supporting workers in need through case management and a 24/7 help line.

HELP FOR YOUR FAMILY

www.miningfm.com.au

Mining Family Matters has developed *The Survival Guide for Mining Families*, which describes the practical ways to boost the emotional resilience of workers and keep relationships healthy and strong.

www.headspace.org.au

Headspace is the National Youth Mental Health Foundation providing early intervention mental health services to 12-25 year olds. Information and services for young people, their families and friends can be accessed through the website.

CELEBRATING 50 YEARS
MENTAL HEALTH WEEK
 7-14 OCTOBER 2017
 Connect with **nature**
 Connect with **community**
 Connect with **self**
 for mental wellbeing



STAYING MENTALLY HEALTHY

The health of an individual encompasses their physical and mental wellbeing.

We have become fairly familiar with what is required to achieve and maintain our physical health, but we tend not to be clear on what is required to keep our mental health in check.

Just as is the case for our physical health, our mental health is subject to change over time. It is not something that we can take for granted, it takes ongoing investment if we want to get the most out of it.

In order to give our bodies the best chance of performing well in a race, it would be helpful to start a training schedule well ahead of time and eat nutritious food in the lead up. It makes sense then, that there are things we can do to give ourselves the best chance of achieving and maintaining good mental health too.

Some of the proactive things you can do to give yourself the best chance of good mental health are below. Scheduling an item from each of the categories on a weekly or fortnightly basis is a simple way of starting to establish a helpful habit of actively investing in your mental health. Why not start now, and reflect on your progress when Mental Health Week 2017 rolls around in October?



Connect with yourself

This is about paying attention to what you need and taking care of yourself. You could do something as simple as waking up 20 minutes earlier than everybody else so that you can enjoy your coffee in peace!



Connect with community

This is about being around others to socialise or to work toward a common goal. It could be:

- something as simple as organising to meet with a friend for a walk and a talk
- something bigger like joining a group at your local recreation centre.



Connect with nature

This is about being outside, breathing in the fresh air and appreciating the simplicity and beauty of nature – plenty to choose from in Australia!

It could be:

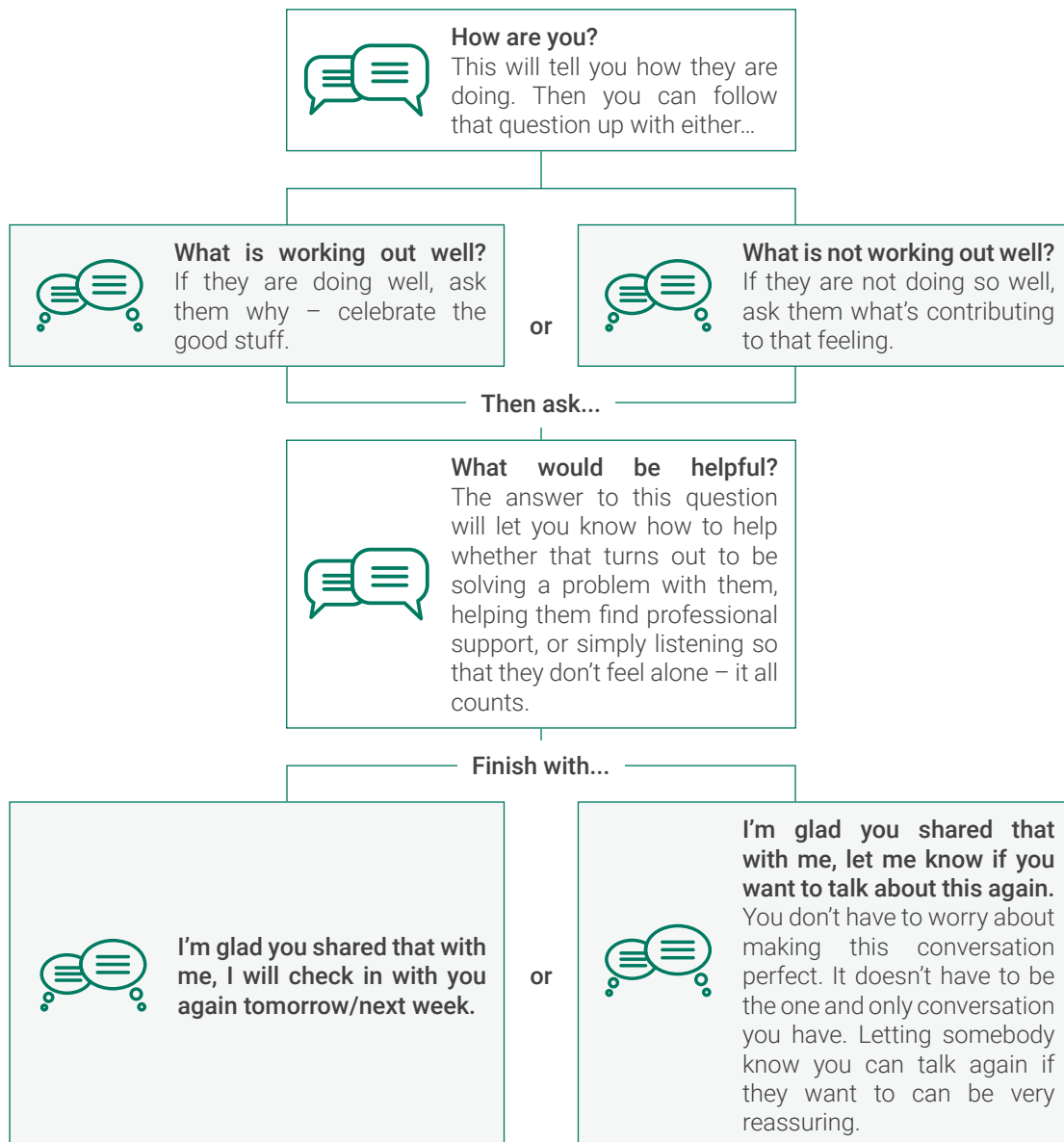
- something as simple as watching the sun set and eating your dinner outside
- something bigger like going camping or bushwalking.

WATCHING OUT FOR OTHERS

As well as encouraging friends and family to connect with self, others and with nature, we can also watch out for them by checking in with how they are doing or feeling.

Sometimes people feel uncomfortable about asking how somebody is doing or feeling because they are unsure what the response might be – what if the person is not doing well?

A simple way to manage this uncertainty, and to remain genuine in your decision to check in on them, is to ask more than one question. Aim to ask questions that give you easy clues as to how you could support that person if they could do with some help. Remember that you can always support them to find other sources of help if needs be.



If this person is experiencing some big problems and you feel out of your depth, help them to seek professional assistance from one of the services listed. When somebody is not doing well, and their mental health is depleted, a sense of being alone in their problems can make their whole situation feel even worse. This is why having this conversation with them in the first place could make a significant difference.



THE NEW BILL IS AN IMPORTANT STEP IN UPDATING AND IMPROVING THE REGULATION OF WORKPLACE HEALTH AND SAFETY.

– MINISTER BILL JOHNSTON



PROGRESS ON WORK HEALTH AND SAFETY LEGISLATION

The State Government has given the green light to develop a modernised Work Health and Safety Bill for Western Australia.

Based on the national *Work Health and Safety Act 2011*, the Bill will improve consistency with the rest of Australia and provide the primary legislation for workplace safety and health across all Western Australian industries.

The Bill will be supported by industry-specific regulations to suit the State's unique conditions, enabling the resources sector to continue to use a risk-based approach.

Petroleum and major hazard facility industries will continue to operate under a safety case approach.

The State Government's contemporary, single Act approach has been adopted following collaboration between the former departments of Commerce and Mines and Petroleum (now the Department of Mines, Industry Regulation and Safety).

Consistent with the Government's commitment to reduce red tape, the Bill will replace three Acts – *Occupational Safety and Health Act 1984*, *Mines Safety and Inspection Act 1994* and *Petroleum and Geothermal Energy Safety Levies Act 2011*.

The development of the Bill will involve extensive consultation with stakeholders and the community, prior to its expected introduction to State Parliament in mid-2019.

Minister for Mines and Petroleum, and Commerce and Industrial Relations Bill Johnston said the safety and health of workers is a high priority for the Government.

"Occupational, health and safety legislation in WA is 30 years old and is out of date," Mr Johnston said.

"This is why we're taking action – the new Bill is an important step in updating and improving the regulation of workplace health and safety."



RESOURCES SAFETY REPRESENTED ON INDUSTRY REFERENCE COMMITTEES

The Australian Government has introduced a new framework for engaging industry in the development of training packages that will guide the delivery of vocational education and training (VET).

An important component of the new framework is the formation of industry reference committees (IRCs) that provide a conduit for industry feedback to government on industry trends and for the promotion of VET to employers. Each of the IRCs is supported by a skills service organisation (SSO), whose role is to provide technical, operational and secretariat services. This is to enable IRCs to undertake their industry engagement and training package development and review activities effectively.

IRCs comprise industry representatives with expertise from a cross-section of the particular industry or sector, with members drawn from stakeholders across the country. The Australian Industry and Skills Committee has invited the Department's Mines Safety Branch to be a member of three IRCs specific to the mining industry:

- drilling
- extractive
- metalliferous mining.

Inspector of Mines Team Leader Waeel Ilahi has been appointed as the representative on the drilling and extractive IRCs. Regional Inspector of Mines Martin Ralph has been appointed to the metalliferous mining IRC. Price Waterhouse Coopers (PwC) is the SSO appointed for the three mining industry IRCs.

Work plans for the next 12 to 24 months have been submitted for the three IRCs. Once endorsed, the review of specific qualifications or units of competence will start.

IRCs provide a vital industry engagement forum and are the formal point through which industry's requirements for skills are considered and defined in training packages. As such, the Departmental's delegates are important contacts for mining industry representatives who wish to provide input into the development and review of the relevant training packages.

RESOURCES

www.skillsforaustralia.com/industries/mining-and-drilling/

The PwC's Skills for Australia website has a wealth of information on the mining, drilling and civil construction industry sectors, and factors that influence the sector.

For general enquiries in relation to training package development, contact PwC's Skills for Australia on 1800 714 819 or info@skillsforaustralia.com

Find out more about IRCs and their appointed members at www.aisc.net.au/ircs



UPDATES TO DANGEROUS GOODS REGULATIONS

Amendments to the Dangerous Goods Safety regulations took effect on 4 March 2017 and were made to accommodate the increasing industry use of the Globally Harmonised System of Classification and Labelling of Hazardous Chemicals (GHS). The GHS has been introduced nationally to comply with the model Work Health and Safety Regulations 2011.

It is important to note that these amendments do not introduce the GHS – they only respond to the introduction of the GHS by other laws and help industry avoid additional costs. Those other laws are interstate laws, but it is expected that Western Australia will introduce Work Health and Safety legislation using the GHS in the near future.

All dangerous goods safety regulations under the *Dangerous Goods Safety Act 2004* will continue to use the dangerous goods classification system.

The amendments primarily target the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007 and allow GHS labelling of dangerous goods packages and GHS safety data sheets as alternatives to the current use of dangerous goods labelling and safety data sheets.

The amendments eliminate the cost of re-labelling GHS-compliant packaging and re-writing GHS-compliant safety data sheets. All references to material safety data sheet or MSDS in the previous regulations have been replaced with safety data sheet or SDS.

Also, the definition of a combustible liquid has been changed to exclude all currently regulated substances with a flashpoint higher than 93 degrees centigrade. The definitional change is a deregulatory change and corresponds to the GHS classification system, making

it easier for industry to identify combustible liquids to be treated as dangerous goods. Higher flashpoint liquids are not considered sufficiently hazardous to warrant a dangerous goods classification.

All references to C1 combustible liquid have been replaced with combustible liquid.

Any dangerous goods site licence holder who identifies that their combustible liquid has

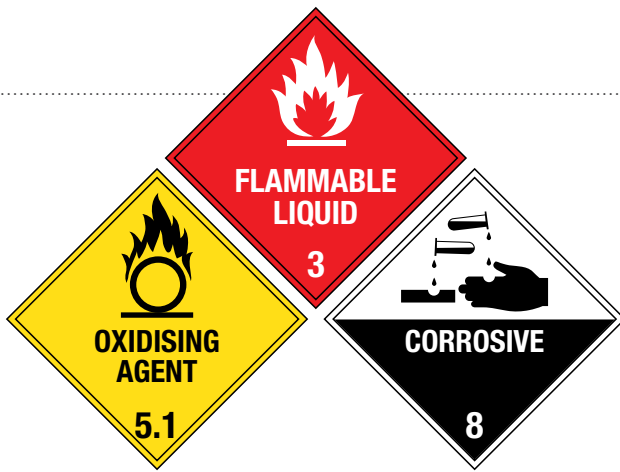
- a flash point higher than 93 degrees centigrade, or
- is not classifiable by the GHS as a Flammable Liquid Category 4,

is no longer storing dangerous goods and may contact the Department to remove the liquid from their dangerous goods safety site licence.

NEW SAFETY DATA SHEET DEFINITION IN THE REGULATIONS

Safety data sheet (SDS), for particular dangerous goods, means a document in English that contains the information in relation to the dangerous goods that is required by –

- (a) the *National Code of Practice for the Preparation of Material Safety Data Sheets 2nd Edition* [NOHSC: 2011 (2003)] (ISBN-1-920763-10-4); or
- (b) the *Preparation of Safety Data Sheets for Hazardous Chemicals – Code of Practice* published by Safe Work Australia in February 2016 (ISBN 978-0-642-33311-7)



NEW COMBUSTIBLE LIQUID DEFINITION

Combustible liquid means a liquid that is not a Class 3 dangerous good that has –

- (a) A flashpoint that is no higher than 93 degrees centigrade; and
- (a) A fire point, as defined in AS 1940-2004, that is less than the boiling point.

UPCOMING CHANGES TO THE REGULATIONS FOR TRANSPORTING DANGEROUS GOODS

The Department is making progress in implementing the latest (fifth) edition of the *Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG7.5)*.

This edition is already allowed in some jurisdictions, where it took effect on 1 March 2017 with the one-year transition period ending 1 March 2018.

The Department is currently drafting the necessary amendment regulations, which will include some minor changes to the administration of the licensing of dangerous goods tank vehicles and dangerous goods drivers. They will take effect in the second half of this year.





FORUMS HIGHLIGHT IMPORTANCE OF HUMAN AND ORGANISATIONAL FACTORS

"If we are ignorant of these factors, then we will continue to make the mistakes we always have."

The "factors" Resources Safety Executive Director Simon Ridge refers to are human and organisational and the impact they can have on safety and health.

"It's not new, these ideas have been around for quite a while," Mr Ridge said.

"The oil and gas sector and the aviation industry have probably run further with them."

Mr Ridge said it also recognises a fundamental truth for the overwhelming majority of incidents in the resources industry.

"People don't deliberately try to put their safety at risk," he said.

"We have to ask ourselves the question – what leads people to make the decisions they make."

To increase the focus on these factors, the Department has developed the "top 11" human and organisational factors for the Western Australian resources sector.

Influenced by the UK Health Safety Executive's work on human factors, the Department conducted further research and held workshops with industry.

So what exactly are human and organisational factors?

Mines Safety Director Andrew Chaplyn sums them up as the factors that affect or influence on the reliability of people and systems.

"They are the key parts of the health and safety management system that can impact on a safe work environment," Mr Chaplyn said.

"It can be things like fatigue, training, competency, fit-for-purpose equipment and equipment design.

"But it also includes systems for when things do go wrong – like sound emergency response."

The Department has been raising awareness regarding human and organisational factors for a number of years. However, the focus has increased significantly in the past 18 months.

In May, the Department hosted two Human and Organisational Factor Forums – one in Perth, targeting the mining industry, and another in Karratha, targeting the petroleum industry.

The Perth event attracted more than 200 people, the largest number of attendees for a single-theme event hosted by Resources Safety.

"For one subject to attract well over 200 people was fantastic," Mr Chaplyn said.

The forums included presentations from the Department, industry experts and regulatory colleagues from the Eastern States.



TYC

From left: Director Mine Safety Performance NSW Department of Industry's Resources and Energy Tony Linnane, Practice Leader Health and Human Factors NSW Department of Industry's Resources and Energy Kylie Newton, Executive Director Resources Safety Simon Ridge, HSEE Manager Fortescue Metals Group Jodi Goodall, State Mining Engineer Andrew Chaplyn, Founder and Registered Psychologist The Kiel Centre Ronny Lardner and Manager Human Factors Woodside Energy Martin Anderson at the 2017 Human and Organisational Factors Forum

One such colleague was Tony Linnane, Director Mine Safety Performance, from the New South Wales resources regulator.

"We were invited to talk about our perspectives on human and organisational factors, and what we have been doing as a regulator to address that issue in New South Wales," Mr Linnane said.

"This included how these factors impact on risk control measures that people put into place to manage work health and safety.

"We've done a lot of work with the Western Australian Department over a long period of time and I think it is a really good illustration of two government departments working together to get better outcomes for both of us."

Mr Linnane said it was also an opportunity to provide insights to both regulators about the challenges of addressing human and organisational factors.

"These factors are critical because they look at the ways organisations structure their business and design their work, but also the way that we as humans behave," Mr Linnane said.

"That can have a really big bearing on whether or not risk control measures will prevent adverse work health and safety outcomes or not.

"It's another piece in the puzzle."

Mr Linnane said the popularity of the forum was indicative of the importance being placed on understanding human and organisational factors.

"Mine operators are trying to work out what is the next step in terms of driving health and safety performance to better levels," he said.

"It is about thinking smarter about how they manage risk. Knowing and understanding the effect that human and organisational factors have is really critical to that."

According to Mr Chaplyn, continuing to collaborate through events such as forums will be important to increasing our understanding of how to address human and organisational factors.

"It is a great way to share ideas and help each other raise awareness in this area," he said.

"It's not something that you can just flick a switch and it changes tomorrow – but it can be integrated gradually into the system."

Go to www.dmirns.wa.gov.au/ResourcesSafety to find out more about safety regulation in Western Australia's resources industry.



STAY ALERT

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

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

EXPLOSIVES INCIDENT

Mines Safety Significant Incident Report No. 250 and Dangerous Goods Safety Significant Incident Report 01-17 describes an incident where a shotfirer discarded a long-period delay detonator a few seconds before it fired and initiated the attached detonator cord.

The importance of safe systems of work to manage the risks of using explosives was highlighted as well as using fit-for-purpose products, the importance of clear blast design and documentation, and incident reporting.

WORKER SERIOUSLY INJURED IN BLOCK-MAKING MACHINE

Mines Safety Significant Incident Report No. 251 covers how a worker setting up a limestone block-making machine was caught between its moving parts while attempting to remove a rock.

The importance of maintaining safe systems of work (e.g. suitable isolation procedures, systems of control) and adequate training and supervision are discussed.

RELEASE OF STORED ENERGY SERIOUSLY INJURES WORKER

During the manual lifting of a cone crusher bowl, a fitter was struck in the sternum by a packing plate dislodged under pressure.

Mines Safety Significant Incident Report No. 252 discusses robust maintenance systems, hazard reporting and appropriate response to reduce the potential for inaction and tolerance of sub-standard conditions.

DELAY IN DISCOVERY AND TREATMENT OF INJURED WORKER

The risk posed to workers who travel within and between mining operations is highlighted in *Mines Safety Significant Incident Report No. 253*. Following an incident, a service worker was injured and unable to raise an emergency call. His absence went unnoticed for two-and-a-half hours. There was also a subsequent delay in treatment.

The need to establish and review travel procedures is discussed as well as secondary communication devices, and review of emergency responder needs (equipment and site familiarity).

SUICIDE AWARENESS

The factors surrounding suicide are complex and varied. They may arise from events happening in an individual's home life, work life, or a combination of the two.

Mines Safety Bulletin No. 139 and Petroleum Safety Bulletin 01/2017 was issued to raise awareness in the resources sector of workplace hazards that may impact on mental health and what measures can be taken to, as far as is practicable, manage the potential for psychosocial harm.



WIND ACTION ON BUILDINGS AND PLANT

During severe storms and wind events buildings, temporary structures and plant can be exposed to loading that may not have been considered in design, construction or operation. This can lead to damage or possible collapse.

Mines Safety Bulletin No. 140 provides advice following several incidents where buildings and temporary structures have collapsed. Responsible persons are reminded of their duty-of-care obligations and duties, under legislation, relating to construction. This includes determining site wind speeds, meeting design specifications and conducting building inspections.

Wind action has also resulted in several fixed crane runaway incidents causing damage and derailment. *Mines Safety Bulletin No. 145* has recommendations about design and the communication of design specifications, construction and commissioning, and safe systems of work.

REFUGE CHAMBER MAINTENANCE

Refuge chambers provide a safe haven to support life, with a supply of breathable air that must be ready for use at all times. A poor understanding of a unit's critical life support system components can affect the chamber's performance and operational time.

To assist in maintaining a refuge chamber so it can support life in an emergency situation, *Mines Safety Bulletin No. 141* recommends a number of actions in regards to refuge chamber functionality, modifications, maintenance and inspection.

VEHICLE SUPPORT STANDS

Mines Safety Bulletin No. 142 was issued following inspections where defective ratchet vehicle-support stands were found. Damage may result in the sudden failure of the stand to support a load and could lead to serious or fatal injuries.

Actions are recommended regarding support stand use, inspection and maintenance, and training and instruction.

USE OF EXCAVATOR BUCKET AS A LIFTING POINT

The use of unrated lifting points on an excavator has the potential to expose workers to harm through the sudden failure of a bucket tooth or sling, loss of control of the load, and potential instability of the excavator.

Principal and other employers are reminded in *Mines Safety Bulletin No. 143* of the requirements for plant to be maintained and operated in a safe manner. Recommendations include confirming the excavator is safe for use in accordance with relevant standards or engineering principals, and using a ground-engaging tool assembly only if a competent person has assessed and rated it as a lifting point.

GAS STORAGE FOR FIRE-SUPPRESSION SYSTEMS

The gas released when automatic fire-suppression systems are activated is an asphyxiation hazard. Several incidents involving the unintended activation of such systems have raised concerns that the potential for gas release may not have been adequately considered.

Taking measures to detect an oxygen-deficient atmosphere, providing adequate natural or mechanical ventilation, worker training and safety signage are some of the actions mentioned in *Dangerous Goods Safety Bulletin No. 0117* and *Mines Safety Bulletin No. 144*.



HELPING MINERS LEARN SAFETY LESSONS FROM THE PAST

The Department has developed a register containing the findings from investigations into fatal mining accidents in Western Australia.

Mines Safety Director Andrew Chaplyn said the *Hazard register for Western Australian mining fatalities* grew from an Investigation Branch analysis of 64 mining fatalities between January 2000 and December 2015.

“The information we had included important details regarding the key hazards that contributed to those fatalities occurring, such as occupations, work tasks, locations, and equipment or infrastructure involved,” Mr Chaplyn said.

“It also detailed the root cause of the incident and any precautions or preventative measures that could have averted the incident.”

This included the findings from coronial inquests.

Mr Chaplyn said the data should be used by employers and workers to assist in the development of safe work practices on mining operations.

“It is very important people understand some of the key hazards they are dealing with have resulted in fatalities,” he said.

“The register is clear and allows people to go through and look at their operations and the hazards they are managing.

“It really should crystallise their thinking about these hazards and the controls that should be in place to ensure they don’t result in fatalities or injuries.”

Mr Chaplyn said that while the register was not intended to be the sole source of information for developing site-specific hazard registers, it was a useful tool to check current risk registers and hazards.

“You may find something on our register that you haven’t thought of or considered as a part of your safety systems,” he said.

“It is a recent representation of what has happened here in Western Australia and it applicable to our sites.”

Mr Chaplyn said there would be further developments in the analysis and use of the Department’s safety information.

“We are looking at different ways of analysing our injury data particularly from the inspectorate side, and how we can use information from the different operations we work with to better understand the hazards we are dealing with,” he said.

“Not only does this help train inspectors, it also helps to build a common understanding of what areas we need to work on.”

To view the hazard register and other information, go to the accident and incident data page via www.dmirs.wa.gov.au/ResourcesSafety

GOING GLOBAL – HAZARD REGISTER TOOL TRANSLATED TO TURKISH

It is not just Western Australia that sees the value in the hazard register.

Earlier this year, the register was also translated into Turkish by an international mining company.

Mr Chaplyn said it was important to take the good work being done in Western Australia and use it in other mining jurisdictions.

“Mining hazards are not that different around the world,” he said. “It is fantastic to see that others are benefiting from this as well and hopefully it can result in safer mining around the world.”



INTRODUCING THE SAFETY SNAPSHOT SERIES

The Department has launched the first instalment of its new monthly and quarterly safety snapshots.

The quarterly performance snapshots focus on injury and incident data provided to the Department by the minerals sector for a three-month period.

The monthly safety and health snapshots address key topics in the minerals sector that have been identified by the Department as potential areas of concern.

Mines Safety Director Andrew Chaplyn said the information can assist industry in making more data-driven decisions.

"Increasing the use of data to drive decision-making is an important focus for the Department," Mr Chaplyn said.

"We collect so much information, it is important we use that data to improve our and industry's understanding."

Mr Chaplyn said the use of data also enabled the Department to identify emerging safety trends and focus regulatory effort.

The first monthly safety snapshot focusses on blasting practices and the quarterly snapshot covers the January-March 2017 quarter.

The snapshots can be accessed and downloaded from the Department's website. They can be used by employers and workers to assist in the development and promotion of safe work practices on mining operations.

The better use of data in driving decisions is a core element of the Department's *Towards 2020* regulatory strategy.

NANO DIESEL PARTICULATE MATTER RESEARCH UNDERWAY

A world-leading research study into nano diesel particulate matter (nDPM) in underground mines is about to commence.

WHAT IS NANO DIESEL PARTICULATE MATTER AND WHAT ARE THE RISKS?

Diesel engines produce exhaust particles, which, when breathed in, increase the risk of developing long-term health problems, including lung cancer and possibly bladder cancer.

The Cancer Council noted that in Australia, diesel engine exhaust is the second most common cancer-causing agent (carcinogen) workers are exposed to behind ultraviolet radiation exposure.

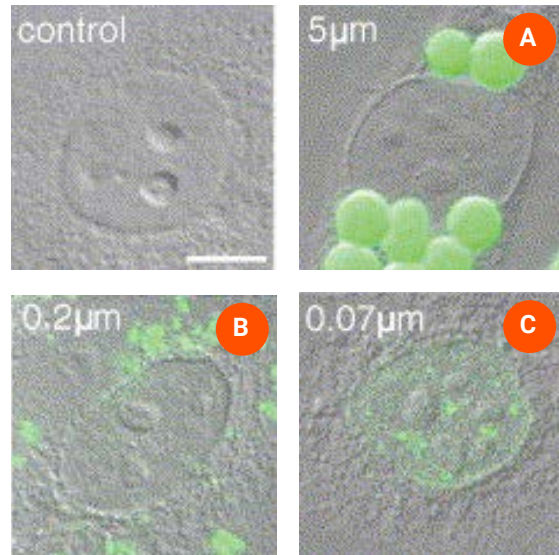
State Mining Engineer Andrew Chaplyn said diesel particulate matter is a known hazard for mining operations, especially in underground mines, where there is widespread use of diesel vehicles and equipment.

"Underground miners can be exposed to higher concentrations of diesel exhaust than most other workplaces," he said.

Simon Ridge, Executive Director Resources Safety and Chair of the Mining Industry Advisory Committee (MIAC) said newer technology diesel engines produce high quantities of smaller-sized diesel particles of less than 100 nanometres, known as nano diesel particulate matter, or nDPM.

"nDPM is difficult to capture with diesel particulate filters, as it is like a gas and travels further in the mine," Mr Ridge said.

When inhaled, nDPM can pass through lung walls into the bloodstream and enter cells. Importantly, nDPM absorbs and transports more toxic and carcinogenic substances. Research shows that occupational exposure affects human DNA and the resulting genetic effects may be passed on to the children of exposed workers.



Images illustrating the effects of nano particles on human cells.

- A. Particles sized at 5,000 nanometres (5 micrometres) remain outside the cell
- B. A few particles at 200 nanometres (0.2 micrometres) have entered the cell
- C. Particles at 70 nanometres (0.07 micrometres) which is at nDPM size, enter and damage the cell

From Chen, M., and A. von Mikecz. 2005. Formation of nucleoplasmic protein aggregates impairs nuclear function in response to SiO₂ nanoparticles. *Experimental Cell Research*. 2005 Apr 15;305(1):51-62. Epub 2005 Jan 24.

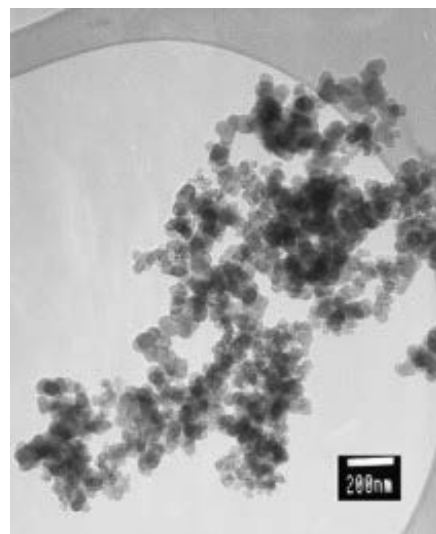


Image of nano diesel particulate matter (note scale bar)

WHAT IS BEING DONE?

In 2015, the Department evaluated diesel emissions in Western Australian underground mines. This demonstrated that mine operators need to develop diesel emission management plans, based on the Department's guideline – *Management of diesel emissions in Western Australian mining operations*.

In 2016, MIAC established a nano diesel particulate matter working group, comprising experts from government, universities and industry, to investigate nDPM.

The working group reviewed worldwide research on the topic and found that the characteristics, behaviour and health impacts of nDPM in underground mines is unknown.

Two parallel research projects will be undertaken.

BEHAVIOUR AND PROPERTIES OF NDPM IN AN UNDERGROUND MINE

This project will study the physical and chemical properties of nDPM, as well as its behaviour in an underground mine environment, where there are different air temperatures, pressures and airflows compared to the surface.

This requires:

- workers to wear specialised sensitive measuring equipment during their shift to determine real-time personal exposure, the mass, number and surface area of nanoparticles
- use of a non-toxic 'tracer gas' and measuring equipment to assess where the nDPM travels in the mine and how it is affected by mine ventilation and different work tasks
- detailed assessment of the mine environment and ventilation through measurement and computer modelling
- use of special pressurised equipment to study behaviour of nDPM in deeper mines, where there is higher air pressure.

The Department, together with a research grant from the Minerals Research Institute of Western Australia (MRIWA), is funding this study.



Some of the measuring equipment that will be used in the research.

HEALTH IMPACTS OF NDPM

This project, funded by the Department, is a medical research study that will run concurrently with the mining operation project. The medical research will involve 100 individual mine workers across a range of occupations and activities. Researchers will collect workers' demographic data, medical and occupational history information, and task activity details throughout the monitoring period. Participants will be fitted with diesel monitoring equipment during their shifts and undergo physical measurements including a variety of pre- and post-shift spirometry, blood and urine tests.

Using funding from the Department and MRIWA, with advice from MIAC's nDPM Working Group, the research team includes the ChemCentre, Curtin University, and the University of Western Australia.

Simon Ridge acknowledged the involvement of AngloGold Ashanti Australia's Sunrise Dam mine.

"Participation by an active underground gold mine was crucial for the project to proceed," Mr Ridge said.

"The mine's involvement will improve health and safety outcomes for the benefit of all underground workers – not just in Western Australia, but around the world."

Also collaborating are Queensland University of Technology, BBE Consulting and the Australian Institute of Occupational Hygienists (AIOH).

Mr Chaplyn said understanding the characteristics and health effects of nDPM was essential to ensuring appropriate control measures are applied for the continued use of diesel-powered equipment in underground mines.

COAL WORKERS' PNEUMOCONIOSIS RE-EMERGES IN THE EASTERN STATES

WHAT IS COAL WORKERS' PNEUMOCONIOSIS (CWP)?

CWP or 'black lung disease' is a potentially fatal disease caused by long-term exposure to coal dust which can evolve into progressive massive fibrosis (PMF). The disease may take up to 25 years to develop, and there is no known cure.

There is a higher risk of contracting CWP in underground coal mines, but international research and recent cases in Australia show that CWP can occur in surface coal mine workers.

CWP was thought to have been eradicated in Australia, but re-emerged in Queensland during 2015, with a significant number of workers being diagnosed.

As at 27 April 2017 there have been 21 confirmed cases of CWP reported in Queensland (since May 2015).

SILICOSIS

Silica is even more dangerous than coal dust. The International Agency for Research on Cancer (IARC), part of the World Health Organisation (WHO) of the United Nations, has classified silica as a Class 1

carcinogen, causing lung cancer, renal disease and autoimmune diseases like rheumatoid arthritis.

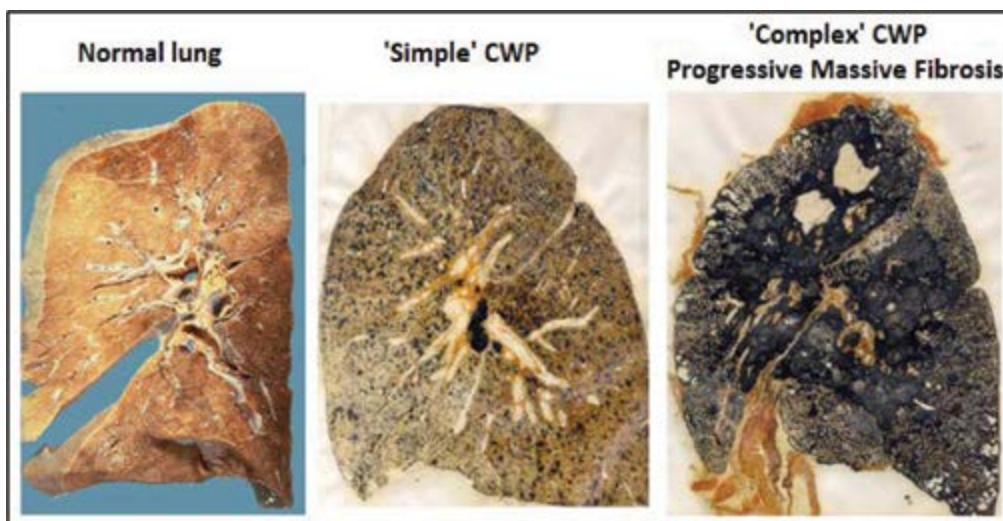
Silica is the most common element found in the earth's crust, and is a major component of beach sand and granite. Combined with other substances, silica does not cause silicosis – it is the fine airborne particles of crystalline silica, as found in quartz, tridymite and cristobalite, that cause silicosis.

Workers in quarries, mines, brickwork, construction, tunnelling, agriculture, and anyone who is disturbing the earth, drilling through rock, or is exposed to brick and concrete dust, is at risk for silica exposure.

MIXED DUST PNEUMOCONIOSIS

Mixed coal dust (coal dust mixed with other types of dust, such as silica), can cause mixed dust pneumoconiosis (MDP). Mixed dust is more toxic than coal dust alone as rapid progression of MDP and progressive massive fibrosis are more likely.

On 3 February 2017, an open cut mine worker in NSW was diagnosed with complicated mixed dust pneumoconiosis, the first case reported in NSW since the 1970s.



Source: Queensland CWP Select Committee image collection

OTHER AIRBORNE CONTAMINANTS

Besides coal dust and silica, other types of airborne contaminants can also be harmful to humans, including asbestos, welding fumes, vanadium, chromium, and carcinogenic contaminants relating to nickel.

Prolonged inhalation of asbestos fibres can cause serious and fatal illnesses including lung cancer, mesothelioma and asbestosis (a type of pneumoconiosis). Welding fumes have recently been reclassified by IARC from a Group 2B (possibly carcinogenic to humans) to Group 1 (sufficient evidence of carcinogenicity in humans). The reclassification indicates that welding fumes are believed to be more dangerous to humans than previously thought.

WESTERN AUSTRALIA

The last known case of CWP in Western Australia occurred in 1974. While underground coal mining in the State ceased in the 1990s, workers may be exposed to coal dust at surface coal mines. WorkCover WA research on CWP found no occurrences.

Executive Director Resources Safety, Simon Ridge, said the Department's stance is workers should not be exposed to hazardous atmospheres.

"In view of the recent developments in Queensland and New South Wales, Resources Safety is proactively reviewing its health surveillance, and will work with

stakeholders to develop appropriate strategies for Western Australia", Mr Ridge said.

Director Mines Safety and State Mining Engineer, Andrew Chaplyn, said the Department uses a proactive, risk-based approach, where control measures are implemented to prevent harm to mine workers' health.

"Mine operators are encouraged to develop a risk-based hygiene management plan," Mr Chaplyn said.

"This gives an overview of the mine-specific occupational health and hygiene hazards, monitoring programs and control measures."

Mining operations conduct sampling to reduce the risk of workers being exposed to atmospheric contaminants exceeding recognised international standards. Contaminant sampling is undertaken on site by an authorised ventilation officer or technician. One of the parameters measured is "respirable dust", which is the finest particles able to reach the lowest part of the respiratory system.

If a mine site has an exceedance for any of the measured parameters, it is required to investigate and report to the Department using the health and hygiene sampling module within the Safety Regulation System (SRS), which replaced the previous CONTAM system.

The Department follows up reported exceedances to ensure work practices are adjusted to prevent further worker exposure.

QUEENSLAND INQUIRY INTO CWP

In September 2016, a Queensland Parliament Select Committee commenced an inquiry into the re-emergence of CWP. The committee was asked to consider:

- whether legislative and other regulatory arrangements to eliminate and prevent CWP were adequate and effectively maintained
- the roles of government agencies, mine operators, medical practitioners etc.
- relevant reports and studies
- the efficacy and efficiency of processes for coal mine dust measurement and mitigation
- other respiratory diseases associated with underground mining.

The Committee's final report *Black lung, white lies: Inquiry into the re-identification of Coal Workers' Pneumoconiosis in Queensland* was released on 29 May 2017, and contained 68 recommendations in relation to the administrative and legislative framework for protecting the health and welfare of coal workers in Queensland. The Committee's terms of reference have been extended, with another report due on 29 September 2017.





TYC

WHAT IS A CONFINED SPACE?

The Department is reminding mine operators and workers of the dangers of working in confined spaces.

The safety reminder was prompted by an incident on a New South Wales farm earlier this year that killed three family members. It is believed one man initially collapsed due to a build-up of carbon monoxide inside a water tank. The two subsequent victims were attempting a rescue when they too succumbed to the atmosphere inside the tank.

Regional Inspector of Mines Martin Ralph said it was important mine operators and workers understood the hazards associated with working in confined spaces.

"While the New South Wales tragedy occurred on a farm, there are similar tasks and environments on mining operations," Mr Ralph said.

"Hydroblasting and tank cleaning, as well as activities such as welding, cutting or using solvent-based cleaning agents can occur in confined spaces on mine sites.

"Without the proper safety precautions, this can lead to potentially atmospheric conditions."

Petrol or diesel powered tools such as high-pressure water cleaners, pumps, compressors and generators produce poisonous carbon monoxide gas.

"Carbon monoxide can rapidly accumulate, even in areas that appear to be well-ventilated, and build up to dangerous or fatal concentrations within minutes," Mr Ralph said.

"That is why it is important the risks associated with working in a confined space are identified and addressed before work starts.

"Only trained and competent personnel are allowed to conduct and monitor work in a confined space."

Operators should consider taking measures to detect oxygen-deficient atmospheres in these areas, and alarms should be in place to alert workers when oxygen levels are below 19.5 per cent.

The Department has further guidance and information about working in confined spaces on its website. Visit www.dmirs.wa.gov.au/ResourcesSafety



TRANSPORTING DANGEROUS GOODS IN REMOTE AREAS

Incidents involving relatively small quantities of dangerous goods such as LP gas, petrol, chlorine, can and do happen. This is why the Department developed the pamphlet *Transporting petrol, LP gas or pool chemicals to your community?* The pamphlet provides safety information to residents of remote indigenous communities for whom travelling large distances with these dangerous goods is a common occurrence.

The pamphlet highlights the importance of using suitable and stable containers or packages when transporting dangerous goods, and ensuring these containers remain upright in the vehicle.

Dangerous Goods Officer Alex Blackman said it was also important to allow air flow through the vehicle, so fumes cannot build up if a container does have a leak.

"A lot of people are not aware that both LP gas and petrol fumes can combine with air to form an explosive mixture," Mr Blackman said.

"Preventing damage to containers and allowing any potential leaks to escape the vehicle are vital. If there is a build-up of gas or fumes, something as simple as lighting a cigarette can cause ignition and an explosion, as was seen outside an Aboriginal community in late-2010."

It is also not well known that commonly used pool and water treatment chemicals, such as chlorine, can be extremely dangerous.

Mr Blackman said different chemicals should be kept apart, and all containers or packages checked to ensure they are in good condition.

"Arriving back in their community, people should also know that it is important to remove dangerous goods from the vehicle as soon as possible," Mr Blackman said.

"Potentially even the smallest of leaks can build-up vapours if left for a long enough period of time. It is important not to park near ignition sources."

As well as dangerous goods officers, the Department's liaison officers have also helped distribute dangerous goods safety information across the State.

Liaison officers regularly visit remote communities and have been distributing the pamphlet on their travels. Kimberley liaison officer Brian Lloyd said the pamphlet provided integral information to communities and allowed him to further discuss issues with them.

"Meeting with remote community members allows for a two-way exchange of information, and providing them with knowledge such as this often draws out other information that may prove useful for the education of both the communities and the Department," Mr Lloyd said.

"People in remote communities really value such visits and receiving information such as this can ensure safe standards are equally applied throughout the remote regions."



BEYOND THE GATE – CHAIN OF RESPONSIBILITY

All dangerous goods sites including major hazard facilities and mine sites have a legal responsibility to ensure that dangerous goods are transported safely from their facilities.

The Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007 detail the requirements for people and businesses involved in transporting dangerous goods.

In April 2015, changes to the *Road Traffic (Vehicles) Act 2012* and the *Road Traffic (Administration) Act 2008* introduced greater responsibilities to anyone within the transport 'chain'. These changes mean that if a vehicle is involved in a breach of the regulations (e.g. mass, dimension or loading requirement), a person who is connected with that vehicle may be held legally accountable, if by action, inaction or demand, they caused or contributed to the breach.

WHAT DOES IT MEAN IN AN OPERATIONAL SENSE?

Everyone within the transport chain is accountable for safeguarding against the risks of someone doing the wrong thing. The consignor must ensure that safety standards are met for vehicles and their equipment being transported from their site. This can be verified by checking that road tankers are approved to Australian Standard AS 2809 *Road tank vehicles for dangerous goods* and are currently dangerous goods licensed.

A consignor is:

- a person who has possession of the dangerous goods prior to them being transported; or
- a company or person who engages a transport company to transport goods; or
- as per Regulation 40 of the Dangerous Goods Safety (Road and Rail Transport Non-explosives) Regulations 2007.





WHAT ARE MY RESPONSIBILITIES?

If you are a site manager or site operator, you are responsible for ensuring:

- staff in control of the dangerous goods understand the risks and safe management
- packaging is labelled in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code)*
- the ullage of road tankers and portable tanks filled on site is compliant with the ADG Code
- vehicles are placarded in accordance with the ADG Code
- transport documents contain correct information
- vehicle maintenance and safety standards are adhered to
- segregation of incompatible dangerous goods is maintained
- load restraint is adequate (in accordance with the *Load Restraint Guide*)
- the vehicle complies with its mass and dimension requirements
- dangerous goods drivers and vehicles are appropriately licensed
- staff are trained in how to respond in the event of an emergency.

NEW APP TO HELP 'DECODE' DANGEROUS GOODS TRANSPORT

A new app for mobile phones and tablets is being developed for dangerous goods drivers and others in the transport industry.

Lawry Lim, app developer and Principal Dangerous Goods Officer said the app will allow users to see the requirements for transporting different types of dangerous goods on various vehicle types and combinations.

"With a simple swipe of the screen, a driver can access tailored information on their load, including placarding, load restraint, separation and segregation requirements, emergency information and travel route restrictions", Mr Lim said.

"The aim is to 'decode' what can seem like a complex set of rules around dangerous goods transport and provide it in a straightforward, easily accessible and simplified manner.

"The app, which also works offline, can be used in a transport depot here in Perth or in remote areas of the State outside of phone coverage to assist drivers and ultimately keep them and the public safe."

The app prototype, first shown at the Perth Truck and Trailer Show in July 2015, went on to win the Department's Innovate Award and is in the final stages of user acceptance testing.

Sign up to our weekly news alerts to find out when the free app will be available for download from the Department's website www.dmp.wa.gov.au/subscribe



WHAT DO VEHICLES AND HUMANS HAVE IN COMMON?

Both suffer from poor performance when not maintained.

Despite vehicle maintenance and driver fatigue being two areas that companies can readily address, we continue to see corners cut when it comes to both fatigue management and the maintenance of vehicles. Taking shortcuts is a significant contributor to serious accidents and fatalities and these areas should not be neglected. Looking after employees and vehicles needs to be a priority as both are crucial not only for a safe business but also for a productive one.

Lack of maintenance may result in a minor issue like a windscreen wiper not working, but it could just as easily result in a brake failure and the inability to stop a vehicle. Transport companies are expected to have a maintenance program in place to ensure vehicles are roadworthy. It is recommended that there is also a pre-start procedure that is conducted daily prior to be use to allow drivers to raise any roadworthiness issues before the vehicle leaves the depot.

As dangerous goods officers, we are out on the road regularly inspecting vehicles transporting dangerous goods in Western Australia. One of the items we will be checking is roadworthiness. The *Australian Code for the Transport of Dangerous by Road and Rail* (ADG Code) states "A vehicle used to transport dangerous goods must be free of any defect that is likely to create a risk in transporting the goods."

Just like our vehicles, human beings also need maintenance. Our maintenance comes from eating well, exercising, socialising and getting quality sleep.

We all require sleep to be able to effectively and safely perform our daily tasks. A study published in October 2000 (Williamson and Feyer, 2000) demonstrated that 17 – 19 hours without sleep has a similar effect on the human body to having a blood alcohol concentration (BAC) of 0.05 per cent. Performance effects were studied over a period of 28 hours of sleep

deprivation and after measured doses of alcohol up to about 0.1 per cent BAC. The findings reinforce that sleep deprivation produces impairments in cognitive and motor performance that are likely to contribute to a reduction in safety on the road. If you have ongoing problems sleeping, you should consult a doctor as there may be underlying conditions that can be treated, allowing you to get regular, quality sleep.

Companies are encouraged to take a proactive approach and develop internal policies that have a more conservative limit to the number of hours drivers can work in one day. Not only does this work towards helping manage fatigue, it allows a healthier work-life balance which promotes a greater level of happiness and improved morale within the organisation. More information on the management of fatigue can be found on the Department's website.

As a final note, regulatory agencies are often seen as the enemy and a hindrance to getting the job done. However, it is worth remembering that the officer that has stopped you to conduct a routine inspection is doing so because they want you to return home safe at the end of the day. Sleep well and drive safe.

RESOURCES

- Williamson, A., and A. Feyer. Moderate Sleep Deprivation Produces Impairments in Cognitive and Motor Performance Equivalent to Legally Prescribed Levels of Alcohol Intoxication. *Occupational and Environmental Medicine* 57.10 (2000): 649–655. PMC. Web. 26 Apr. 2017.
- Department of Mines, Industry Regulation and Safety
 - Fatigue, www.commerce.wa.gov.au/worksafe/fatigue-0
 - Guidance about preventing and managing fatigue, www.dmp.wa.gov.au/Safety/Guidance-about-preventing-and-7034.aspx

HAZARDOUS AREAS MANAGEMENT

The Institute of Instrumentation, Control and Automation (IICA) extended an invitation to the Department to present on hazardous areas management at a recent event.

A hazardous area as defined in Australian and New Zealand Standard AS/NZS 60079 is an “...area in which an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of electrical apparatus”.

For the petrochemical, hazardous chemical and mining environments, this is an issue that needs to be considered and managed carefully. Hazardous areas (HA) usually exist in these operations and are generally always present around petrochemical storage tanks.

To minimise the risks associated with explosive atmospheres, there is the need to minimise the risk of ignition sources. All equipment in a hazardous area must be designed, installed and maintained correctly.

The hazardous areas inspection and maintenance regime is integral to hazardous area management and must be undertaken by competent persons.

Prior to commissioning: A detailed inspection should be completed, and all non-compliances recorded and rectified.

During operation: Regular periodic inspections should be conducted, all non-compliances recorded and rectified, and maintenance completed, as required. Continuous supervision by skilled personnel is an alternative to regular periodic inspections. This requires that visual and close inspections are carried out as part of the normal work schedule.

Change management: Any changes, or replacement that is not like-for-like, should have a detailed management of change process completed.

RISK MANAGEMENT

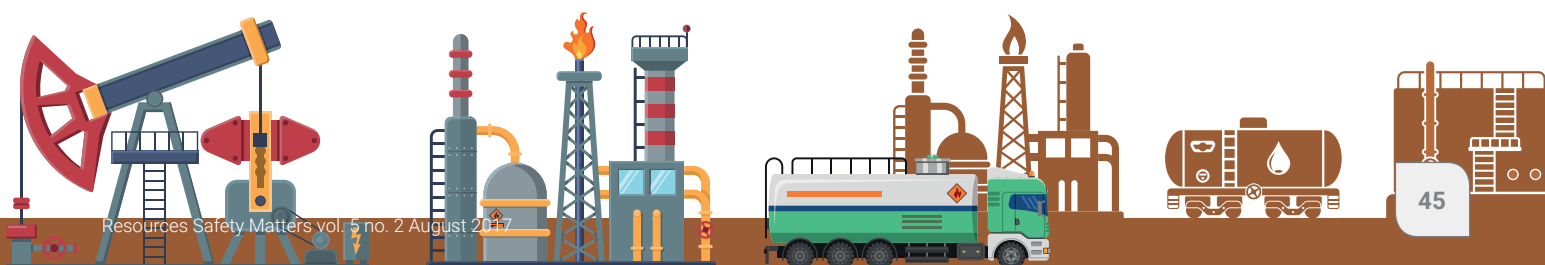
A robust and documented management system should be maintained for the HA. This demonstrates how your risks are being managed and should include:

- HA policies – describing key system objectives
- HA manual or dossier – specifying the approach and responsibility to managing the HA
- HA management procedures – to clarify methodology
- RACI matrix (or similar) – to specify responsibility, accountability, and who has been consulted and informed in HA management
- inspection and maintenance regime – describing HA processes and how tasks should be completed
- forms, data and records as evidence of conformance, including:
 - training and competency records to demonstrate the current and ongoing competency of the personnel performing hazardous areas inspections and maintenance
 - HA equipment records, including design and installation criteria, and maintenance criteria, schedules and records (e.g. management of change, fitness-for-purpose assessment, audit process).

WHAT DOES THE DEPARTMENT LOOK FOR?

From a Departmental perspective, the management of HAs is assessed through:

- **Safety case, safety report or safety management system (SMS)**
These are assessed to determine how the organisation manages any HA risks in within their operations.
- **Audits and inspections**
The commitments made in the safety case, safety report or SMS are verified. The overall HA management system and activities will be scrutinised.
- **Investigation**
If an issue or incident occurs, HA management will be examined as part of the investigation.



KEEPING ON THE STRAIGHT AND NARROW

Many mine sites use plant which is supported and guided by rails. These include bridge and gantry cranes, stackers, reclaimers, mobile conveyor sections and trippers.

While the rails appear to be secondary to the plant, they are in fact fundamental to its successful and safe operation. If the rail, or the clips that hold them, are not in an acceptable condition (e.g. alignment, support clips failed or any modifications not approved by competent persons) there is the potential for:

- impact from falling parts
- wheel snagging or derailment resulting in loss of:
 - machine control
 - footing or falling of workers
 - the load (e.g. a crane's suspended load)
- structural and mechanical component failure.

COMMON INDICATORS OF ISSUES WITH YOUR RAIL

"Before most, if not all, collapses there are pre-cursors elsewhere and if these are recognised, and lessons learned from them, then more serious events may be prevented."

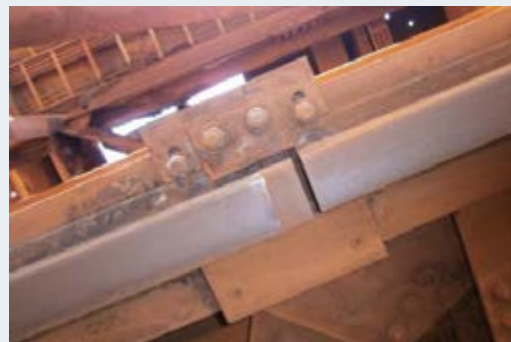
– Dr Soane, Institute of Structural Engineers.

The following is a visual guide to help identify that there may be an underlying issue with your rail.

Modification of parts



The slotted holes on the modified rail clips are facing inward (left side) and not fail safe. The rail is far off the supporting member centre (web) which can also result in additional forces, not accounted for in the original design.



The rail (plan view) has moved longitudinally and the modified clip is no longer restraining the rail flange.

The above contributed to the fall of a clip from height which could have resulted in injury. Refer to Mines Safety Significant Incident Report No. 184 Shiploader rail clamps fail after original parts modified in unsuccessful attempt to overcome problem of rail misalignment.

Damaged buffers

Damaged buffers can indicate misalignment problems. If the crane is misaligned it may cause large buffer impact forces.

Inadequate construction or maintenance

Missing or damaged base plates, rail plates and grout can lead to bent rails and in turn, additional loading and fatigue on the plant.

Impact damage

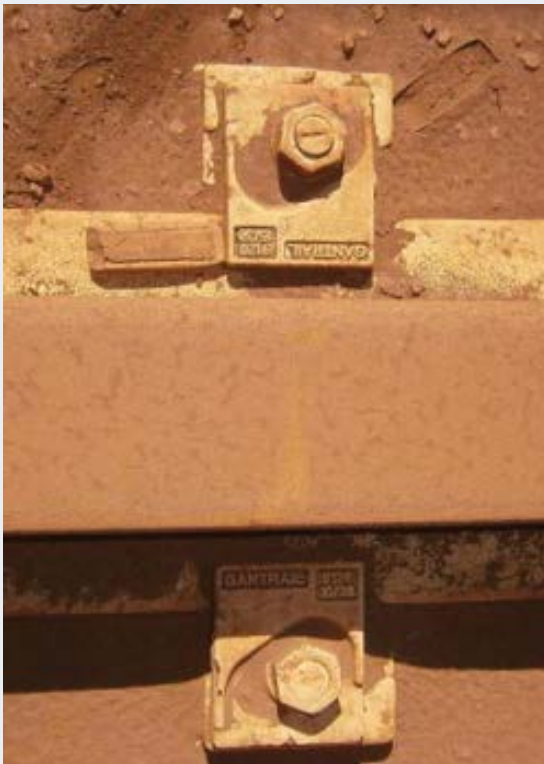
The bright area on the bolt head indicates a contact point with the crane as it travels over the clip.



The rail displaced laterally indicates movement more than allowed by the detail. This leads to wheel flange contact.

Impact damage and misshaped rails can indicate excessive wear of rails and wheels. Thermal and flexural movement allowances and design details can also result in damage and failure. In severe cases this can result in derailment.

Broken clip fasteners and missing rail clips



The nose piece under the uppermost clip has broken off. Without the nosing the rail clip is no longer vertically restraining the rail flange.



Rail clips broken off.

Breaking rail clips or parts of clips usually relate to misalignment problems. Without restraint of rail clips the rail can rotate and displace, leading to loss of plant control and possible derailment.

Worn wheels and rail



Crane wheel inner flange worn off.



Severe rail wear (thickness of a finger). The shards of material were from the rail and the crane wheel flange.

Wear can be the result of misalignment, inappropriate detailing and inadequate design.

Off-centre wheels



This illustrate the eccentricity between the centre of crane wheel and the centre of the rail. Crane wheels running far off the rail centre line can cause secondary stresses not allowed for in the runway girder design.

RESOURCES

The loads experienced by rail-mounted equipment are directly related to the rail alignment. Refer to Table 7.20.9 of AS 1418.1 *Cranes, hoists and winches – General requirements* which tabulate rail alignment limits.

Crane design, construction, testing, maintenance, modification or repair must comply with AS 1418 [rr. 6.33(b), 6.35 Mines Safety and Inspection Regulations 1995]. Other rail mounted equipment standards (e.g. AS 4324.1 *Mobile equipment for continuous handling of bulk materials – General requirements for the design of steel structures*) refer to AS 1418.1.



MAKING THE MOST OF YOUR BEST ASSET

Since October 2016, the Department, with input from industry, has been developing guidance to assist sites in growing and supporting a key resource – their safety and health representatives (SHRs).

When it comes to improving a site's safety performance, there is evidence that allowing and encouraging SHRs to perform their role is crucial in meeting that objective.

"They are the boots-on-the-ground in their work area, an important link between employer and employee," mines inspector John Ahlin said.

"Safety and health representatives can assist in identifying gaps or deficiencies in the site's safety and health management system and the controls required to make the workplace safer and healthier."

Along with other members of the South West Inspectorate, Mr Ahlin has been active in the development and testing of guidance material to improve SHR engagement and foster industry's understanding of its responsibilities towards this position.

The *Safety and health representatives audit* has been trialled at eight sites across the South West, at operation types ranging from processing facilities to

small and large mine sites. Following industry and inspector feedback, the audit has been reviewed and is undergoing final testing across the State.

"The audit will assist site management in achieving compliance with the legislation. Currently, there is variability in the understanding of the requirements, even at sites where there is effective safety and health representative involvement," Mr Ahlin said.

"Although legislative changes are proposed for mines safety with a new Work Health and Safety Act, the roles and functions of safety and health representatives will remain essentially the same, so the audit should have long-term applicability."

The audit will not only help operations assess their compliance with legislation, but should provide an insight into how well they are supporting their SHRs. The tool covers matters such as understanding your obligations, whether SHRs are empowered through the allocation of time and resources (e.g. training, involvement in investigations), and the effectiveness of SHRs' engagement and communication with management, safety professionals and their peers.

To be informed when the audit is released, sign up to our weekly news alerts at www.dmp.wa.gov.au/subscribe

RESOURCES FOR SHRS

There is a wealth of information available from the Department to assist companies and safety and health representatives. To access promotional material and guidance on the election process and the responsibilities of the SHR, visit www.dmp.wa.gov.au/mineshreps

MENTORING SHRS

A training program by Newmont Boddington Gold is unlocking the potential of its safety and health representatives (SHRs) and helping the site achieve its safety and health goals.

To evolve its safety culture and achieve safety and health goals, Newmont Boddington Gold leadership realised that relying solely on management and its health and safety teams would only get the operation part-way there. SHRs were seen as the important conduit to fully engage the site.

In order to support, grow, educate and empower the SHRs, a structured program was initiated in 2016 by Boddington Gold's Health, Safety and Loss Prevention (HSLP) department. Developed with the input of key site personnel and external providers, the program is designed to develop the resources, skills and knowledge required to fulfil the roles and responsibilities of a SHR. A module is run every month (for 11 months of the year) for all elected SHRs across the site. It utilises primarily internal resources such as the HSLP team, safety and health leaders, and key speakers, both internal and external.

Since the program's inception, awareness and recognition of the SHR role and responsibilities has significantly increased, as shown by the advice sought and a greater involvement of SHRs during inspections and investigations. Other significant initiatives have also been implemented as a result of improving the employees' voice, including:

- use of a tracked elevating device (TED) to assist with lifting heavy equipment componentry and reduce manual handling
- the adoption of sensor measuring technology, which removes workers from the line-of-fire when carrying out component diagnosis.

Ultimately, the program is doing what was expected. It is driving improvements in positive behaviour, establishing a greater level of safety awareness, helping to retain SHRs, and encouraging proactive workforce engagement.



A COLLABORATIVE APPROACH TO INVESTIGATIONS

As part of incident investigation training, Angela Parsons, Boddington Gold's SHR coordinator and safety advisor, approached the Department to provide a regulator's perspective on how investigations are conducted and what inspectors look for.

Mines inspectors John Ahlin and Peter O'Loughlin directly engaged with the next generation of safety leaders through a one-day hands-on workshop. The day involved a presentation on investigation techniques from the viewpoint of an inspector, followed by practical exercises.

As a group, the SHRs were asked to approach a mock accident scene from different angles:

- as first on the scene
- sent by the supervisor to take control of the scene on night shift
- as part of an investigation team.

In pairs, SHRs were then taken to an area of the mine and tasked to take responsibility for part of an investigation. They were asked to identify factual points against items that may be relevant in an investigation.

"We thought this would be a valuable experience," Mr Ahlin said.

"The workshop provided the opportunity for reps to gain further knowledge and experience, and build confidence in a real-world environment. It also gave the reps the opportunity to better understand their roles and objectives, as well as meet inspectors in an informal environment."

Feedback on the program and workshop has been positive from all involved, and the experience further assisted the Department in developing its SHR guidance material.



All photos Claire Johnson

SURFACE MINE EMERGENCY RESPONSE COMPETITION

Hosted by the Eastern Regional Council of the Chamber of Mineral and Energy of Western Australia (CME), the annual competition was held at Gold Fields, St Ives Operations near Kambalda.

Over the first weekend in May, seven teams competed in eight challenging events and an individual theory assessment. Each event was designed to test the teams' emergency response skills in simulated, yet realistic, emergency situations.

Representatives from the Department of Mines, Industry Regulation and Safety's Resources Safety Division were on hand to provide support for the competition. The Department sponsored the Team Skills event and provided adjudicators for the competition.

The home base advantage seemed to come into play with Gold Fields St Ives crowned the overall winner,

following up on its place as runner up at the 2016 Surface Mine Emergency Response Competition. KCGM was the runner up, with St Barbara Leonora Operations claiming third place. Wade Leeson from Gold Fields St Ives took out the award as overall Best Captain for a second year in a row.

In addition to the Best Team Award, Gold Fields St Ives won the Confined Space Rescue, Fire Fighting, Vehicle Extrication, Overall BA Skills, Team Safety, and Theory scenarios. Tessa Simpson from Gold Fields St Ives also won the Theory Individual award.

Team Skills took out the best scenario as voted by competing teams, and Confined Space Rescue was voted as the Chief Adjudicator's Award for Event Management.

CME Chief Executive Reg Howard-Smith said the competition provides an ideal training environment for teams to compare and test their skills.

COMPETING TEAMS

BHP Billiton Nickel West
 Evolution Mining
 Gold Fields Combined
 Gold Fields St Ives
 KCGM
 Northern Star Resources
 St Barbara Leonora Operations

HONOUR BOARD

1st best team	Gold Fields St Ives	Rope rescue	KCGM
2nd best team	KCGM	Fire fighting	Gold Fields St Ives
3rd best team	St Barbara Leonora Operations	Confined space rescue	Gold Fields St Ives
Best captain	Wade Leeson (Gold Fields St Ives)	First aid	KCGM
Best new team	KCGM	Team safety	Gold Fields St Ives
Best new captain	KCGM	Incident management scenario	Northern Star
Theory	Gold Fields St Ives	Overall BA skills	Gold Fields St Ives
Theory individual	Tessa Simpson (Gold Fields St Ives)	Overall first aid	KCGM
Team skills	Evolution Mining	Best scenario (voted by competing teams)	Team skills
Vehicle extrication	Gold Fields St Ives	Chief Adjudicators' award for event management	Confined space
HazChem	Northern Star		

NEW CHAPTER ON PROCESS SAFETY IN OHS BODY OF KNOWLEDGE

In April, the Safety Institute of Australia (SIA) launched two additional important chapters to its OHS Body of Knowledge (OHS BoK).

These chapters are a joint project between SIA, OHS Education Accreditation Board and IChemE Safety Centre. The new chapters on Process Hazards (Chemical) and Managing Process Safety are designed to assist those workers in process environments combine general OHS and process safety.

Senior onshore inspectors Laurentiu Zamfirescu and Sidney Abiodun participated in the peer review process and said the new chapters contribute to an integrated approach to managing safety and, most importantly, break down silos in thinking.

"The chapters provide a clear distinction between conventional OHS risks that result in relatively high frequency, low consequence events (i.e. slips, trips, and falls) and major process hazards that can give rise to lower frequency (rare) but potentially high consequence events," Mr Abiodun said.

"These are the events that can result in significant potential for loss of life and damage to the environment, and also threaten the very survival of a business."

Mr Zamfirescu said the knowledge OHS professionals can gain from the two new chapters on process safety will ensure improved understanding and communication between process safety professionals.

WHAT IS THE OHS BODY OF KNOWLEDGE?

The OHS Body of Knowledge for generalist OHS Professionals was developed in response to an identified need to describe the collective knowledge that should be shared by Australian generalist OHS professionals as a basis for understanding the causation and control of work-related fatality, injury, disease and ill-health. The OHS Body of Knowledge is freely available to individuals for their personal professional use at www.ohsbok.org.au

Organisations and training bodies are encouraged to obtain a license for use.

WHO ARE THE PROCESS SAFETY PROJECT MEMBERS?

Safety Institute of Australia (SIA),
www.sia.org.au

The Safety Institute of Australia Ltd is Australia's peak body for the health and safety profession. It conducts the OHS professional certification program for OHS professionals and practitioners and through the Australian OHS Education Accreditation Board accredited university-level OHS professional education.

IChemE, www.icheme.org

With a membership exceeding 44,000 members in over 120 countries, and offices in the Australia, New Zealand, Singapore, Malaysia and the UK, the Institute of Chemical Engineers (IChemE) aims to be the organisation of choice for chemical engineers. It promotes competence and a commitment to best practice, advances the discipline for the benefit of society and supports the professional development of its members.

IChemE Safety Centre (ISC),
www.ichemesafetycentre.org/

The ISC is a not-for-profit, multi-company, subscription-based, industry consortium, focused on improving process safety. The centre shares, analyses and applies safety-related thinking to advance process safety

MINES SAFETY

\$90,000 FINE FOR 2015 DEATH FROM HEAT STROKE AND EXHAUSTION (JUNE 2017)

Northern Star Resources was fined \$90,000 in the Karratha Magistrates Court for failing to provide a safe working environment and causing the death of an underground jumbo operator's offsider at Paulsen's Gold Mine in the Pilbara region.

On 15 November 2015, Adam Perttula was working underground in hot and humid conditions beside a jumbo drilling machine installing ground support, approximately 900 m from the surface.

Mr Perttula collapsed and was unable to be revived and died the next day. The cause of death was found to be heat stroke and exhaustion.

Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum) Mines Safety Director and State Mining Engineer Andrew Chaplyn said the Department's investigation found the ventilation system was not functioning properly in the area where Mr Perttula was working, due to friction, rips, holes and partial tying off of the duct.

Several witnesses told investigators that they considered the mine to be a 'hot and humid' mine.

Magistrate Young said that there was no dispute that extreme heat was a recognised hazard.

He said the company had policies to deal with the hazard and was aware of the seriousness of the possible consequences.

It was noted the exposure arose in the ordinary course of operations and across the entire workings of the mine.

He said that the ventilation was not reliable, consistent or adequate and that the duties on employers are binding and onerous, however, a deterrent penalty should operate as an incentive towards employers maintaining vigilance.

He noted the plea of guilty was at the earliest opportunity and the company displayed remorse, had an otherwise good safety record over a number of years and ordinarily has a responsible attitude to safety.

Mine safety regulations require that employers and managers at mines must ensure that employees do not suffer harm to their health from the adverse effects of excessive heat.

If conditions are hot and humid, employers must ensure that appropriate workplace environmental controls (including ventilation) and monitoring are implemented, and the manager of an underground mine must ensure that air flow installations in the mine are maintained in good order.

Although the mine had written procedures to deal with excessive temperatures, it failed to ensure that the procedures were followed.

FINE FOR 2015 MMU TRUCK INCIDENT (MAY 2017)

Westdrill Pty Ltd pleaded guilty to two charges of breaching the Mines Safety and Inspection Regulations 1995 and was fined \$5,000 for each charge in Perth Magistrates Court.

The charges followed an investigation by the Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum) into an incident at Mineral Resources' Iron Valley Mine in the Pilbara.

On 4 February 2015, a mobile manufacturing unit (MMU) truck was being driven down a ramp at the mine when the operator lost full control of the vehicle and was unable to slow the vehicle down by using the brakes.

The operator steered the MMU into a windrow to slow the vehicle down. No one was injured and no damage was caused.

The Department's investigation found the driver was a trainee MMU operator and had not been verified as competent to operate the MMU without supervision.

It also found that repairs were performed on the braking system of the MMU on 2 January 2015 by a worker who was not qualified to undertake those repairs.

Director Mines Safety Andrew Chaplyn said it was critical that employers ensure workers are qualified and competent to carry out the tasks they are required to perform.

"In this case no one was harmed, but the potential consequences could have been severe," Mr Chaplyn said.

"Ensuring you have a qualified and competent workforce is a critical component of having a safe mining operation."



DANGEROUS GOODS SAFETY

MINING COMPANY FINED FOR EXPLOSIVE STORAGE CHARGES FROM MAY 2015 (JUNE 2017)

Avoca Mining Pty Ltd was fined \$20,000 in Kalgoorlie Magistrates Court after pleading guilty to four charges related to the secure storage of explosives.

On 5 May 2015, WA Police uncovered the theft of 100 kg of explosives taken from the Higginsville gold operation near Norseman in the Goldfields. Two men and a woman were convicted in relation to the theft.

Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum) Chief Dangerous Goods Officer Ross Stidolph said the Department's investigation discovered a series of failures with regard to secure storage of explosives.

"While the company did make some efforts to comply with regulations, given the high risks to the community associated with explosives, any failures in the systems used to keep explosives secure should be considered as particularly serious," Mr Stidolph said.

"The Department's investigation found that inventory records did not accurately account for explosives moving in and out of the explosives storage facility.

"Companies with an explosives licence need to conduct regular stocktakes and ensure they adequately investigate any discrepancies with their inventory."

In handing down her decision, Magistrate Sandra De Maio said the security of explosives is dependent on the rigorous application of measures and actions that together serve to create a system of checks and balances that allow for the timely detection of an unexplained loss of explosives.

Despite records showing discrepancies between the recorded quantities of explosives and the actual quantities of explosives stored, discrepancies were not investigated by the company.

"Avoca did not ensure that all measures necessary for an effective security system were satisfactorily implemented and maintained," Mr Stidolph said.

"While the root cause of the theft of the explosives was the illegal conduct of a trusted employee, it is important to emphasise that industries engaged in the possession and use of explosives need to have appropriate controls and procedures in place to ensure explosives are secure from sabotage, theft, unexplained loss and unauthorised access.

"An explosives storage licensee is responsible for the security and safety of the explosives. These responsibilities cannot be delegated or transferred to subcontractors.

"Failure to have the appropriate controls and procedures in place can result not only in significant financial penalties, but also put the safety of the community at risk should those explosives end up in the wrong hands."

In handing down the penalty, the court took into account the company's early guilty plea, no previous convictions and cooperation with investigators.



CHEMICAL SUPPLY COMPANY FINED \$5,000 FOR FAILING TO REPORT 2015 ACID SPILL (MAY 2016)

A chemical supply company was fined \$5,000 for failing to report a dangerous goods incident which caused significant burns to one of its workers.

The incident occurred at AGent Sales & Services in Bassendean on 10 March 2015 when a quantity of sulphuric acid spilt into a bund, a specially-built spill containment structure.

A supervisor entered the bund before the spill had been neutralised and received significant burns to his lower right leg, requiring skin grafts and ongoing medical care.

Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum) Dangerous Goods and Petroleum Safety Director Ross Stidolph said the injury constituted a dangerous goods incident and was required to be reported to a Dangerous Goods Officer.

"Resources Safety was not notified by the company and only became aware of the incident after being contacted by WorkSafe and the injured supervisor's wife," Mr Stidolph said.

"Companies are required to report such incidents under the *Dangerous Goods Safety Act 2004*."

While investigating the incident the Department discovered that the company was unaware of its obligations regarding reportable incidents.

"Our investigations found that there had been other incidents which should also have been reported," Mr Stidolph said.

"The importance of reporting dangerous goods incidents cannot be underestimated and is an integral part of the overall safety system.

"Reporting enables a thorough investigation of the incident and is an opportunity to improve safety.

"The lessons we can learn from such incidents can be applied across dangerous goods sites, not just the site where the incident occurred. This helps to minimise the risk to people, property and the environment."

Mr Stidolph said AGent Sales & Services worked cooperatively with the Department.

"The company has proactively implemented significant changes to its systems and operations to improve overall safety at the site and ensure incidents are duly reported," he said.



WA CORONER RECOMMENDS REVIEW OF STANDARDS

"I recommend that the committees responsible for the relevant Australian Standards consider amendments to ensure that people working over or adjacent to water or liquid who may be at risk of falling into the water and drowning wear an approved personal flotation device (PFD) – including AS/NZS 1891.4:2009 (committee SF-015) and AS/NZS 4576:1995 (committee BD-36)".

SUMMARY OF INCIDENT

Shaun McBride was an Irish national who in 2011 was sponsored by Celtic Scaffolding to travel to Australia to work. At the time of his death Mr McBride was in the process of making a life for himself in Australia. He was 28 years of age.

On 4 June 2011, Mr McBride was working as a scaffolder at Rio Tinto Iron Ore's Dampier Operations at East Intercourse Island. He was working as part of a team to dismantle a cantilevered scaffold structure that had been erected underneath the iron ore loading jetty.

During the course of his work, part of the scaffold structure collapsed, causing Mr McBride to fall from the cantilevered platform attached to the hanging scaffold under the jetty, directly into the water below. Some of the scaffolding also fell into the water. Mr McBride fell approximately 4.8 metres before he entered the water that was between 15 and 18 metres deep at that time. He did not resurface and died shortly afterwards as a result of drowning.

At the time of his death Mr McBride was carrying out work on a mine site and his workplace was subject to the provisions of the *Mines Safety and Inspection Act 1994* (MSIA). There is no specific legislation or regulation that requires scaffolders to wear PFDs when working over water on a mine site under the MSIA.

INQUEST

The focus of the inquest was on the safety measures available to Mr McBride for the purpose of preventing a fall into water; the reasons for the partial collapse of the scaffold; whether the deceased utilised his fall arrest system; the practices within the scaffolding industry concerning the wearing of personal flotation devices when working over water and whether any recommendation concerning those industry practices can be made to improve safety for persons working over water.

Rosalinda Fogliani, the State Coroner, was satisfied that Mr McBride was last observed to be standing or sitting on the ledger that separated and fell. Also, at this point that Mr McBride intended to traverse the ledger and swing his hammer from below in an upward motion (towards the structure upon which he was standing or sitting) in order to strike the underside wedge connecting the transom to the standard. The apparent purpose was to remove the transom and pass it up to a colleague.

On the evidence it looked like he had intended to strike the underside wedge connecting the transom

“ IT IS MY HOPE THAT THIS INQUEST HAS HIGHLIGHTED RISKS TO PERSONS WORKING OVER WATER... AND THAT MY RECOMMENDATION SERVES TO AVOID DEATHS ARISING IN SIMILAR CIRCUMSTANCES... ”
 – STATE CORONER, MAY 2017

to the standard (left wedge). Unfortunately however, it appears that he struck the middle wedge of the brace, being the major load-bearing member of the structure. Once this brace wedge was dislodged Mr McBride's entire weight was placed on the ledger connected to the remaining scaffold. He was wearing a fall arrest harness but it had not been hooked on to the correct attachment point.

The Court heard evidence from an independent expert scaffolding consultant who was chair of committee BD/36 which is responsible for scaffolding standards, Standards Australia, who expressed his support for the consideration of an amendment to the Australian/New Zealand Guidelines for scaffolding (AS/NZS 4576:1995) to address the wearing of PFD's by scaffolders in order to mitigate the risks of a fall into water.

The Court heard from members of the Department and the State Mining Engineer, to support a recommendation to the effect that consideration be given by the relevant Australian Standards committees to the making of amendments regarding the wearing of an approved PFD while working over or adjacent to water, where there is a risk of falling and drowning. The State Coroner determined to make a recommendation to this effect to avoid deaths arising in similar circumstances.

FURTHER INFORMATION

The full State Coroner's Report is available from www.coronerscourt.wa.gov.au

MINES SAFETY SIGNIFICANT REPORT NO. 171

Fall from cantilevered scaffold platform – fatal accident

24 June 2011

Action required

Adopt the following safety precautions as a minimum when erecting, altering or dismantling scaffold over water:

- Develop a documented risk assessment signed by a competent person describing the safety precautions to be adopted before erecting, altering and dismantling scaffold. Applicable Australian Standards and manufacturer's specifications must be reviewed and relevant information included in the document.
- Ensure that people working over or adjacent to water or any other liquid wear an approved personal flotation devices at all times where there is the potential to fall into the water or liquid.
- Install a suitable fall injury prevention system and provide adequate training and supervision to ensure that the fall prevention systems are suitable and used correctly.

For more information see our safety alerts at www.dmp.wa.gov.au/safetyalerts



Subscribe to Resources Safety's email alert service to receive safety alerts as they are issued, and find out about new publications, coming events, and how to provide industry feedback on safety and health initiatives.

Visit www.dmp.wa.gov.au/subscribe and look for the "Resources Safety news alert" invitation.

SAFETY IN THE MINERALS EXPLORATION SECTOR

The Department monitors and regulates safety in the exploration industry. This includes the collection of injury and incident data. Analysis of the data in conjunction with workforce numbers can help identify trends in safety performance.

The injury and incident data for a five-year period, from January 2012 to December 2016, has been analysed to determine overall trends in safety performance of the minerals exploration sector and assess whether seasonal workforce numbers impact injury numbers.

A number of things were apparent from the analysis.

- A substantial proportion of injuries within the exploration sector were caused by over-exertion and strenuous movements.
- The majority of these injuries were serious, both lost time and restricted work injuries.
- The categories 'caught between a still and moving object' and 'stepping or jumping' made up a significant proportion of the injuries reported.
- There has been an overall decrease in injury frequency from 2012 to 2016.
- There is a noticeable increase in injury occurrence leading up to lunch time.
- Driller's assistants have the highest number of injuries, roughly three times that of field assistants (the second highest).
- A seasonal decrease in workforce numbers correlates with a decrease in the number of injuries.

WHAT DOES THE DATA TELL US?

Over-exertion and strenuous movement injuries make up 31 per cent of all injuries reported in the minerals exploration industry, with 40 of the 59 reported being serious (Figure 1). While these injuries are still happening, there has been considerable improvement from 2012 to 2016.

'Caught between a still and moving object' and 'stepping or jumping' are substantial contributors to injuries in the exploration industry resulting in 14 per cent and 13 per cent, respectively, of all injuries reported.

Although serious injuries are still occurring, the minerals exploration industry has seen a decrease in the frequency rate for all injuries from January 2012 to December 2016. However, there is an increase for 2016 in comparison to the previous two years (Figure 2).

Time of injury presented possible safety concerns with evidence of an increase in number of injuries between 11 am and 12 pm (Figure 3). This could indicate problems with fatigue management or lack of concentration before the lunch hour. The data does not include musculoskeletal injuries as these tend to have a gradual onset and, as a result, the time of injury is not discernible.

Driller's assistant was identified as the most frequently injured occupation, accounting for 48 per cent of the injuries reported (Figure 4). Field assistant was second with 15 per cent of all injuries.

A seasonal trend has previously been identified in the monthly workforce figures for the exploration sector. Numbers significantly drop in the summer months, with the minimum values recorded in January each year. The seasonal workforce trend raised concerns of stress, fatigue or job urgency leading up to the exploration off-season.

To determine if workforce numbers have any impact on the injuries reported, the data was broken down by week and month displaying cumulative totals for the full five years. The data shows a fluctuating distribution of injuries, except for the last week of December and first two weeks of January when there is a significant decrease in injuries for exploration (Figure 5).

The data does not suggest that the seasonal decline in workforce numbers contributes to the number of injuries, as there is no significant increase in injuries over the months of November and December, leading up to the off-season.

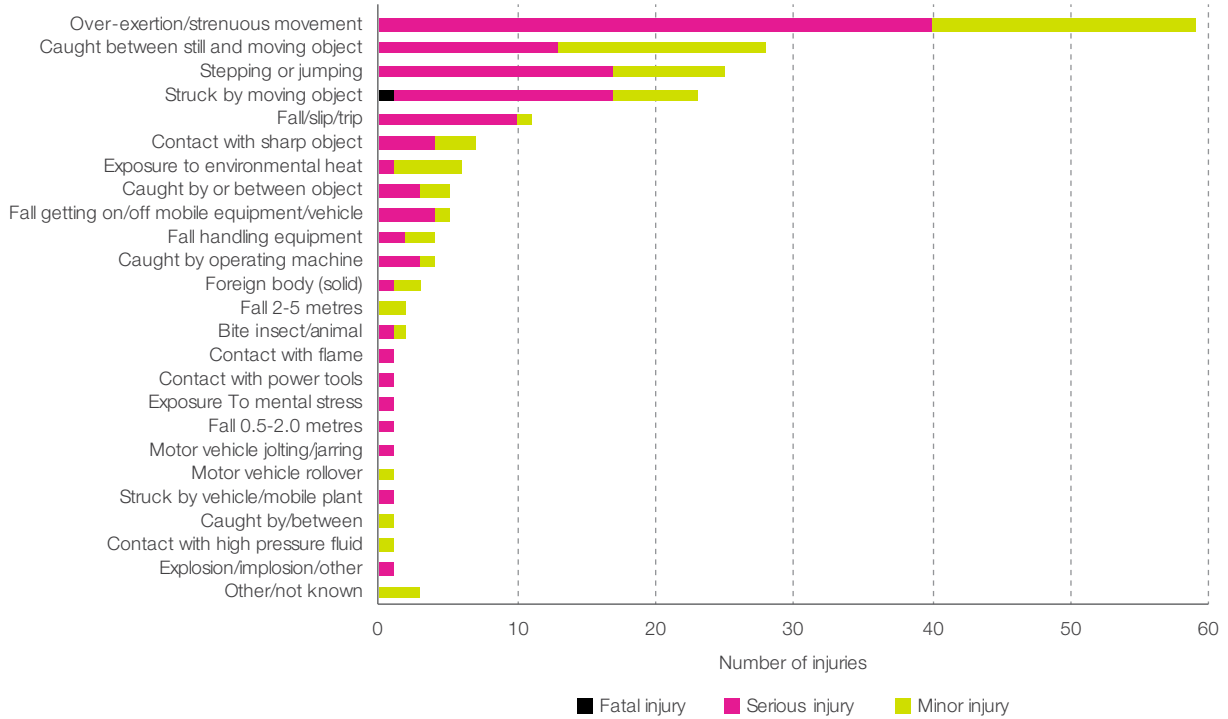
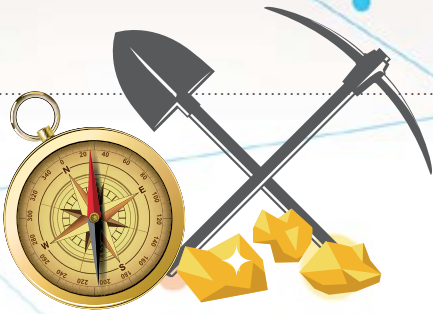


Figure 1 Number of exploration injuries by type of accident from January 2012 to December 2016

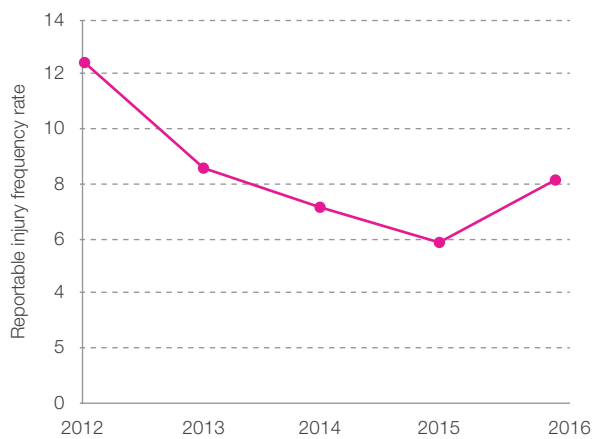


Figure 2 Frequency rate for exploration lost time and restricted work injuries from January 2012 to December 2016

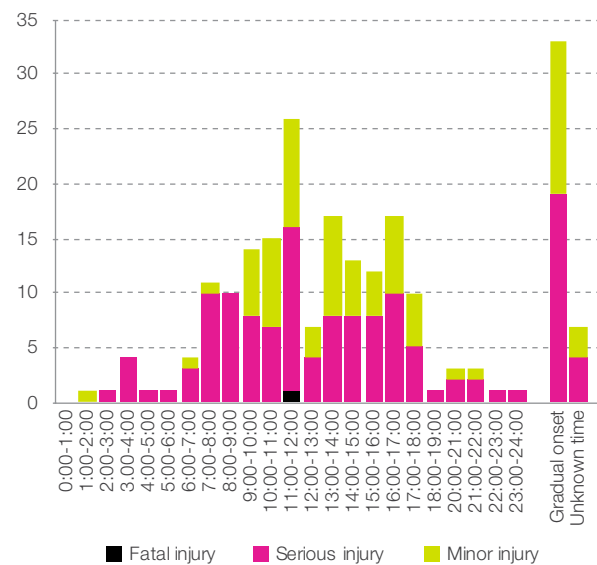


Figure 3 Number of cumulative exploration injuries by time of injury from January 2012 to December 2016

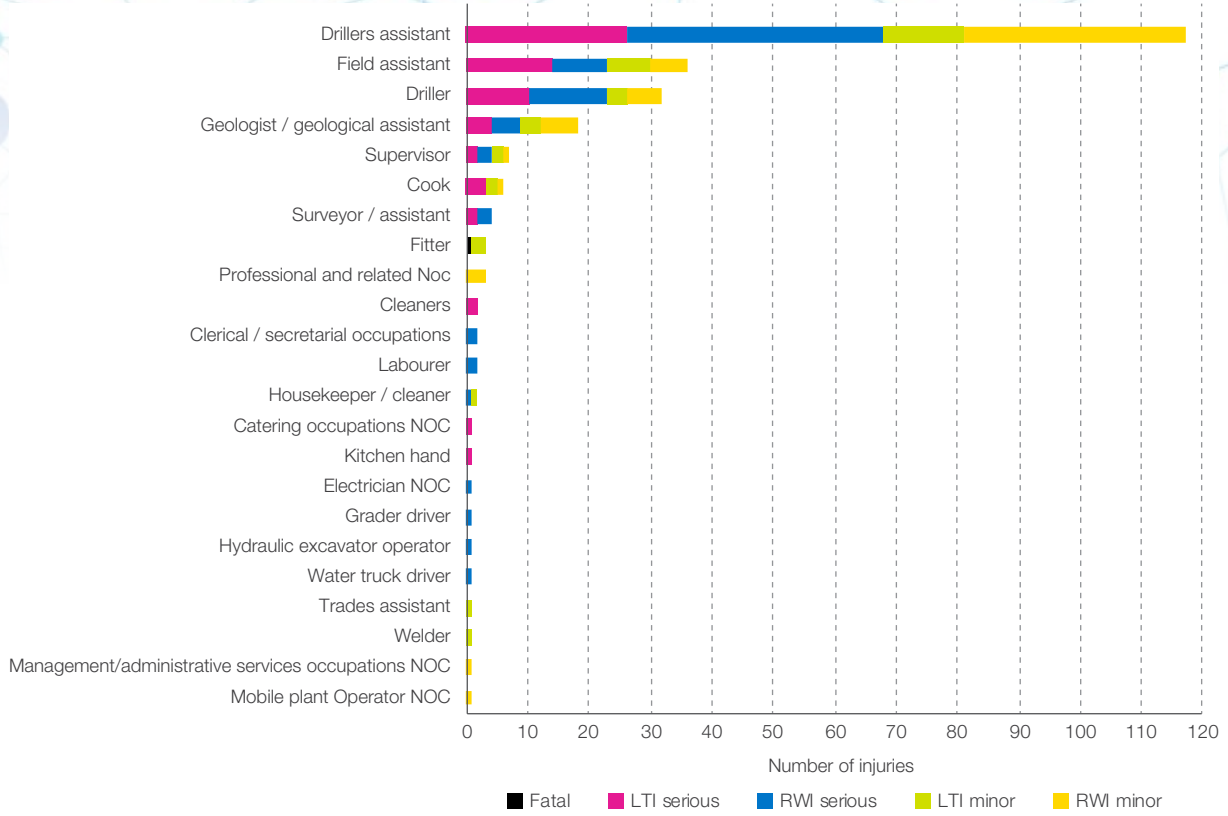


Figure 4 Total number of exploration injuries by occupation from January 2012 to December 2016

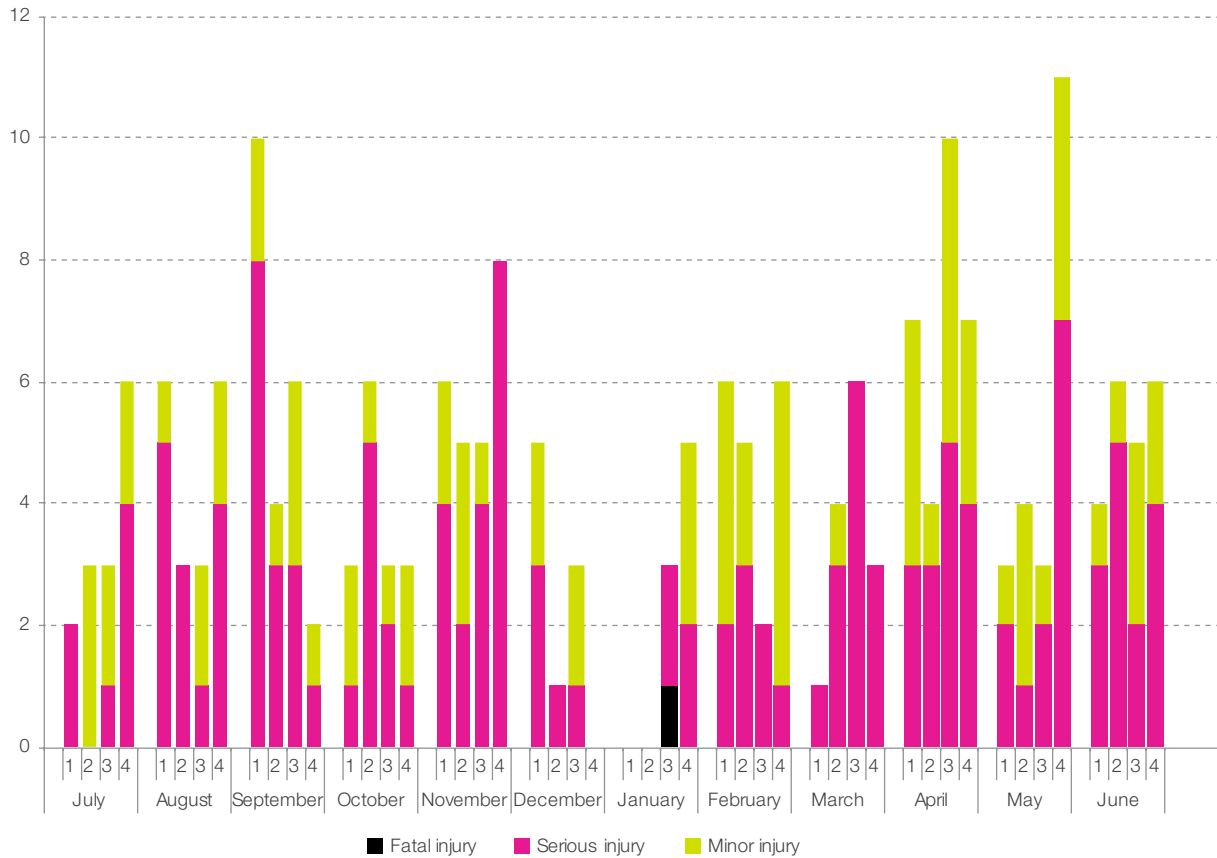
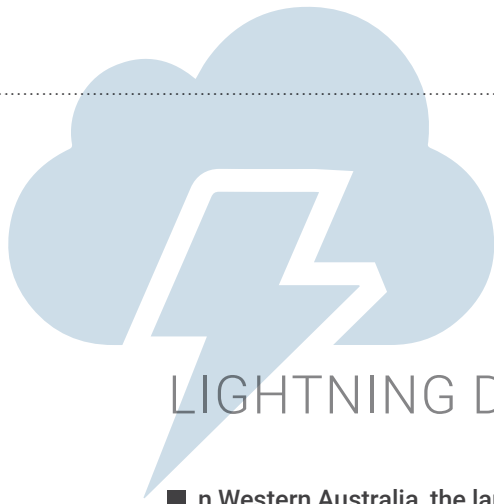


Figure 5 Cumulative number of injuries for each week* and month from January 2012 to December 2016 (* As most months are longer than 28 days, week 4 ranges from 7-10 days)



LIGHTNING DATA

In Western Australia, the large scale of the mining and resources industries, coupled with their remote and exposed locations, heightens the risk of deaths and injuries from lightning strike.

Thunderstorm activity is particularly prevalent especially during the summer months in Western Australia, particularly in the inland regions, from the southern wheatbelt through the central and eastern Goldfields and Pilbara to the Kimberley.

A large number of WA mine sites are in areas of high thunderstorm activity and the majority are open cut, where workers are exposed to the elements.

If a lightning strike hits a worker directly, there is a high probability it will kill them. Touching an object that has been struck, or standing near an object that has been struck, can also kill. If you are close to or touching an electrical appliance, a power source or communication line, it can also be fatal.

If the lightning impulse travels through or along the ground and passes through one limb and out of another you can be burnt or temporarily paralysed. This is why safety procedures and prevention are so important.

WHAT DOES THE DATA TELL US?

Fatal accidents

- There was one fatal accident in the past 16 years attributed to lightning (in 2001).

Injuries

- 73 per cent of lightning incidents have no injuries involved.
- 27 per cent of lightning incidents had associated injuries to one or more people.

Location

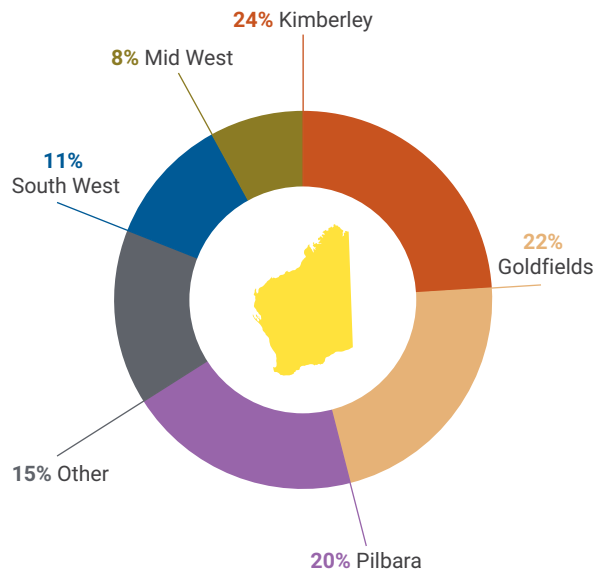


Figure 1 Lightning incidents by location from January 2011 to May 2017

Number of reported incidents

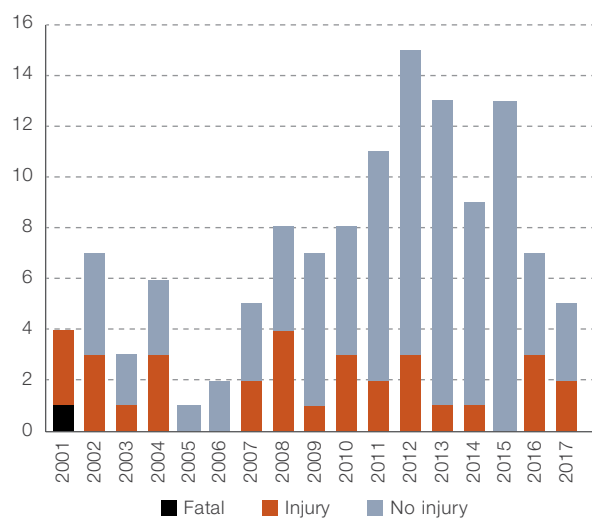


Figure 2 Number of lightning incidents per year from January 2001 to May 2017

With an increased number of reported incidents over the years, it is important that industry stay informed and alert.



TWELVE TIPS

FOR LIGHTNING STRIKE DANGER

1. Carry out a lightning strike audit of buildings and equipment.
2. Have a lightning risk policy and make sure everyone knows it well.
3. Monitor weather conditions and local weather forecasts.
4. Invest in early warning systems.
5. Have safe shelters available.
6. When lightning is near, suspend activities with enough time for people to take shelter.
7. Wait a minimum of 30 minutes from the last observed lightning or thunder before resuming activities.
8. You are safer inside an enclosed metal-bodied vehicle than outside.
9. Seek low ground and avoid open ground and elevated positions such as ridges.
10. Avoid touching, handling or being too near any metallic objects that may become part of the discharge path (e.g. towers, mobile plant, powerlines, pipes, rails, fences, clothes hoists).
11. Last resort: If you are in an exposed area during close lightning activity and you feel your hair standing on end, or hear 'crackling' noises, you are in lightning's electric field – place your feet together, duck your head, and crouch down low with hands on knees.
12. People struck by lightning do not carry an electric charge. If anyone is struck by lightning, you can apply first aid if qualified to do so. Get emergency help as soon as possible.

EXAMPLES OF LIGHTNING INJURIES AND INCIDENTS ON MINING OPERATIONS IN WA (JANUARY 2016 TO MAY 2017)


- Smoke was observed near an ammonium nitrate storage facility during a lightning alert (08/01/2016).
- A maintainer received an electric shock while installing a rubber skirt on a chute at a tailings storage facility. Lightning struck the area while the worker was holding the skirt and using hand tools (17/01/2016).
- A lightning bolt was observed by a grader operator in an open pit. The operator parked-up and isolated the grader and was picked up by another operator in a light vehicle (LV). While entering the LV the AM/FM radio of the vehicle turned on and the dash lights lit up. The workers reported a probable lightning strike (29/01/2016).
- A fire near a mine site was believed to have been started by lightning during an overnight storm. The fire was first observed by a paramedic on the way to the airstrip to meet the morning plane (31/03/2016).
- An operator received an indirect ground current shock from a lightning strike to site village infrastructure. The operator was standing in the village car park when a lightning strike was observed contacting the communication tower ~ 20 m away. The operator felt pain in the right side of his chest and observed sparks on his right boot (06/05/2016).
- A bushfire adjacent to a mining area is believed to have started as a result of lightning, following severe thunderstorms in the area (30/11/2016).
- A fitter received an electric shock while in contact with a sea container during a thunderstorm. The area was inspected by an electrician and no electrical faults were found (10/02/2017).
- Two aerodrome personnel were removing the stairs from an aircraft, due to lightning in the area, and were winding up the stabilisers, when one individual received an electric shock to the hands while the other experienced a shock through the hand and body (14/02/2017).
- A worker was walking from a gym to a room in an accommodation village when there was a lightning strike in the vicinity. The worker felt a pain in the left leg and foot, and attended the medical centre. The individual was given an ECG with normal results (18/02/2017).
- A fixed plant process technician received an electric shock from a decant pump field control station at a mine site. Lightning was present in the area at the time of the event and was deemed a plausible source of a static charge (10/05/2017).
- While investigating a site-wide power outage, a power pole was found to be on fire. It is believed that the pole was struck by lightning and had been smouldering for several hours until it burnt through and toppled over (11/05/2017).

ROCKFALL INJURIES


Rockfall incidents have the potential for serious consequences. In the WA mining industry rockfall has been the cause for many serious injuries, as well as some fatalities.

The potential for rockfall can be increased by seismic events, exposure of rock to air and moisture, blasting, drilling, vehicular vibration, changes in rock stress and deterioration of ground support.

The two most common types of rock failure



Loose blocks falling or sliding from the rock surfaces of an underground excavation.



Ejection of rock from the rock surfaces due to failure of the rock mass by mining-induced stresses. This is usually noisy, with cracking, banging and popping sounds easily heard.

WHAT CAN WE SEE FROM THE PAST FIVE YEARS' OF DATA?

Underground operations report 83 per cent of total rockfall injuries. From 2012 to 2016 30 rockfall injuries were reported for underground operations, against six for surface operations.

During this five-year period underground operations totalled 83 million hours worked in contrast to 854 million hours worked for surface operations. This suggests that a worker is roughly 50 times more likely to be injured by rockfall in underground operations than they are for surface operations.

For the five-year period from 2012 to 2016, surface operations reported 387 rockfalls occurrences while 290 rockfalls occurrences were reported for underground operations for the same period. That more rockfall incidents happen on surface operations but more injuries occur underground, further supports the suggestion that workers are more likely to be injured by underground rockfalls than they are for surface occurrences.

Let's have a closer look at the two most common types of rock failures.

From Figure 1 it is evident that seismic events have a smaller contribution rate than mining-induced rock failure. In 2016 seismic events accounted for 23 per cent of rockfalls.

Rockfalls can result in entrapment, injury or even fatalities. They can also cause damage to onsite services such as ventilation, power distribution and communication devices. Rockfalls have the potential to result in very serious incidents or injuries and therefore adequate prevention procedures need to be in place.

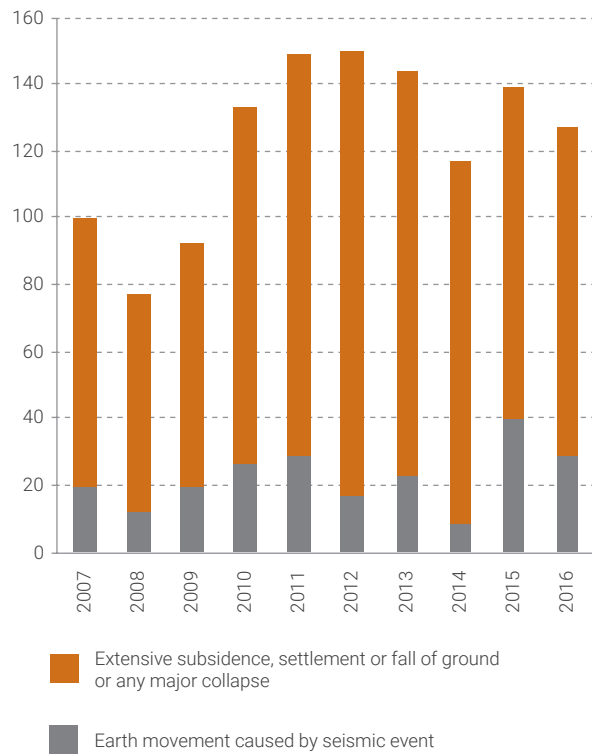


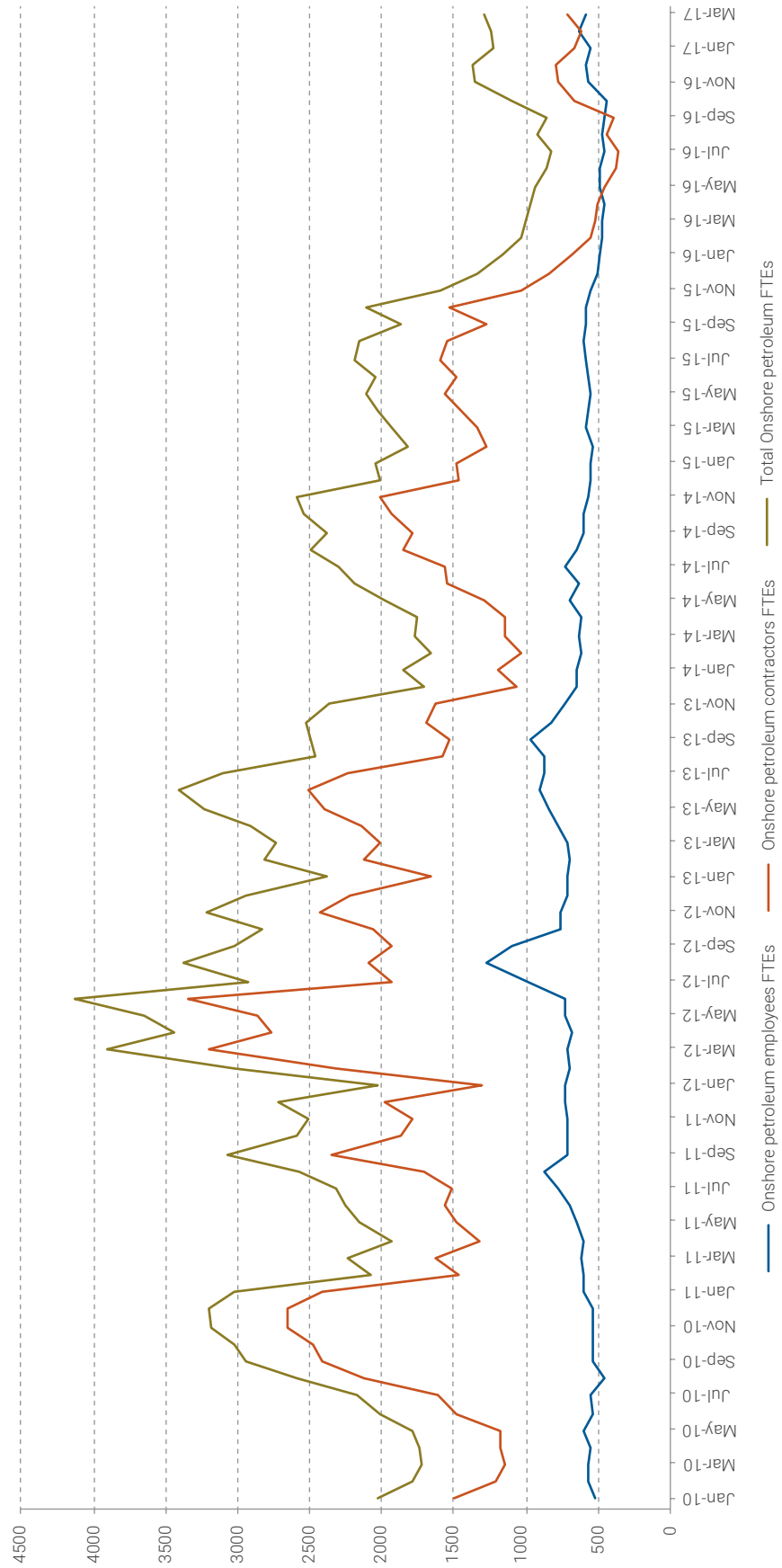
Figure 1 The total number of rockfall incidents reported per year

HAVE YOUR SAY

The Department will shortly be seeking public comment on the draft ground control code of practice and associated guidelines. Sign up to receive Resources Safety news alerts at www.dmp.wa.gov.au/subscribe to be notified when the public comment period commences.

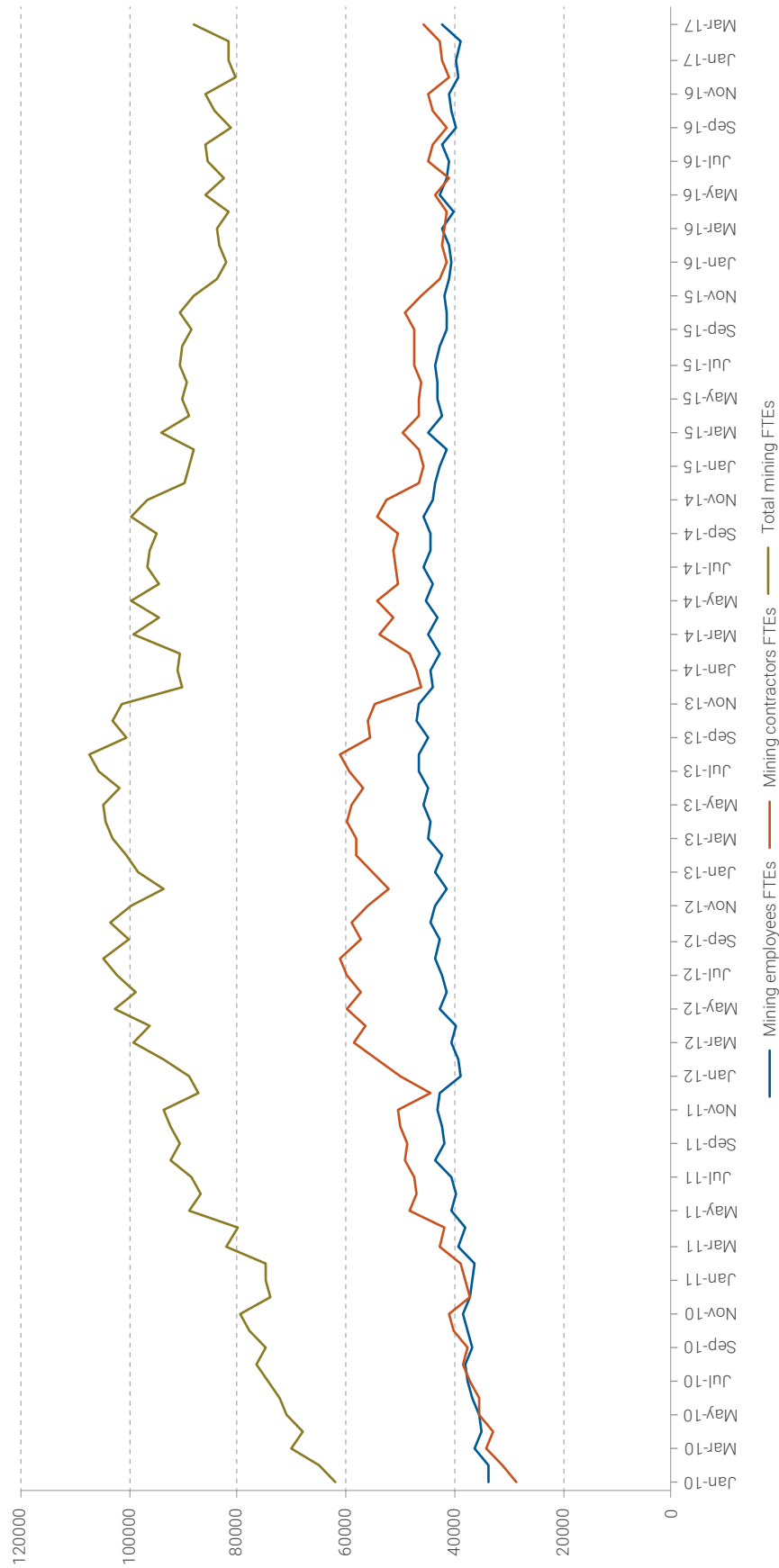
WA'S MONTHLY ONSHORE PETROLEUM WORKFORCE (MARCH 2017)

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

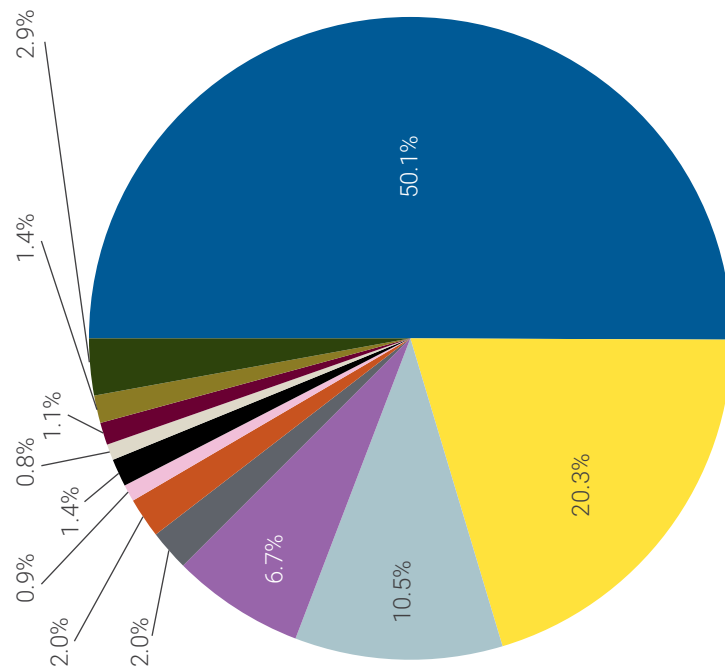


WA'S MONTHLY MINING WORKFORCE (MARCH 2017)

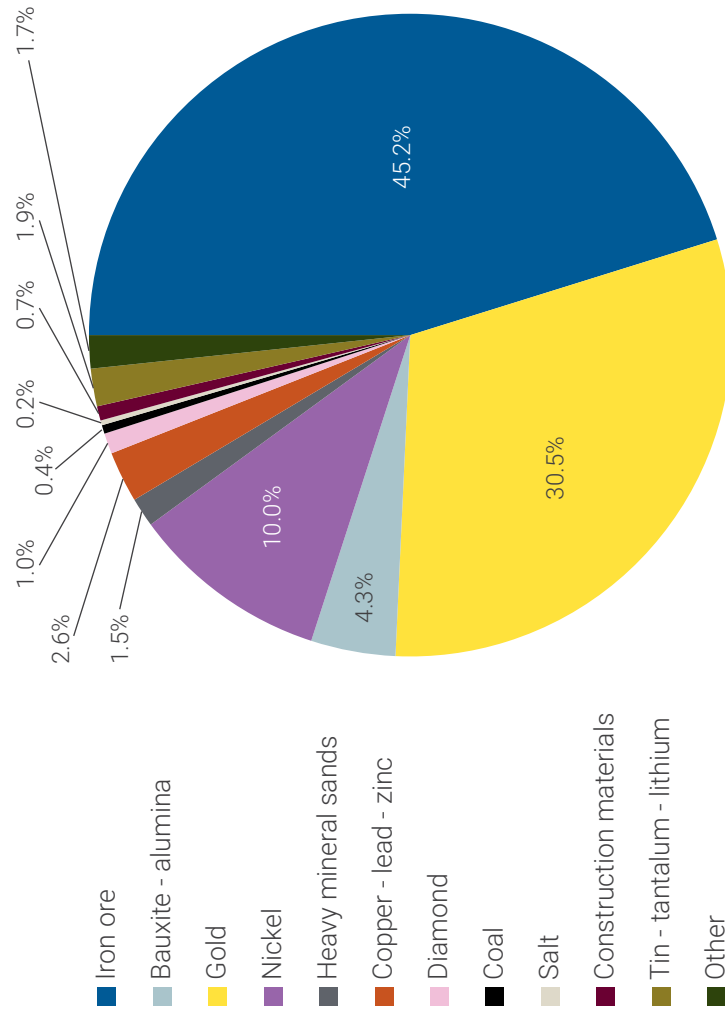
Note: From 1 July 2009, monthly mining workforce figures are plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year



WA'S MINING WORKFORCE – PERCENTAGE BY COMMODITY (MARCH 2017)



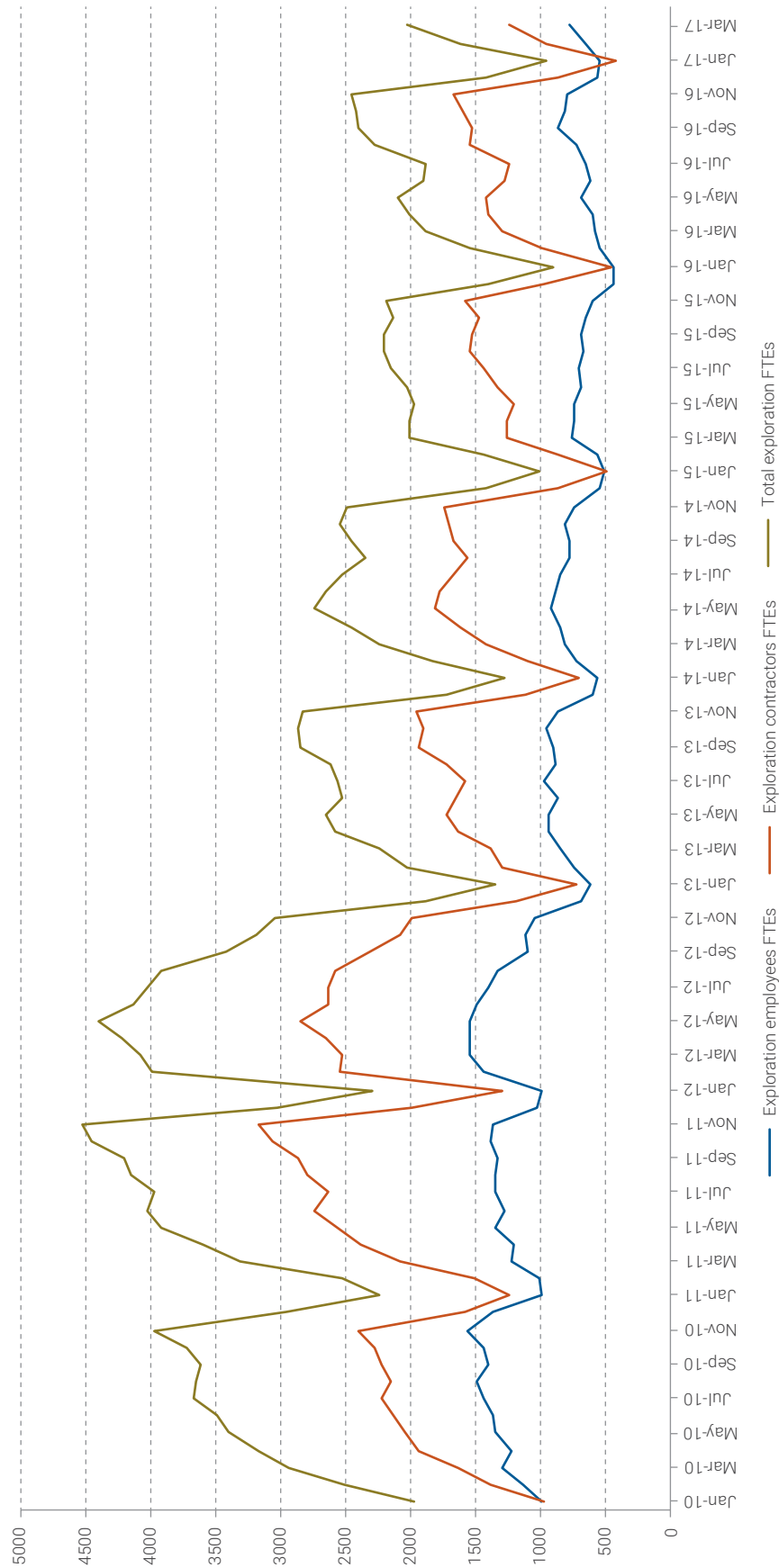
Mining employees FTEs



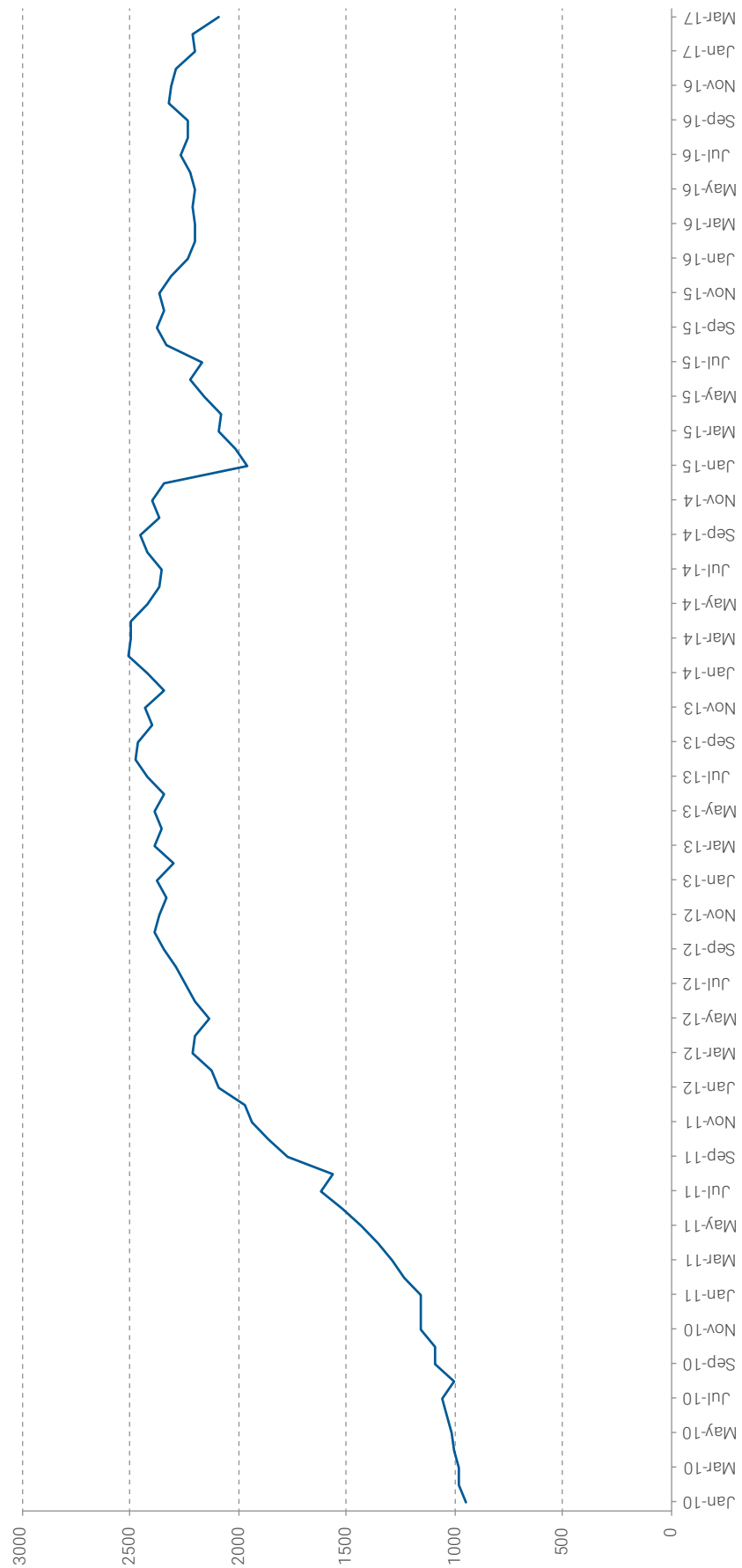
Mining contractors FTEs

WA'S MONTHLY MINERAL EXPLORATION WORKFORCE (MARCH 2017)

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



NUMBER OF ELECTED SAFETY AND HEALTH REPRESENTATIVES FOR WA MINING (MARCH 2017)



MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 250

UNEXPECTED INITIATION OF DETONATOR AND DETONATING CORD

ISSUED: 8 FEBRUARY 2017

Summary of incident

In August 2016, two shotfirers were attempting to initiate an open pit blast with a remote firing device (RFD). After two failed attempts, it was decided to manually fire the shot using a stomper (manual initiation device).

The shotfirers rolled out detonating cord from the blast site to the firing position on the waste dump, located outside the blast exclusion zone. A long-period delay detonator (LP detonator; 3.6 m lead, 9.6 sec) was connected to the stomper.

On the first attempt the stomper's shot-shell failed. On the second attempt the shot-shell fired, but when the detonator did not fire instantly one of the shotfirers thought the detonator had failed. The shotfirer cut the detonating cord below the detonator and picked up the detonator (and attached cord) to discard it. At this

point the shotfirer realised it was a LP detonator and dropped it – a few seconds before it fired, initiating the attached detonating cord.

Without reporting the incident to the quarry manager, the blast crew proceeded to fire the shot manually after sunset, with a new LP detonator. Fortunately, there were no serious injuries or fatalities.

Probable causes

Direct

- Poor practice in the use of the manual initiation device (stomper) which was connected to a LP detonator rather than a lead-in line (signal tube) of sufficient length.
- The shotfirers were in a position where they were exposed to an explosives hazard (i.e. detonator and detonating cord initiating the shot).

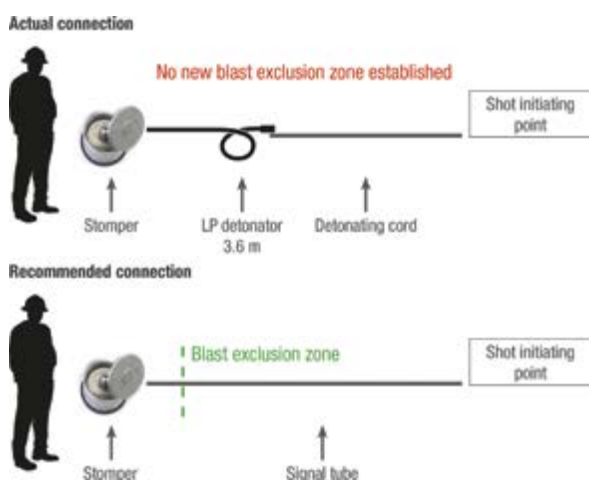
Contributory

Safe systems of work

- The formal risk management processes failed to identify deficiencies in risk controls for the use of explosives on site.
 - There was no procedure, formal training or assessment on the correct use and application of the stomper.
 - Inadequate supervision and monitoring practices contributed to the failure to identify a procedural gap in the use of the stomper.
- The risks associated with the change in work plan were not assessed using the site's task-based risk assessment tool.

Blasting practices and equipment

- LP detonators were not fit-for-purpose and were being used to run down excess stock.
- The blast plan design and document approval process was flawed (e.g. hook-up details were insufficient, hazards associated with use of LP detonators were not recognised).
- The primary initiation system for the shot failed.



Actual and recommended hook-up of stomper

Note: Problems with the remote firing device had been experienced in previous blasts. However, these were not rectified.

- The blast crew felt under pressure to fire the shot due to conditions (fading light, rising water levels) and to meet production requirements.

Actions required

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

Safe systems of work

- As part of a risk assessment:
 - identify and consider all activities involving the use of explosives, including infrequent tasks and contingency plans
 - assess the adequacy and effectiveness of risk controls (considering the hierarchy of control) and monitor to ensure they are maintained.
- Develop and implement safe work procedures for blasting equipment and other blasting activities, based on the original equipment manufacturer's (OEM's) recommendations.
- Provide adequate training and assessment of competency for workers involved in blasting operations, including scenario testing for unplanned or unintended events.
- Management, supervisors and other knowledgeable persons should monitor and check actual work practices to confirm site procedures are followed.
- Conduct a task-based risk assessment when conditions and work practices change.

Blasting practices and equipment

- Use fit-for-purpose products in accordance with the OEM's recommendations.
- Clearly show planned tie-in and hook-up arrangements for blast designs and documentation, in accordance with site procedures and the Australian Standard AS 2187.2 *Explosives – Storage and use – Use of explosives* (Appendix A, section A2).
- Confirm designated firing times, provide adequate time to fire and conduct post-blast activities in daylight hours.

- Inspect and service equipment regularly in accordance with the OEM's instructions.
- Establish a system for the prompt reporting and rectification of defects in blasting equipment and accessories.

Incident reporting

- Confirm incident reporting standards (internal and external) are known by the workforce and followed.

Further information

- Standards Australia, www.standards.org.au
AS 2187.2 Explosives – Storage and use – Use of explosives
- Department of Mines and Petroleum
Mining safety publications, www.dmp.wa.gov.au/Safety/Mining-Safety-publications-16162.aspx
 - *Explosives: Surface transport, use and disposal audit – guide and template*
 - *Accident and incident reporting – guideline*
- Dangerous goods safety publications, www.dmp.wa.gov.au/Safety/Dangerous-goods-safety-16164.aspx
 - *Reporting dangerous goods incidents – guideline*
 - *What are blast plans? www.dmp.wa.gov.au/Dangerous-Goods/What-are-mining-blast-plans-4705.aspx*
- Australian Explosives Industry and Safety Group (AEISG), www.aeisg.org.au
On-bench practices for open cut mines and quarries – code of practice
Blast guarding in an open cut mining environment – code of good practice

Note: This Significant Incident Report has also been issued as Dangerous Goods Safety Significant Incident Report No. 01-17

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 251

WORKER SERIOUSLY INJURED WHILE OPERATING A BLOCK- MAKING MACHINE

ISSUED: 24 FEBRUARY 2017

Summary of incident

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

In January 2017, an operator was in the process of setting up a block-making machine to manufacture limestone blocks. The machine was switched on and set to operate in auto mode.

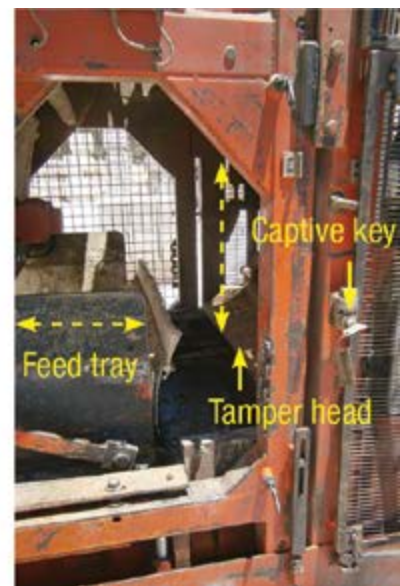
The operator noticed a large rock in the machine's feed tray and opened a safety guard on the side of the

machine, entering an area between the tamper head and feed tray. While attempting to remove the rock, the machine began operating, trapping him between the moving tamper head and feed tray.

Note: In auto mode, a signal from the level sensor (located at the feed tray area of the machine) will start the block-making process.

Another worker walking towards the machine noticed the guard in the open position and the injured operator. The worker switched the machine from auto mode to manual mode (disabling the sensors) and raised the tamper head to free the operator. After receiving emergency medical treatment, the operator was transferred by helicopter to hospital with very serious, multiple injuries.

The original equipment manufacturer included an interlock unit and captive key system for isolation purposes. A key is required to start the machine's hydraulic system using the start switch located in the operator's cabin. The same key should be used to open any of the machine's guards. However, the key



Left: Block-making machine showing the safety guard that was opened. Right: Area between the feed tray and tamper head, dashed arrows indicate direction of movement. Captive key in guard's interlock unit.

must be turned to the off position (shutting down the hydraulics) before it can be removed.

In the same way, the guard must be in the closed position before the key can be removed and used to restart the machine.

The scene examination identified that two captive keys were actually in place on the machine at the time of the incident. One of these was located in the safety guard locking arrangement (interlock unit), which was used to open the guard, while the other was in the start switch, which left the machine operating in auto mode.

Probable causes

Direct

- The operator entered the guarded area of the block-making machine while the machine was not isolated and set to operate in auto mode.

Contributory

- The block-making machine had been set up prior to the incident to operate in auto mode.
- The machine's main electrical isolation switch was not functional.
- Both captive keys were in interlock units at the time of the incident, allowing access to the guarded area while the machine remained under power in auto mode.

Actions required

Mine managers are reminded of the importance of maintaining a safe system of work and verifying the competency of the workers responsible for operating plant and mobile equipment on their sites.

Safe systems of work

- Implement and enforce suitable isolation procedures for plant and machinery.
- Implement and enforce a suitable system of control for captive keys and confirm access to the second key is adequately controlled.
- Undertake a documented risk assessment of all mobile plant in the workplace to identify, assess and control all hazards to which workers are likely to be exposed.

- Implement a suitable maintenance system, including periodic inspections by competent persons, to ensure plant are maintained and are in a safe condition.

Training and supervision

- Confirm workers, such as operators and workers conducting cleaning and maintenance, are adequately instructed, trained and assessed in the use of plant, including its safety features.
- Confirm workers receive adequate supervision in the performance of their duties while operating and maintaining plant.

Further information

- Department of Mines and Petroleum, www.dmp.wa.gov.au/Safety/Guidelines-16146.aspx

Isolation of hazardous energies associated with plant in Western Australian mining operations – guideline

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 252

FITTER STRUCK IN CHEST BY PACKING PLATE RELEASED UNDER PRESSURE

ISSUED: 12 MAY 2017

Summary of incident

In December 2016, a cone crusher became bogged following a power outage, requiring the lifting of the crusher bowl (via the spring packs) to clear the blockage. To achieve this a hydraulic ram (lifting jack), with two steel packing plates placed beneath its base, was positioned on the countershaft ledge. Another steel packing plate was placed between the extension arm of the ram and the retaining plate of the spring pack above.

While a fitter was using a flogging spanner to release tension on a nut under the spring pack in front of him, a packing plate beneath the ram dislodged under pressure. The fitter, who was straddling the crusher's countershaft took the full-force of the plate to his sternum, receiving a significant chest injury.

Note: The cone crusher's internal hydraulic clearing system had been inoperable for over twelve months. At the time of the incident, seven of the twelve hydraulic cylinders were leaking. Repair of the leaking cylinders was planned for a November 2016 shutdown, but due to a delay in receiving parts, did not happen.

Probable causes

Direct

- The fitter was in the line-of-fire of the steel packing plate when it dislodged under pressure.



1. Countershaft the fitter was straddling. 2. Nut that was being un-tensioned.
3. Countershaft ledge on which the ram and steel plates was positioned.

- The lifting of the crusher bowl was conducted manually.

Contributory

Incorrect hydraulic jacking method

- The countershaft ledge on which the hydraulic ram was positioned was covered in mud and oil, not level and installed out of alignment with the spring pack.

Note: The countershaft ledge was not identified in the original design drawings and is considered a modification.

- The steel packing plates were contaminated by oil (reducing the friction on the packing plate surface) and positioned offset to the hydraulic ram, increasing the potential for release during equipment movements.

Safe systems of work

- The hazards posed by the long-term inoperability of the hydraulic clearing system and the offset countershaft ledge were not effectively identified, evaluated or adequately addressed.
- There was no safe system of work for jacking activities.
- The job hazard analysis (JHA) developed for the task failed to recognise the potential for the release of stored energy and workers being in the line-of-fire.

Actions required

Mine operators are reminded of the importance of providing and maintaining, so far as is practicable, a working environment in which workers are not exposed to hazards. To support this, the following actions are recommended.

- Undertake a documented risk assessment of all plant in the workplace to identify, assess, evaluate, control, monitor and review all hazards to which workers are likely to be exposed.
- Implement a robust maintenance system that ensures:
 - availability of critical plant components
 - a timely response to loss of serviceability of plant components
 - regular inspection of plant by a competent person
 - plant is maintained in a safe condition.
- Promote hazard reporting and appropriate response to reduce the potential for inaction and sub-standard conditions to be tolerated.

Further information

- Department of Mines and Petroleum, Mining safety guidelines, www.dmp.wa.gov.au/Safety/Guidelines-16146.aspx

Isolation of hazardous energies associated with plant in Western Australian mining operations – guideline

MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 253

INJURED WORKER NOT DISCOVERED AND TREATED FOR EXTENDED PERIOD

ISSUED: 27 JUNE 2017

Summary of incident

In January 2017, the driver of a service vehicle was travelling along a haul road to a satellite pit to deliver fuel. The area had experienced overnight rain, and the driver lost control of the loaded vehicle. The light vehicle mounted a verge and rolled onto its roof.

The vehicle's radio aerial was damaged in the rollover and the driver, who was unable to walk due to serious injuries, could not raise an emergency call. Use of the haul road had been restricted because of conditions, he was discovered two and a half hours later by a passing worker who raised the alarm. The driver's absence had gone unnoticed by his work colleagues.

There was a delay in the arrival of the emergency responders before the driver was taken to a regional hospital for treatment.

Probable causes

Direct

- The vehicle rolled.
- The driver was unable to call for assistance due to the damaged radio aerial and absence of a back-up communication system.

Contributory causes

- There was no procedure or policy to account for workers travelling between satellite pits and the mine.
- The ambulance was unavailable and the back-up ambulance had to be jump started.
- The emergency rescue team were unfamiliar with the site and did not know the way to the incident location.
- The vehicle was fitted with mismatched tyres, not driven to conditions and overturned on a section of road with excessive camber that was not sheeted with gravel.



Overturned service vehicle

Actions required

The risk posed by travel is not limited to those who work in remote areas, but also affects those who travel within and between mining operations. The following actions are recommended to reduce the risks to workers who undertake travel.

Safe systems of work

- Establish and review procedures to plan and monitor safe travel during work, including communication and emergency response.

Note: Consider estimated length and time of the return journey, scheduled calls, and responsible person to raise alarm if schedule not met (ideally the supervisor).

- Confirm secondary communications devices or systems are available to workers when travelling in case of loss of primary communication system.
- Instruct and train workers in safe travel procedures and use of safety equipment and communication devices.
- Review vehicle movements to avoid unnecessary travel when weather is likely to adversely affect road conditions.

Note: The service vehicle was sent to refuel equipment in the satellite pit. However, the conditions meant operations had ceased and the fuel was not required.

Emergency response

- Provide alternative arrangements or back-up emergency equipment should primary emergency vehicles be unavailable.
- Familiarise emergency responders with all areas of the operation, the application of alternate arrangements, and use of back-up emergency equipment.

Further information

- Department of Mines and Petroleum, Guidance about travelling for work, www.dmp.wa.gov.au/Safety/Guidance-about-travelling-for-6824.aspx
- Department of Mines and Petroleum, Mines safety alerts, www.dmp.wa.gov.au/Safety/Minesafety-alerts-13194.aspx

Mines Safety Significant Incident Report No. 163 *Exploration employee lost in remote bush*
Mines Safety Bulletin No. 118 *Working alone with corrosive substances – potential loss of communications*

MINES SAFETY BULLETIN NO. 139

SUICIDE AWARENESS FOR THE WESTERN AUSTRALIAN RESOURCES SECTOR

ISSUED: 16 MARCH 2017

Background

Note: This bulletin is issued to raise awareness of potential suicide risk factors for personnel engaged in the resources sector. It is not intended as an instructional document on suicide prevention.

Based on the 2007 National Survey of Mental Health and Wellbeing (Slade et al., 2009), it is estimated that at some point in their lifetime, about 2.1 million adults in Australia have had serious thoughts about ending their own life, and 500,000 have attempted suicide. Based on the survey, each year about 370,000 Australians think about ending their life and there are 65,000 suicide attempts.

Australian Bureau of Statistics figures for 2015 put the lives lost from suicide at 3,027, making it the 13th leading cause of death in Australia for that year. Suicide was the leading cause of death among those

aged 15 to 44 years, and the second leading cause of death in the 45 to 54 age group.

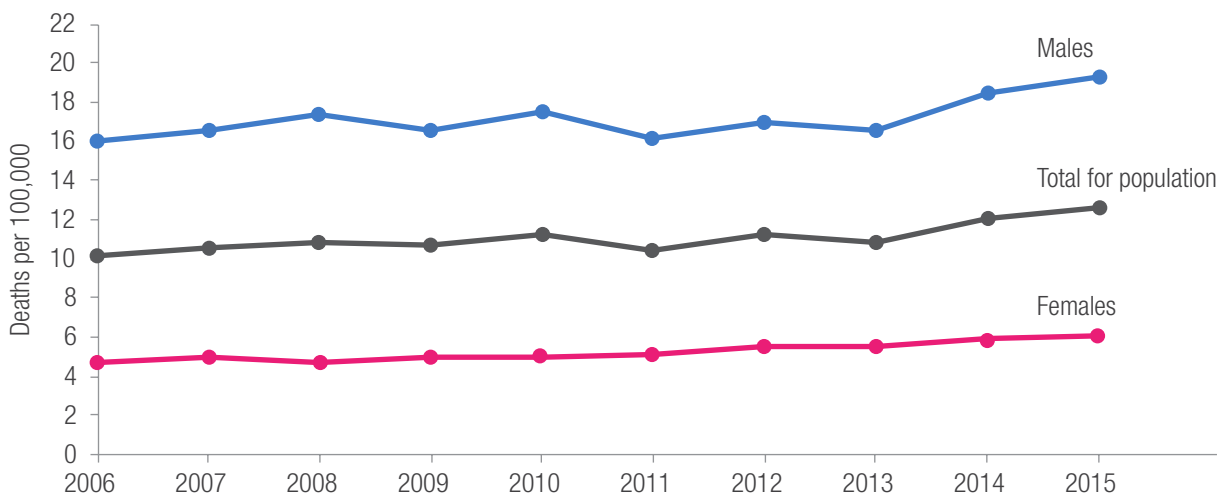
Males died from intentional self-injury at three times the rate of females. Western Australia's resources industry workforce is predominantly male, with workers mainly aged between 25 and 45 (Education and Health Standing Committee, 2015).

The factors surrounding suicide are complex and varied. They may arise from events happening in an individual's home life, work life, or a combination of the two. Employers should be aware of workplace hazards that may impact on mental health and take measures as far as is practicable to manage the potential for psychosocial harm. The aim is to support good mental health and reduce the likelihood of suicide and attempted suicide. Within the resources sector, strategies should cover the workplace and, if provided, associated accommodation facilities.

Summary of hazard

Risk factors

The presence of particular risk factors increases the likelihood of suicidal behaviour. Awareness of these risk factors, including those listed below, is useful when considering the needs of a group or workforce in general:



Standardised death rates (deaths per 100,000 of estimated mid-year population) for intentional self-harm, 2006 to 2015. Source: Australian Bureau of Statistics, 28 September 2016.

- a history or family history of mental health problems
- being male
- family discord, violence or abuse
- a family history of suicide
- a chronic medical condition, or being a carer for a person with such a condition
- parenthood
- using alcohol and other drugs
- being indigenous
- identifying as gay, lesbian, bisexual, transgender or intersex
- poverty or low income
- social or geographical isolation
- bereavement.

Note: An absence of risk factors or the presence of only a few risk factors does not equate to no or low risk, nor does it mean that the person has never or will never have suicidal thoughts.

Warning signs

While identifying those at risk of suicide can be difficult, warning signs may include:

- being withdrawn and unable to relate to co-workers
- talking about feeling isolated and lonely
- expressing fears of failure, uselessness, helplessness, hopelessness or loss of self-esteem
- impulsivity or aggression
- dramatic changes in mood
- fragmented sleep or obvious tiredness
- dwelling on problems with seemingly no solutions
- speaking about tidying up affairs
- threatening to hurt or kill themselves
- talking or writing about death, dying or suicide
- expressing no reason for living or sense of purpose.

Note: People may show one or many of these signs, and some may show signs not on this list. One in five people show no signs.

There is a greater risk of suicide if any of these signs is coupled with any of the following situations:

- recent loss of a close relationship

- sudden change in work circumstances
- serious or embarrassing work-related event
- increased use of alcohol or other drugs, including medications
- history of suicidal behaviour
- current depression, burnout or unexplained fatigue.

Contributory factors

Employees may respond differently to the various stressors experienced in a work environment. While people are generally able to adjust to short-term stressors and continue performing their normal work duties, any stress that develops into a long-term issue may affect a person's psychological and physical health.

Work stressors can include:

- bullying, harassment or discrimination
- being performance managed
- work-related interpersonal conflict or relationship breakdown
- stressful working conditions (e.g. excessive hours, fatigue)
- business-related financial difficulties
- business restructures
- impending redundancies
- work-related compensation claims
- pain, depression or mobility limitations after workplace injury
- involvement in work-related court proceedings.

Measures taken to eliminate or reduce work stressors can help prevent work-related suicide and promote good mental health.

Mines Safety Bulletin No. 139 continued

Actions required

All employers and managers have an obligation to take appropriate steps to eliminate or minimise health and safety risks in the workplace. For mental health and wellbeing matters, employers and managers should:

- identify possible psychosocial hazards, workplace practices, actions or incidents that may cause, or contribute to, the mental illness of workers
- take actions to eliminate or minimise these risks.

Preventative and protective measures

There are practical actions workplaces can take to support the mental health and wellbeing of workers and help prevent suicidal behaviour. Proactive measures include:

- implementing workplace policies and programs that promote a mentally healthy workforce and minimise suicidal thoughts and behaviours
- promoting a workplace culture that is inclusive, destigmatises mental health problems and encourages help-seeking
- prioritising psychosocial workplace safety, including identifying ways to reduce work-related stressors
- promoting suicide awareness and the availability of mental health resources and wellness initiatives within the workplace
- providing suicide prevention training to equip employees with the skills to assist those at risk and encourage them to seek professional help
- establishing mechanisms for the recognition, and early detection of mental health and emotional difficulties in the workplace such as:
 - analysing workplace data
 - direct observations
 - employee surveys
 - peer support programs
- providing access to care such as:
 - professional interventions and treatment
 - employee assistance programs
 - external community health resources
- developing procedures for when persons are missing from work to ensure that an immediate welfare check is conducted to verify they are safe
- developing appropriate reporting mechanisms at the workplace (with consideration to a person's

right to privacy) so employees, supervisors, chaplains and others feel empowered to report persons at risk so they can get professional help

- establishing emergency protocols or procedures to respond to persons identified at risk and for incidents of suicide and attempted suicide
- establishing and maintaining effective communications systems at the mine so support services can be contacted at all times
- restricting access to means of suicide such as firearms, lethal doses of medications, chemicals and pesticides.

Professional help

People who can provide psychological and medical help include:

- general practitioners
- psychiatrists
- clinical psychologists and psychologists
- mental health nurses.

Other support services are also available.

Incident response

Some actions to consider when developing a site's incident response protocol are listed below.

- When a person is identified as missing from the workplace, conduct a welfare check immediately.
- Call site emergency personnel to respond immediately upon discovery of a person suspected to have attempted or completed suicide. The site's emergency response plan should then be activated, which includes notifying the appropriate authorities.
- As soon as sufficient information is available, brief workers in an open and honest manner without discussing the method used to attempt or complete suicide.
- Organise an appropriate tribute for the person who died.
- Conduct an investigation into the incident to determine if there could be any work-related reasons for the incident. It may be more appropriate to use an external investigator to prevent bias and maintain independent findings.
- For attempted suicides, ensure an appropriate return-to-work program is provided, based on an assessment by a qualified health professional. A

similar method can be applied for incidents when employees experience a traumatic or personal event that requires them to leave work.

Mining and petroleum operations are requested to report incidents of suicides and attempted suicides to the Department of Mines and Petroleum, as recommended by the 2015 parliamentary inquiry into the mental health impacts of fly-in fly-out work arrangements.

Further information

- Department of Mines and Petroleum, www.dmp.wa.gov.au
Prevention and management of violence, aggression and bullying at work – code of practice
Alcohol and other drugs at the workplace – guidance note
Fitness for work: Guidance about mental health and wellbeing [webpage]
 - Department of Commerce, www.commerce.wa.gov.au/worksafe
Psychologically safe and healthy workplaces: Risk management approach toolkit
Introduction to work-related stress
 - Department of Health, www.health.gov.au
Slade T., Johnston A., Teesson M., Whiteford H., Burgess P., Pirkis J. and Saw S., 2009. *The mental health of Australians 2. Report on the 2007 National Survey of Mental Health and Wellbeing*. Department of Health and Ageing, Canberra, 59 pp.
 - Australian Bureau of Statistics, www.abs.gov.au/ausstats/abs@.nsf/mf/3303.0
3303.0 – Causes of death, Australia, 2015
 - Mental Health Commission, www.mentalhealth.wa.gov.au/mentalhealth_changes/wa_suicide_prevention_strategy.aspx
Suicide Prevention 2020 – together we can save lives
 - Suicide Prevention Australia, www.suicidepreventionaust.org
- Work and suicide prevention: Position statement, February 2014*
- The dark shadow of work: Suicide among working age adults, 20 February 2014 – media release*
- Mental Health First Aid Australia, www.mhfa.com.au
Kitchener B., Jorm A. and Kelly C., 2013. *Mental health first aid manual (Third edition)*. Mental Health First Aid, Parkville, Victoria, 140 pp.
 - Parliament of Western Australia, www.parliament.wa.gov.au
Legislative Assembly, Education and Health Standing Committee, 2015. *The impact of FIFO work practices on mental health – final report*. Report No. 5, June 2015.
 - Chamber of Minerals and Energy of Western Australia, www.cmewa.com
Blueprint for mental health and wellbeing
 - Australian Human Rights Commission, www.humanrights.gov.au
Workers with mental illness: A practical guide for managers

Acknowledgement

The Mental Health Strategies Working Group, established under the auspices of the Mining Industry Advisory Committee (MIAC), provided feedback for this bulletin. Information on MIAC and this working group is available at www.dmp.wa.gov.au/Safety/What-is-the-Mining-Industry-8578.aspx

Note: This bulletin is also issued as Petroleum Safety Bulletin 01/2017 with the approval of the Director Dangerous Goods and Petroleum Safety.

MINES SAFETY BULLETIN NO. 140

STRUCTURAL COLLAPSE OF BUILDINGS AND TEMPORARY STRUCTURES DURING WIND EVENTS

ISSUED: 27 MARCH 2017

Background

Several incidents involving the collapse of buildings and temporary structures (e.g. container structures) during severe thunderstorms and wind events have occurred in recent years. These incidents have resulted in damage to equipment and injuries to workers.

Inspectors have identified buildings with:

- damage (e.g. corrosion, impact)
- no design and construction records
- no final sign-off on the 'as-built' records by competent persons
- modifications not approved by competent persons.



Building and temporary structure damage following severe storm events. Left. Collapse of heavy mobile plant workshop roof. Right. Overturned container shelter.

Summary of hazard

Buildings (including temporary structures) can collapse when their strength is inadequate for the load applied (e.g. wind action). The strength of a building relies on adequate design, construction and continued maintenance. If parts of the building, its connections, bases or foundations are damaged or modified, its strength may be inadequate. For workers or those seeking shelter during a storm, the collapse of building has the potential to cause serious injuries from falling or moving debris associated with the structure, or parts thereof, collapsing.

Contributory factors

- Buildings not designed to withstand potential wind conditions as required by the Australian and New Zealand standard AS/NZS 1170.2 *Structural design actions – wind actions*.
- Construction of the building, including its bases and connections, not carried out in accordance with the designer's requirements.
- Buildings not inspected adequately, during or after construction, or maintained thereafter to a suitable standard.

Actions required

Principal employers, mine managers, building designers and constructors are reminded of section 14(3) and their duty of care obligations under the *Mine Safety and Inspection Act 1994* and duties relating to construction under the *Mine Safety and Inspection Regulations 1995*.

- Building designers and suppliers to determine the correct site wind speeds for the building's design, as required by AS/NZS 1170.2 [wind regions, Figure 3.1(A) and Table 3.2] and communicate this (together with any other loading or construction requirement) to relevant parties.

Note: Each site's conditions and building locations are unique and need to be correctly assessed to ensure site-specific wind speed is recognised.

- Building constructors must meet all design specifications, including the installation of the required anchorage and tie-down practices for buildings and temporary structures.
- Buildings must be inspected during and after construction to confirm the quality of construction and that the ongoing conditions meet the design specifications.

Note: Records of this inspection should be kept for future verification.

- Where an existing building's wind resistance is undocumented, assess (using a competent person) the building for the wind loads specific to their location, as required by AS/NZS 1170.2.
- Implement a building maintenance system, including periodic inspections by competent persons, to ensure buildings are maintained in a safe condition.
- Implement suitable systems and procedures for the management of potential hazards associated with severe weather events on site.

Further information

- Standards Australia, www.standards.org.au
AS/NZS 1170 *Structural design actions*
AS ISO 13822 *Basis for design structures – Assessment of existing structures*
- Department of Mines and Petroleum, Codes of practice, www.dmp.wa.gov.au/Safety/Codes-of-practice-16145.aspx
Safe design of buildings and structures – code of practice
- Department of Mines and Petroleum, Mines safety alerts, www.dmp.wa.gov.au/Safety/Minesafety-alerts-13194.aspx
Mines Safety Bulletin No. 124 Structural safety of buildings, plant and other structures
Significant Incident Report No. 182 Whirlwind carries transportable ablution block 50 metres

MINES SAFETY BULLETIN NO. 141

MAINTENANCE OF REFUGE CHAMBERS FOR UNDERGROUND MINES

ISSUED: 27 MARCH 2017

Background

Underground mine workers need access to a safe place of refuge in the event of an irrespirable atmosphere. Refuge chambers provide a safe haven to support life, with a supply of breathable air that must be ready for use at all times.

The basic life-support features of a refuge chamber include:

- reliable and clean compressed air supplies
- the capability to totally seal workers from an external irrespirable atmosphere
- a cooling system to prevent heat-related disorders over an extended period of use
- an effective chemical scrubber system(s) to remove expired contaminants (e.g. carbon monoxide, carbon dioxide).
- reliable power or battery supplies.

The Department of Mines and Petroleum's 2013 guideline on refuge chambers in underground mines recommends each refuge chamber have a design operating capacity of no less than 36 hours for occupants when operating as a stand-alone unit. Any refuge chamber not capable of sustaining life for this duration should not be used for emergencies (as defined by r. 4.36, Mines Safety and Inspection Regulations 1995), unless a risk assessment has confirmed its adequacy.

The Department of Mines and Petroleum have concerns that the capacity for some refuge chambers to support life in an emergency may have been compromised.

Summary of hazard

A compromised refuge chamber may lead to the following issues during an emergency:

- inability to support life for the recommended minimum duration of 36 hours
- ingress of contaminants into the refuge chamber
- failure of life support systems to operate effectively (e.g. contaminant gases, heat)
- reduced battery power capacity.

Contributory factors

A poor understanding of the critical life support system components in a refuge chamber may decrease awareness of the factors that can affect the chamber's performance and operational time.

Functionality

- Placement of the refuge chamber in a higher ambient temperature environment than the operating range specified by the original equipment manufacturer (OEM).

Note: A higher temperature may compromise the effectiveness of the cooling system, resulting in greater power consumption.

- Batteries replaced with a different type or mixed with different types, which may compromise the operational time of the refuge chamber.
- Corrosion of battery terminals, chassis and internal electronics equipment in the refuge chamber.
- Use of out-of-date chemicals in the scrubber system, which may reduce the effectiveness of contaminant removal from the air.

Maintenance and inspection

- Failure to identify defects due to the inadequacy of the inspection or service program.
- Inadequate maintenance of the mine air supply filtration system.

Note: Oil, moisture and salt can enter the refuge chamber and damage sensitive electrical and electronic equipment.

- Inadequate maintenance and inspection of seals and pressure equalisation mechanisms (e.g. valves).

Note: Irrespirable air from the exterior can enter the refuge chamber due to a failure to maintain positive pressure (i.e. damaged doors, rubber seals and grommets).

Actions required

The following actions are recommended to duty holders to assist in maintaining a refuge chamber so it can support life in an emergency situation.

Functionality

- Design and maintain the power supply to the refuge chamber so it is fully functional at all times throughout an emergency.
- Check the functionality of each refuge chamber regularly and after each move.

Modifications

- Apply a formal change management process to refuge chamber modifications, including the OEM's review and authorisation prior to modifying the chamber.
- Keep records of any modifications.

Maintenance and inspection

- Implement an adequate risk-based monitoring program to maintain refuge chambers in a state of readiness for the duration of any foreseeable emergency.
- Equip and maintain refuge chambers in accordance with the OEM's specifications.
- Verify that refuge chamber seals and pressure equalisation mechanisms are effective through regular leak testing.
- Ensure repair, replacement or maintenance work is undertaken by a competent person(s).

Further information

- *Department of Mines and Petroleum, Refuge chambers in underground mines – guideline*, www.dmp.wa.gov.au/Documents/Safety/MSH_G_RefugeChambersUGmines.pdf
- Refuge chambers in underground mines (webpage), www.dmp.wa.gov.au/Safety/Refugechambers-in-underground-7896.aspx

MINES SAFETY BULLETIN NO. 142

RATCHET VEHICLE SUPPORT STANDS

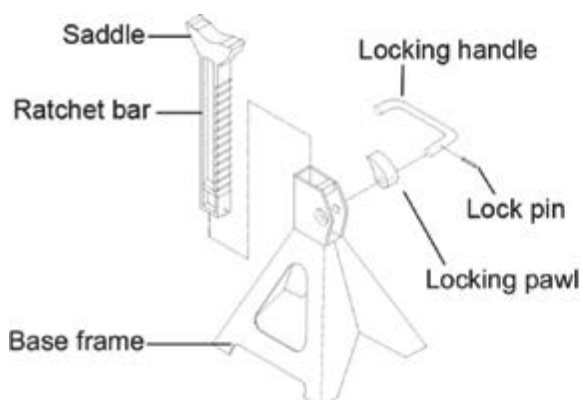
ISSUED: 12 MAY 2017

Background

The Department of Mines and Petroleum has observed a number of defective ratchet vehicle support stands during inspections at several mining operations.

This type of vehicle support stand is commonly used in workshops for a range of vehicle maintenance support tasks. These devices are very versatile as they are available in a range of sizes and associated mass limits. Ratchet support stands generally require minimal maintenance, have very few parts and are easily height adjustable.

A small but key element of the ratchet vehicle support stand is a lock pin (commonly a roll pin) that rigidly connects the locking pawl to the locking handle. The locking handle provides a downward force on the locking pawl when it engages with the ratchet bar during a height adjustment.



The lock pin can drop out, be damaged through shear forces or become distorted by crushing. If these problems occur the position of the locking handle may give a false impression that the locking pawl is engaged correctly in the ratchet bar.

Summary of hazard

Incorrect handling or use of a ratchet vehicle support stand in a manner not intended by the manufacturer may lead to a damaged lock pin or defective components. This damage may result in the sudden failure of the stand to support a load and could lead to serious or fatal injuries for workers or those in the vicinity.

Contributory factors

The following can contribute to failure of the stand to support the load.

- Faults not being identified through a lack of understanding as to how the locking pawl, lock pin and locking handle work in conjunction with each other.
- Damage or failure of the lock pin through:
 - inappropriate handling of the ratchet vehicle support stand



Left. Configuration of a ratchet vehicle support stand. Right. Sheared lock pin located in the locking handle.

- lifting or dragging the assembly by the locking handle
- adjusting the height of the ratchet bar by manipulating the locking handle using a lever or impact.

Actions required

Principal employers and mine managers are reminded under the Mines Safety and Inspection Regulations 1995 that plant be maintained and operated in a safe manner [regulation 6.2] and that an employer has duties when plant is damaged or repaired [regulation 6.22].

Training

- Train and instruct workers in the inspection and correct use of ratchet vehicle support stands

Note: This includes identifying that the locking mechanism is fully engaged when a load is placed on the stand.

Use

- Check for any defects before using each vehicle support stand.
- Avoid shock loading or lowering stands when they are loaded.
- Mark each stand with its working load limit (in kilograms).
- Store vehicle support stands under cover in a dry location.

Inspection and maintenance

- Implement a scheduled inspection programme to verify:
 - that no modifications have been made to any part of the vehicle support stand
 - the frame and other parts are not distorted or cracked
 - there is no movement between the locking handle and the locking pawl
 - there is no corrosion or damage.
- Remove damaged vehicle support stands from service, investigate and resolve the reason for the damage.
- Maintain vehicle support stands and replace parts in accordance with the manufacturer's specifications.

Note: Some manufacturers do not advocate the use of lubricants on ratchet vehicle support stand components.

Further information

- Standards Australia, www.standards.org.au
AS 2538 Vehicle support stands

MINES SAFETY BULLETIN NO. 143

USE OF AN EXCAVATOR BUCKET AS A LIFTING POINT

ISSUED: 12 MAY 2017

Background

Some mining operations are permitting excavator operators to pick up and relocate equipment using the ground engagement tool (GET) or bucket tooth of an excavator. In these instances, the site's risk assessment process has found the lifting practice to be acceptable although a competent person has not assessed the suitability of using the bucket teeth as a lifting point.

An excavator GET or bucket tooth is typically attached to the body of the excavator bucket with an adaptor piece. The adaptor piece is welded or pinned to the bucket body and the bucket tooth tip is commonly attached to the adaptor using connecting pin(s).

Bucket tooth tips and adaptors are typically made from hardened material for wear resistance. Depending on the fabrication technique (casting or forged), this material may be brittle and suddenly fail, especially if shock loading occurs (e.g. lifting).



A bucket tooth loaded with a wire rope sling (left) and a soft sling (right).

Bucket teeth are not normally designated or engineered by the manufacturer for lifting. They are designed for soil loading during earth moving operations, where they may be subjected to high stress loading and potential damage, which can reduce their strength.

Summary of hazard

The use of unrated lifting points on an excavator has the potential to expose workers to harm by the:

- sudden failure of a bucket tooth or sling, which can lead to
 - loss of control of the lifted load
 - a failed bucket tooth becoming a projectile hazard to surrounding workers, including the excavator operator
- instability of the excavator if the lifted load exceeds the excavator's tipping load.



A. Examples of a bucket tooth tip (left) and adaptor pieces. B. A fully assembled bucket.

Contributory factors

- Inadequate visual inspection of bucket teeth for damage during earth moving operations (due to position of potential damage, location of bucket and operating environment).
- Damage to the sling through excessive:
 - bending due to the bucket tooth dimensions not meeting the recommended bending radius of the sling
 - wear on the fibres of the sling from abrasive surface of the bucket tooth (i.e. no wear protection).
- Irregular inspection of slings for damage.

Actions required

Principal and other employers at a mining operation are reminded of the requirements of regulation 6.2 of the Mines Safety and Inspection Regulations 1995 for plant to be maintained and operated in a safe manner. The following actions are recommended if intending to use an excavator bucket as a lifting point.

- Use only designated lifting points on the bucket unless the GET assembly is assessed and rated as a lifting point by a competent person.

Note: The designated lifting point should follow the design and testing requirements set out in section 5 of Australian Standard AS 1418.8 Cranes, hoists and winches – Special purpose appliances.

- Adequately and regularly inspect slings for damage in accordance with manufacturer's recommendations and relevant Australian standards.

Note: Consider use of protective sleeves on slings if a GET assembly is to be used as a lifting point.

- Conduct practical tests to assess the competency of excavator operators to undertake lifting operations.
- Confirm an excavator is safe to use for lifting operations in accordance with the relevant standards, including AS 1418.8, or sound engineering principles. This includes:
 - determining rated capacity
 - inspection and testing
 - engineering controls (e.g. controlled lowering device).

Further information

- Standards Australia, www.standards.org.au
AS 1418.8 *Cranes, hoists and winches – Special purpose appliances*

MINES SAFETY BULLETIN NO. 144

GAS STORAGE FOR AUTOMATIC FIRE-SUPPRESSION SYSTEMS

ISSUED: 29 MAY 2017

Background

Automatic fire-suppression systems are usually installed in rooms containing significant amounts of electrical equipment, such as large server rooms and data centres. The systems typically work by automatically releasing an inert dangerous good (Division 2.2 non-flammable, non-toxic gas) in the server room or data centre to reduce the oxygen levels, which controls and extinguishes fires without human intervention.

Several incidents involving the unintended activation of fire-suppression systems have been reported. Due to an actuator failure, sites were unaware the system had activated. The Department of Mines and Petroleum has inspected sites that store their connected gas cylinders in a separate gas storage room to the data centre or server room. The potential for a gas release in the storage room may not have been adequately considered.

Note: In one incident a triple zero caller heard a large hissing noise coming from the gas storage room. The Department of Fire and Emergency Services attended and detected that the oxygen level in the gas storage room was below 19.5 per cent.



A fire-suppression system's gas storage cylinders.

Summary of hazard

The gas released when fire-suppression systems are activated is an asphyxiant hazard and can cause suffocation by diluting or displacing oxygen.

Contributory factors

- Gas cylinders are installed in workspaces.
- Inadequate risk assessment of the gas storage room, resulting in inadequate ventilation, no alarms (e.g. leak detector), no oxygen monitoring and no placarding or labelling on the door warning of the presence of dangerous goods.

Actions required

Operators are reminded of their duty to ensure that all risks associated with the presence of a hazardous atmosphere within the site are eliminated, or if this is not reasonably practicable, the risk arising from the hazardous atmosphere is minimised.

Note: A hazardous atmosphere in this case means an atmosphere that does not contain a safe concentration of oxygen for breathing.

Recommended actions include:

- taking measures to detect oxygen-deficient atmospheres in areas where there is a potential for an unintended gas release, such as server rooms and gas storage rooms
- Note: Alarms should be in place to alert workers when oxygen levels are below 19.5 per cent.*
- providing adequate natural or mechanical ventilation where connected gas cylinders are stored outside of the server room

- training workers in:
 - the risks of asphyxiation and control measures
 - procedures and processes for working in rooms containing gas storage cylinders
 - operation and maintenance of fire-suppression system equipment
 - the proper use, fitting and maintenance of personal protective equipment and risk control equipment
 - implementation of the emergency plan
- installing safety signage in accordance with AS ISO 14520.1 *Gaseous fire-extinguishing systems – Physical properties and system design – General requirements*.
- placarding the entrance to the building and each room where the total water capacity of all the gas cylinders and associated pipework of Class 2 dangerous goods exceeds 1,000 litres
- installing HAZCHEM signage at every entrance to the site.



Placard for Class 2 dangerous goods and HAZCHEM signage.

Further information

- Standards Australia, www.standards.org.au
 - AS 1851 *Routine service of fire protection systems and equipment*
 - AS 4332 *The storage and handling of gases in cylinders*
 - AS ISO 14520 *Gaseous fire-extinguishing systems – Physical properties and system design (set)*
- Department of Mines and Petroleum, codes of practice, www.dmp.wa.gov.au/Safety/Codes-ofpractice-16207.aspx
 - Storage and handling of dangerous goods – code of practice*

Note: This Bulletin has also been issued as Dangerous Goods Safety Bulletin No. 0117.

MINES SAFETY BULLETIN NO. 145

UNCONTROLLED MOVEMENT AND DERAILMENT OF FIXED CRANES DURING STORM WIND EVENTS

ISSUED: 1 JUNE 2017

Background

In recent years there have been several incidents of fixed cranes running away during windy conditions. During these incidents, there was uncontrolled long-travel movement of the crane to the end of the runway and contact with the long-travel end stops.

The resulting impact with the long-travel end stops damaged the end stops, and caused the crane carriage to dislodge from the runway rails. Further use of the derailed crane could have resulted in a collapse of the crane.

Summary of hazard

During storm wind events fixed cranes and their associated structures are exposed to loading which may not have been considered in the design and construction or during the operation of the crane.

This can lead to overload of parts and loss of control of the crane or load which has the potential to cause injury to those in the vicinity.

Contributory factors

Based on wind runaway incident reports and classified plant registration reviews, inspectors have identified the following.

Design and communication of design specifications

- Crane's design not addressing all the requirements of Australian and New Zealand Standard AS/NZS 1170.2 *Structural design actions – wind actions*.
- Inadequate dissemination of design specifications by the designers of the crane, including validation that the manufacturer has understood the designer's specifications.

Safe systems of work

- The crane's system of work not addressing the crane's operating limits (e.g. crane operated in wind conditions exceeding design constraints).
- Crane operators not trained and assessed as competent for the type of crane to be used, including work to be performed and potential hazards of the operating environment.
- The storm-locking arrangement on the crane (where available) not utilised after each use or before a strong wind event.



Upper carriage (left) and lower carriage (right) of semi-gantry crane following a derailment.

Actions required

The following actions are recommended to reduce the potential for fixed crane runaways.

Design and communication of design specifications

- Designers of cranes must consider the expected wind loading (i.e. AS/NZS 1170.2) and issue design specifications that satisfy the required safety margins for both in-service and out-of-service wind speeds (e.g. sufficient counterweight for overturning, automatic braking and locking systems to prevent sliding)

Note: During the planning of the crane's design, parties must agree and record the operational requirements regarding the in-service wind speed.

- Designers must confirm that their design and drawings have been interpreted correctly by the manufacturer, so that the manufacturing (detailing) drawings are suitable for construction of the crane.

Construction and commissioning

- Manufacturers must verify all aspects of the design have been met:
 - provision of all relevant data required for the design of the runway girders (i.e. AS 1418.18 *Cranes, hoists and winches – crane runways and monorails*, Appendix A)
 - provisions for counterweights if specified
 - drives (which provide suitable braking effort), drive numbers and arrangement
 - suitability of the rail system, including alignment checks and condition.

Safe systems of work

- Employers are to implement a safe system of work to ensure the crane is operated within its design specifications.

Note: Address provisions for locking and/or braking devices and positioning of the crane during storm wind events. Utilise suitable wind-speed monitoring systems where specified.

- Managers and supervisors are to:
 - provide workers with adequate instruction, training, assessment and supervision to operate fixed plant cranes
 - frequently inspect and suitably test critical equipment (not limited to brakes, electrical controls and drives) using competent person(s)
 - ensure modifications to a crane are assessed by competent person(s) to confirm conformance with Australian standards.

Further information

- Standards Australia, www.standards.org.au
 - AS 1418.1 *Cranes, hoists and winches – general requirements*
 - AS 1418.3 *Cranes (including hoists and winches) – bridge, gantry and portal cranes (including container cranes)*
 - AS 1418.18 *Cranes, hoists and winches – crane runways and monorails*
 - AS/NZS 1170.2 *Structural design actions – wind actions*
 - AS 2550.1 *Cranes, hoists and winches – safe use – general requirements*
 - AS 2550.3 *Cranes, hoists and winches – safe use – bridge, gantry, portal (including container cranes), jib and monorail cranes*
- Department of Mines and Petroleum, Guides and procedures, www.dmp.wa.gov.au/Safety/Guides-and-procedures-16202.aspx
 - Evaluation of asset integrity management system (AIMS) – guide*

Note: Although issued for petroleum operations, this guide has general application to the mining industry.

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