AusIMM THE MINERALS INSTITUTE

Health & Safety Newsletter

INSIDE THIS ISSUE

H&S NEWS
DECEMBER 2010

FOUR TIPS FOR ATTENDING A RISK ASSESSMENT

So you've been invited to a Risk Assessment? Not sure why you've been invited or what is going to happen there? Not sure how you can best contribute? Here's **four tips** on what to expect in a **team risk assessment session**, including the **terminology** you might hear, how the **process** might work, and how you can best **contribute**.

If you've been asked (or told) to attend a 'Risk Assessment' but have never participated in one before, it's likely that you're a little unsure about exactly what is involved and why you're being asked to contribute.

Risk assessments have become an extremely common tool used in the mining industry to look at work procedures, pieces of equipment, plant setups, new practices or system and basically anything else you can think of in a mining operation. Risk assessments are typically carried out whenever there is something **new** or something has **changed**.

There are a range of different risk assessments we perform on a mine site, from an on-the-job hazard assessment, through to a team talk before a job starts, right up to a full, formal, documented risk assessment. It is this final formal type that we are focusing on here – the type where you will receive an invitation to attend a session lasting from a few hours to a few days.

1.What to expect

A **formal risk assessment** usually involves a **team of people** working through a **structured process** that involves the following **steps** (*you can find definitions of some of the key terms later in this article*):

1. Defining the task steps or areas of focus
2. Identifying hazards in each area
3. Assessing the risk associated with each hazard
4. Deciding what further controls are needed

A **facilitator** will run the session, and his job is to help everyone understand the process and tools that will be used, and to keep everyone on track. The facilitator will explain the process at the start of the session, but there is a lot of value in just waiting to see how the process works by actually watching as it gets underway.

The **team** will be between four and 15 people (depending on requirements). The team will include people from all over the mine site with all sorts of different jobs and experience levels.

Many parts of the risk assessment process involve the group 'brainstorming' and discussing ideas. It is important that everyone gets a chance to have their say, and that all ideas are captured, so make sure you throw in your ideas at each stage of the process. The entire process is based on the **groups'** opinions, consensus and (wherever possible) agreement. You won't be required to do anything by yourself, but the team only works when everyone contributes!

2. Why you've been invited

When carrying out a risk assessment, it is **vital** that a wide range of people attend and give their input. Different people have different experiences and are also going to be doing different roles relating to whatever it is you are carrying out the risk assessment on. It is very important that a range of people from different roles are represented in the risk assessment team – so you should find yourself in the session with some people you don't usually work with, and some people you do. It's the **range of views and opinions** that makes the risk assessment process so thorough and worthwhile.

So you will have been invited because you bring a **unique** viewpoint or experience to the team that is necessary to make sure the process and outcomes are thorough. You're a key member and the team can't do it without you!

3. Terminology you will hear

Hazard – *a situation or energy source with the potential to hurt someone or have a negative impact on the environment or the business.*

Risk – *a combination of the likelihood of a hazard causing a negative outcome and the consequence if this hazard does occur. Usually has a classification such as low, medium, high, or a numerical ranking.*

Likelihood – *how likely it is that a hazard will turn into something negative (i.e. the probability of an accident resulting from the particular hazard).*

Consequence – *the negative impact that could result from a hazard (i.e. the injury that might result).*

Risk matrix – *a table on which we look up the likelihood and the consequence of a hazard to find out what risk level the hazard has. Each individual mining company will have a different matrix, but it might look something like the one at the end of this article. You'll be given the one for your company at the session.*

Acceptable risk – *each company will define the level of risk that they consider acceptable. We can't remove all risk, so we need to define what we will accept. This should be shown on the company's risk matrix. We are always trying to reduce the risk to **below** this level, but this is the maximum we can accept.*

ALARA / ALARP – *As Low As Reasonably Achievable or As Low As Reasonably Practical. This is our aim, to get our risk levels down as low as we **reasonably** can. We can't reduce the risks to zero, but we need to do as much as we **reasonably** and **practically** can to reduce them.*

Controls – *the things we do to lower a risk or prevent a hazard becoming an injury (i.e. PPE, guarding, procedures, training).*

Actions – *The controls we decide are important to manage risks are not worth anything unless they are actually put into action. An important step in the risk assessment is to record exactly who will take action on the controls, what they will do and when they will do it by.*

Residual risk – *once we have done all we can to reduce the risk on a particular hazard to ALARA or ALARP, there will still be some risk there (we can rarely get it down to no risk without eliminating the job altogether). The amount of risk that remains after we've put our controls in place is called the residual risk.*

4. How to contribute

My best advice is to go into the process (like you should with anything you are new to) with an **open mind** and **take the time** at the start of the day to see how things work and understand the process. Risk assessments are an **extremely powerful tool for improving safety and operations** when they are done well and when the team works together with good discussions and everyone contributing.

Risk assessments are a chance to influence safety for a long time to come, and should be seen as a forum for doing that.

For each topic area that the team is looking at, **just work through the following five questions over and over**:

- *What could go wrong?*
- *What would happen if it did go wrong?*
- *How likely is it to go wrong?*
- *What can we do to reduce the chance of it going wrong?*
- *What can we do to reduce the impacts if something does go wrong?*

This is the general pattern of all risk assessments (in very simple terms). We use a structured process, a highly paid facilitator, and a big table for recording the results — but in general it is the five steps above that we follow over and over to make sure we've covered every hazard.

Make sure you are thinking about things that could **realistically** happen, while also keeping in mind and discussing with the group any extreme outcomes that might be very unlikely. A good risk assessment team will consider things that could *easily* happen where the outcome is not too severe (i.e. a first aid treatment), as well as things with serious outcomes that are *unlikely* to happen (i.e. a slip or trip resulting in a fatality).

Summary

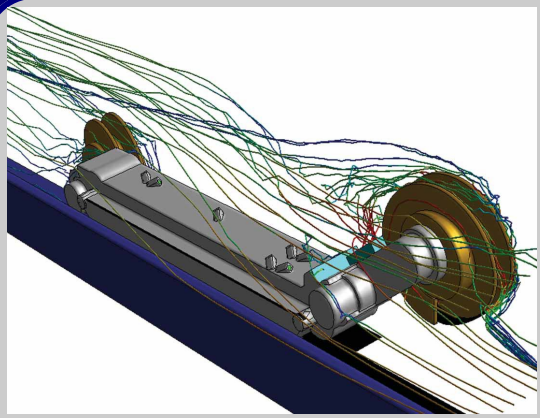
Risk assessments are an **extremely valuable tool** for managing safety across all areas of the mining process. But their success depends on the team involved being **proactive**, **thoughtful**, and **committed** to finding practical solutions to the hazards that they uncover.

Go into the session armed with the tips above and an attitude of wanting to make a difference to safety, and you should find the day interesting, challenging and enjoyable.

Stay safe and productive.

By Jamie Ross, member of The AusIMM H&S Committee, and author of many safety and leadership articles specific to the mining industry at his blog MiningMan.com.

Read more on this topic here: http://www.miningman.com/



Dust busting: *Computer-generated image showing dust and airflow patterns around the longwall shearer*

The other kind of 'clean coal'

The most obvious hazards in a coalmine are the presence of gas and the threat of explosion, plus floods in wet mines and structural collapse in particularly unstable ones.

But two other killers — less obvious and less cataclysmic – pose significant risks to mine workers.

They are pollutants in the form of coal dust and diesel particulates from engine fumes.

Coal dust can, if not handled carefully, result in serious health issues, chiefly high concentrations of breathable coal dust, which can lead to pneumoconiosis — or 'black lung disease' — and silicosis from mining material with a high quartz content. There are measures that mines can take such as ensuring workers wear masks and introducing engineering controls including ventilation dilution, water infusion, wet-cutting, water sprays, wetting agents and foam and dust collectors such as dust scrubbers.

Better-than-expected results from recent tests of a dust scrubber at BHP Billiton Mitsubishi Alliance's mine at Broadmeadow in Queensland's Bowen Basin give hope for healthier mine environments.

Scrubber systems have been tested before but success was limited by a lack of understanding of the dust and airflow patterns around the sites for dust control. With the support of the Australian Coal Association Research Program (ACARP), CSIRO has taken on several research projects based on Computational Fluid Dynamics (CFD) modelling to improve the understanding of dust flow patterns around the longwall shearer and walkway under different operating conditions.

Scrubbing in

The new shearer scrubber system trialled at Broadmeadow was developed by two of CSIRO Exploration & Mining Division's senior scientists, Senior Research Engineer and Project Leader Dr Ting Ren and Senior Principal Mining Engineer Dr Rao Balusu, together with the environmental remediation company EnviroCon.

As Dr Ren explained, "the scrubber is a modular system consisting of an intake hood directed into the intake ventilation, a hydraulic-driven fan sucking the air into an impact filtration system and a discharge duct forcing the clean air under the shearer body towards the face".

A series of sprays was incorporated into the sides of the intake hood to create an agglomeration impact point for the dust/water mixture prior to impact filtration removal. These sprays were also designed to provide positive pressure resistance and create an 'air curtain' to stop dust entering the walkway and, secondly, to blow airborne dust out of the walkway.

"Cleansed air is discharged under the shearer ranging arm towards the face. The combination effect of the spray pressure, flow and design adds additional collection and dust behaviour modification to the system," Dr Ren said.

"We only had extremely confined space around the shearer and therefore the shearer scrubber has to be designed to fit and survive in such a harsh environment. We achieved this by incorporating innovative 3D CFD modelling studies and engineering designs."

The mine commissioned Gillies Wu Mining Technology Pty Ltd to establish the effectiveness of the longwall shearer scrubber in reducing dust at manned positions where shearer operators work during the cutting cycle. Four cycles were monitored with the first two undertaken by a day-shift crew and the second two by a night-shift crew.

Positive results

Monitoring results indicated that the dust reduction rate varied from 43 per cent (with average dust concentration falling from 1.35 mg/m^3 to 0.77 mg/m^3) to 56 per cent (with average dust concentration falling from 1.59 mg/m^3 to 0.70 mg/m^3).

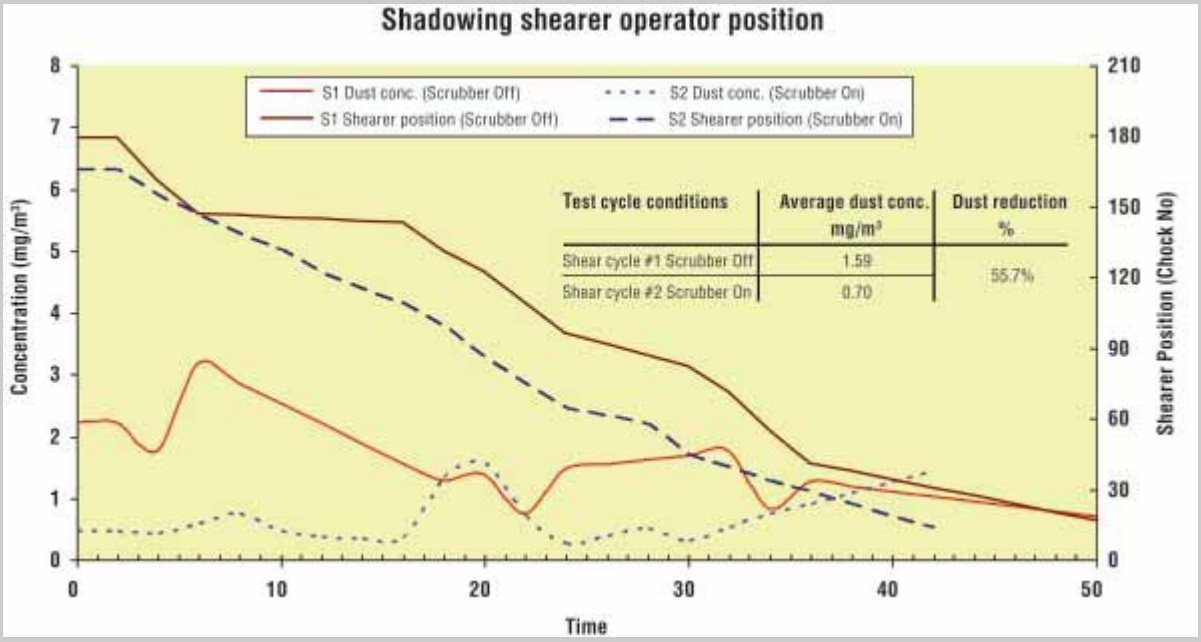
According to Dr Ren, the results were better than expected and indicated a positive advance in mine safety.

"We are making a great step in dust control (mostly coal dust) on longwalls by the installation and demonstration of this longwall shearer dust scrubber at Broadmeadow Mine," he said.

"We are currently evaluating the effectiveness of the scrubber but our initial observation following its installation has been extremely encouraging and this has been endorsed by longwall operators at the mine."

"We now have very positive feedback from the mine and the crew working on the longwall," Dr Ren added. "The scrubber will become an integrated part of their shear system and specific operating protocols will be implemented at the mine to ensure the effectiveness of the system."

There is already strong interest being shown by other mines and more tests and refinements are due before the product can be commercialised.



Clean sweep: *The best results show dust reduction rate was 56 per cent*

Reflections of The Nine Lives of a Geologist

The exploration and mining environment contains many hazards that are both natural and man-made. The hazards occur within defined mine site environments as well as exploration areas embrace all types of environmental and terrain conditions.

As a minerals industry professional, every geologist, who has a level of responsibility for his/her own safety or for the safety of others, needs to gain an appreciation of the nature of the hazards that have potential to result in work-related fatality, injury, disease and ill-health. The professional geologist needs to be a part of a system that addresses the risks associated with site hazards and to develop strategies to effectively manage and control these risks.

In addition, by definition, exploration geologists are engaged in activities that can encourage them to explore new areas, particularly those where the nature of the hazards are often unknown or not clearly identified.

Hazard identification and risk management includes personal safety and the safety of colleagues and persons under supervision. Geologists need to consider a further level of professional input to compile and analyse geological information for use by mining engineers and mine managers to assess and manage their risk associated with geological hazards. Not only does technical data need to be compiled but there is also a need to assess the reliability of such data and the likely range of adverse outcomes possible within error limits of the data collected.

So when the members of The AusIMM Health & Safety (H&S) Committee were asked to consider contributing to the latest edition of the *Field Geologists' Manual*, it was a task that we embraced with much relish, given our collective extensive fieldwork experiences, some not so pleasant, gained over many years working on mine sites and in the field generally!

In my own case, I recall that when studying mining at Melbourne University in 1968, our student group was taken through some of the unsafe underground mining operations I have ever experienced — the now abandoned tin and tungsten mines of Storey's Creek and Rossarden in Tasmania. In one of these operations, the double-decker man cage that conveyed us, four men at the time, down through a deep shaft that penetrated a section of unstable ground was one of the hair-raising experiences of my earlier life as a trainee geologist. We exited the workings by scaling a myriad of open ladders and scrambling up narrow risers, which were not better than gopher diggings. The place was a disgrace, and it does not surprise me that it was closed in the 1970s. The old 'pit-pony' operations of the Wonthaggi Coal mine (also visited during that year) were not much better!!

The first nine years of my career as a novice exploration geologist (working for several large mining companies and a consulting firm) exposed me to so many hazards encountered whilst working with drilling rigs and heavy equipment under all sorts of conditions, and then geological prospecting, in some very difficult and dangerous areas located in Australia and in PNG. I often wonder how I survived a range of serious incidents (e.g. vehicular, helicopter, flooded watercourses, etc).

I had received no H&S training or guidance from any of these employers – I can only assume that perhaps my formative years of military training in the navy and years in the scouting movement provided me with some innate skills that saved the day for me, time and time again, or perhaps, I was just darn lucky!

However, whilst working in the United States (US) on 'home territory' with Cyprus Mines Corporation, I did acknowledge that all field staff members were required to attend structured safety courses with the US Bureau of Mines.

My awareness of H&S arose in 1978 when, as the Area Manager of the Mt Hotham Alpine Resort (engaged because of my geoscience qualification and project management experience to undertake all the slope rehabilitation and erosion control work), I became responsible through 'duty of care' considerations for all visitor safety, including skiers — this eventuated after the well-publicised death of three skiers. My duties were expanded to assume responsibility for a professional ski patrol, a medical centre, and an SES unit. From that point on, the resort management undertook hazard identification in all areas of the resort, particularly along ski runs and cross country trails!!

Returning to the mainstream mining industry during the 1980s, I had the opportunity to visit most of the coalmining operations (particularly underground) in New South Wales (NSW) and to experience firsthand, and working alongside the coal mining inspectors, to gain a keen appreciation of a well oiled and regulated H&S regime.

In working on this project, my other H&S committee colleagues were also keen to relate their own experiences. One colleague, a CEO of a minerals exploration company, tabled a one-page list of the more serious hazards that have killed or injured so many of his friends and injured himself on some occasions over the last 30 years. He recalled that he has lost seven friends or colleagues killed and three with permanent injuries that prevented them from continuing their careers, mostly from vehicle and helicopter incidents.

Another colleague recalled six Falconbridge Mines directors who all perished in a light plane crash in Canada in the mid 1970s; a geologist who sustained a permanent disability with a billy of boiling hot porridge that spilt on his leg when a handle broke; a geologist who drowned, at the Emu Mine in Western Australia (WA) (one of a total of six drowned including mine manager when a riverbank burst and flooded open cut and portal); a mine manager killed by head injury from a truck reversing into the one he was driving; and the list goes on!

So it would not be surprising to learn that the contents of the H&S chapter in the new *Field Geologists' Manual* were compiled with the best interests of inexperienced and uninitiated young field geologists in mind as the target audience. Yes, we are aware that industry practices have improved markedly over the past 40 years, and that all of the larger companies will or should have in place well documented H&S processes and training regimes. However, this may not be the case for small companies, or in field offices, well away from the well controlled environments of head office and regulated mine sites.

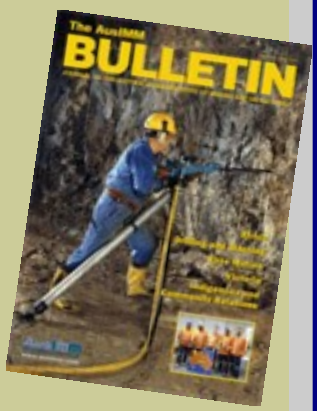
The AusIMM H&S Committee does hope that the new manual (scheduled for release next year) will provide much needed guidance for our AusIMM colleagues for avoiding death or serious injury in the pursuit of their cherished career aspirations, surviving their fieldwork days with all nine lives intact!

Angus M Robinson
(former exploration geologist)

The AusIMM Bulletin Update

The December 2010 edition of the Bulletin has been published! Features include:

- *Africa*
- *Drilling and Blasting*
- *Base Metals*
- *Victoria*
- *Indigenous and Community Relations*



The February 2011 edition is currently in production, with features to include:

- *China*
- *New South Wales*
- *Coal*
- *Water in Mining*
- *Underground Mining*

If you are interested in submitting to future editions of the Bulletin, please send an outline of your proposed article to the Editor via editor@ausimm.com.au

The AusIMM Bulletin is also available online! Members Only section:
http://www.ausimm.com.au/content/default.aspx?ID=43
(please ensure you are logged in)

The AusIMM Events

14th Australasian Tunnelling Conference 2011
8 – 10 March 2011, Auckland, New Zealand
Register online via the 14th Australasian Tunnelling Conference 2011 website

11th AusIMM Underground Operators' Conference
21 – 23 March 2011, Canberra, ACT, Australia
Register online via the 11th AusIMM Underground Operators' Conference website

Calling for papers !!

The AusIMM New Leaders' Conference 2011
4 – 5 May 2011, Newcastle, New South Wales
Calling for papers, deadline 17 December 2010,
submissions via email to otetfong@ausimm.com.au

The AusIMM International Uranium Conference 2011
8 – 9 June 2011, Perth, Western Australia
Calling for abstracts, deadline 1 February 2011
submissions via The AusIMM International Uranium Conference 2011 speakers' Portal

MetPlant 2011
8 – 9 August 2011, Perth, Western Australia
Calling for papers, deadline 15 December 2010
submissions via the MetPlant 2011 Conference Speakers' Portal

35th APCOM Symposium
26 – 30 September 2011, Wollongong, New South Wales
Calling for papers, deadline 23 December 2010
submissions via the 35th APCOM Symposium Speakers' Portal

Eighth International Heavy Minerals Conference 2011
5 – 6 October 2011, Perth, Western Australia
Calling for papers, deadline 20 December 2010
submissions via the Heavy Minerals 2011 Speakers' Portal

Explo 2011
27 – 28 October 2011, Melbourne, Australia
Calling for papers, deadline 13 December 2010
Submissions via the Explo 2011 Speakers' Portal

Second International Future Mining Conference 2011
22 – 23 November 2011, New South Wales, Australia
Calling for papers, deadline 31 January 2011
Submissions via the Second International Future Mining Conference 2011 Speakers' Portal

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You can also find out more about the H&S Committee by visiting our webpage! : http://www.ausimm.com.au/Content/default.aspx?ID=205

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