

DIGGING DEEPER

Wran Consultancy Project
Executive Summary

Independent Consultant Report by **Shaw Idea**
Commissioned by NSW Mine Safety Advisory Council



NSW DEPARTMENT OF
PRIMARY INDUSTRIES





Preface

The entire NSW mining industry's commitment to achieving and sustaining world-class performance in OHS is demonstrated by the commissioning in 2007 by the NSW Mine Safety Advisory Council (MSAC) of research into: production bonuses and safety incentives; working time and fatigue management; and OHS management systems and consultation.

These three, interrelated, topics were priorities identified by the Wran Mine Safety Review in 2005. In 2006, the newly-formed and revitalised MSAC moved quickly to develop a comprehensive research project and then selected a consulting consortium lead by Shaw Idea to carry it out within a relatively short time frame.

'Digging Deeper' is an apt name for this project. Never before has so much detailed and credible information been obtained from all sections of the NSW mining industry. Never before have so many sites been visited, people interviewed, questionnaires completed and follow-up workshops held. The extensive knowledge gathered from this process has provided a clear picture of how work is structured and how systems are implemented in the NSW mining industry. This knowledge also provides an insight into how relationships can be built that improve management and performance in the industry.

The process, the information, the analysis, the outcomes and the recommendations are contained in this two volume report of the project.

All sectors of the industry – coal, metals and extractives, large, small, local and multinational – have been willing participants throughout. The result is a veritable mine of cross-checked information, opinion and data that form a statistically sound foundation for the conclusions and recommendations.

The commitment of the groups represented on MSAC (NSW Minerals Council; Cement, Concrete and Aggregates Association of Australia, NSW; Construction, Forestry, Mining and Energy Union, Mining and Energy Division; Australian Workers Union and the NSW Department of Primary Industries) to encourage their members to play a full role in the project is laudable and contributed markedly to the validity of the information obtained. This commitment demonstrates MSAC's resolve to make a positive difference in OHS in the NSW mining industry.

The report demonstrates that the industry has made major steps in managing the significant mining-related OHS risks over the years. The industry and those who work in it are to be congratulated. The report, however, did identify a number of areas where improvements are required. Importantly, MSAC has accepted the report, considered the recommendations and developed a program of action to address them. MSAC has informed the Minister for Primary Industries of its program and has recommended the Minister supports the program and promotes the report and its findings in NSW and beyond.

MSAC's first priority is to oversee the development and implementation of an industry-wide fatigue risk management education and improvement strategy that is supported by NSW DPI, employer groups and unions. High priority will also be given to developing a consultation, education and improvement strategy that covers all sectors of the NSW mining industry, then overseeing its subsequent implementation. In a similar vein, MSAC will oversee the implementation of an OHS management system education and improvement strategy that is agreed to by all the stakeholders. On the matter of production bonuses and safety incentive schemes, MSAC will oversee the implementation of a review of safety incentive schemes and the use of production bonuses by industry at company and site level.

Each of these programs will be undertaken with the full involvement of MSAC's membership. Moreover, their implementation will be followed up and progress reported to MSAC at regular intervals.

To accompany each of the four programs, MSAC will develop and implement an information and communication strategy to inform the NSW mining industry of the 'Digging Deeper' project outcomes and of the educational and OHS improvement strategies that are being developed and implemented.

The efforts of all who contributed to this important and impressive report are acknowledged with thanks. These efforts will, however, only be worthwhile if the momentum is maintained, through the concerted programs of action outlined above that seek to focus activity to improve OHS performance in the NSW mining industry. Addressing the issues that have been identified in this report is crucial. Not to do so would be cynical in the extreme. It is with this in mind that MSAC has prioritised its activities so that tangible improvements will soon be achieved.

MSAC will work co-operatively with all stakeholders across sectors, companies and regions to reinforce the need for action to implement more effective approaches to OHS in NSW mines, and thereby achieve the goal of world-class OHS performance and zero harm to the mining workforce.

Norman Jennings
Chairman
NSW Mine Safety Advisory Council

A handwritten signature in blue ink, appearing to read 'N Jennings', with a long horizontal stroke extending to the right.

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Executive Summary

Introduction

This report details the findings of the *Digging Deeper* Project, commissioned by the New South Wales (NSW) Mine Safety Advisory Council (MSAC). This project was undertaken by a team of researchers:

- Andrea Shaw (Shaw Idea Pty Ltd) as project leader;
- Dr Verna Blewett (New Horizon Consulting Pty Ltd);
- Laurie Stiller (Beyond Words);
- Christine Aickin (Workability Pty Ltd);
- Prof Drew Dawson (Centre for Sleep Research, University of SA);
- Dr Sally Ferguson (Centre for Sleep Research, University of SA);
- Dr Stephen Cox (Stephen Cox Consulting); and
- Professor Kaj Frick (Malardalen University, Vasteras, Sweden).

The project gives an accurate and reliable picture of the state of play in the NSW Mining Industry with respect to the topic areas of:

1. Production bonus and safety incentive schemes;
2. Hours of work and fatigue management; and
3. OHS management systems disconnect and consultation.

During the project we have worked with all sections of the industry to develop practical and effective strategies to strengthen OHS management in the areas covered by the topics.

Method

We undertook the project in an 11-stage research process:

1. Write a literature review
2. Prepare and distribute an issues paper
3. Conduct a census of mines and interview key stakeholders
4. Refine the sampling and data collection strategy
5. Produce an interim report
6. Data collection
7. Data analysis
8. Write interim report
9. Conduct three *Future Inquiry* workshops
10. Write draft report
11. Write final report.

The findings that resulted from this process for each of the project topics are summarised below.

Production bonus and safety incentive schemes

Schemes used in the industry

Production bonus and safety incentive schemes were most commonly found in the coal sector and most extractive sites had no schemes of any type. There were two types of safety incentive schemes – those that involved a financial payment in exchange for achievement of outcome targets and those that involved reward or recognition for contributions to the OHS management process. Production bonus schemes in place included schemes that did not include safety components and some that combined safety with production criteria. Most schemes applied to operational employees only, with only 11 schemes including staff and managers. Only two schemes included subcontractors.

A surprising number of interviewees on sites with these schemes were not aware of the nature or even existence of them. This may be because most schemes had been in place for some time and were historic or part of a broader industry or corporate framework. As a result there had often been limited or no consultation in determining the OHS measures that were included.

For the schemes that involved payments or tangible rewards for achievement of outcomes, the measures or targets used to determine eligibility covered the whole site. Thus, if there was a lost time incident in one part of the site, the payment for everyone on site was affected. While subcontractors were usually not directly involved in these schemes, injuries or incidents that involved subcontractors were often taken into account in determining eligibility for payments. Thus, if a subcontractor experienced a lost time incident, direct employees on the site would have their bonus or incentive payment affected. In contrast, the safety incentive schemes that involved recognition for contributions to OHS management were often on the basis of team performance or contribution.

Impact on OHS

Production bonus and safety incentive schemes that involve payment in exchange for achieving particular outcome targets have not proved themselves to consistently or reliably improve safety outcomes. The confusion about the presence of such schemes evident in our interviews and in questionnaire responses suggests that any positive effects are likely to be limited at best.

The most commonly cited benefit was that the schemes encourage effective injury management. Rather than a benefit, this could well be seen as a cost of the schemes, since responding promptly to injuries is a fundamental building block of effective OHS

management. If such action is only undertaken when there is a financial benefit available, the basics of OHS management may not be in place. As the *Future Inquiry* Workshop participants identified, in a world class OHS system, people contribute to OHS management, not because of extra money, but because it is ‘the right thing to do’.

Generally, sites reported that safety incentive schemes making payments as a result of achievement of outcome targets either made no difference at all or had negative effects on incident reporting. The questionnaire responses suggest that this is more likely where large payments are involved, which further reinforces the negative consequences that may have been realised.

A small number of sites had safety incentive schemes that recognised contribution and effort towards OHS. More positive outcomes for organisational factors associated with effective OHS management were evident at these sites, suggesting that an approach involving recognition of contribution rather than payment for outcome targets may have more positive results. *Future Inquiry* workshop participants reinforced the value of such an approach and recommended that the ideal safety incentive scheme provides recognition for high achievement and contribution, not payment in exchange for low levels of reported injuries, however defined.

Better reward and recognition schemes

As a result, we recommend that NSW mining enterprises should review their existing safety incentive schemes and shift them from a focus on outcome data to a focus on improvement and contribution. A guide to undertaking such a review is provided as Attachment 10 in Volume 2 of this report.

Given the potential for under-reporting and the other negative effects associated with payment schemes based on outcome measures and the lack of evidence of value from them, we recommend that such schemes should not be used in the industry.

We did not find that there was necessarily a direct link between production bonus schemes and breaches of work procedures such as ‘short cuts’, although we did receive some reports of such problems. However, the link between roster risk and high production bonus payments needs more careful examination at those sites that make such payments to ensure that payment systems are not creating disincentives for addressing working arrangements with negative OHS consequences.

Hours of work and fatigue management

Hours of work

Hours of work in the NSW mining industry are high (average 49.8 per week) and far in excess of the hours worked in the mining industry on average around Australia (average 44.7 per week). The following factors affect the hours of work:

- *Occupation.* Those in management and professional positions work longer hours than those in blue collar and administrative positions.
- *Sector.* Those working in the metalliferous sector work significantly longer hours (54.33) than in the extractive (50.33) and coal (48.10) sectors.
- *Employment status.* Contractors work longer hours (51.86) than direct employees (50.12) across the industry. The difference between contractors and direct employees is largest in the metalliferous sector (65.85 compared with 52.40).
- *Size.* Those employed at large sites work longer hours than those at small and medium sites. In particular, those employed at large sites in the coal and metalliferous sectors work significantly longer hours (52.24) than those employed at small and medium sites (48.39).
- *Location.* Those employed at sites in the far west of the state work significantly longer each week (55.75) than every other region.

Monitoring hours of work

The census of the industry showed that the overwhelming majority of sites use timesheets to record and monitor hours of work and that the use of swipe cards, while limited, is spread across large sites in all three sectors. Many sites reported that the data collected about working hours are monitored to ensure agreed maxima are not exceeded. However, even where swipe cards are used to record hours of work, information about hours on site is not always used to track hours so that those on site approaching or exceeding a specified limit can be identified and alerted.

As this suggests, the main control measure over hours on site is not the monitoring system. For blue collar employees, the main control is the existing industrial arrangements over hours of work that specify when overtime is worked. For white collar employees, there are few, if any, controls. Management and professional

employees all reported that their hours were not formally monitored or reviewed.

Given the long working hours identified in the NSW industry, more rigorous and interventionist monitoring of hours would be useful. Given that hours of work information is collected at almost all sites, this would not require the introduction of new systems. Rather, existing systems should be extended to staff positions and the full functionality of existing systems should be used. This does not necessarily mean that staff should clock on and clock off, but sites should be tracking and, where necessary, controlling the hours worked by all workers on site.

On the whole, a smart card system has strong support, but we are concerned that this is because sites may see this as an easy solution, and not undertake the risk management action needed to effectively manage hours of work and fatigue. A smart card system would not address the problems we observed with monitoring and assessing hours of work in the NSW mining industry. For existing smart card systems to have maximum functionality, the systems established by different providers must be able to interconnect to read records of hours worked stored on cards provided by other companies.

Shift arrangements and fatigue

Many people interviewed reported that they were fatigued as a result of their hours of work and shift arrangements. Respondents reported statistically significant differences between fatigue according to shift. Night shift was reported to cause significantly worse effects on work performance and fatigue levels than either afternoon or day shift. Afternoon shift was significantly worse than day shift. The finding that night and afternoon shift have such effects on key parameters such as work performance, alertness and ability to concentrate suggests that current shift arrangements are not adequately managing the risks associated with shift work.

Our data show that fatigue and other problems arise primarily from the time of day that work is being done, not the number of hours involved.

Each site was assigned a risk rating based purely on the roster arrangements using criteria that are well established to contribute to increased fatigue-related risk. On the basis of these factors, 24 rosters were low risk, 16 were medium and 11 were high risk.

We found that:

- Roster arrangements on most sites with extended shift rosters (both high and medium risk) are not designed to accommodate circadian rhythms.

- Some high risk shift rosters do not allow for long enough breaks so that workers can get sufficient rest between shifts.
- Many high and medium risk rosters do not provide adequate breaks within shifts. This accounts for nearly half of all of the rosters we identified.
- Some high and medium risk rosters work so many consecutive shifts and/or involve such extensive on-call work for at least some groups of workers that a cumulative sleep debt is likely to be accrued and was reported to us.

Roster arrangements therefore do not effectively control the risks associated with extended hours and shiftwork in all cases.

Fatigue risk management

The NSW mining industry recognises the importance of effective control of OHS risks arising from fatigue and hours of work. Despite this, few sites provided evidence of systematic risk assessments of fatigue. We found limited evidence that sites had a thorough understanding of the causes of fatigue, with most attitudes to fatigue focussed around non-work causes, rather than the contributions made by working arrangements. The importance of addressing the inter-related personal and organisational factors was not widely recognised.

The industry has had significant opportunity to voluntarily adopt effective, preventive approaches to fatigue risk management and a number of sites in our sample demonstrated both the benefits and the barriers faced by such approaches. However, the limited adoption of such an approach suggests that voluntarism in this area has limitations. As a result, we have found that DPI should intervene more directly in this area.

A key underpinning of effective risk management of fatigue and hours of work is accurate and reliable information about fatigue-related incidents. Existing “no blame” approaches to incident reporting and investigation must extend to fatigue as well.

In summary, the industry’s approach to fatigue risk management must recognise that working long hours and at night will necessarily result in fatigue. A risk management approach that seeks to shift responsibility for this to individuals is bound to fail and may result in serious negative consequences. More effective approaches to fatigue management that recognise the responsibilities of employers, as well as employees, have benefits broader than just OHS. The potential of more family-friendly working arrangements to aid the recruitment and retention of skilled workers at a time of serious labour shortages was well recognised by participants at the *Future Inquiry* Workshop.

OHS management systems and consultation

There is room for improvement

The industry's commitment to this project is clear evidence of its preparedness to embrace continuous improvement and we have been able to identify clear opportunities for this. Areas that need to be addressed across the industry are:

- focussing on a systematic approach to OHS management, rather than adherence to a specific OHSMS;
- improvements in consultation and participation by the workforce;
- controlling risks at source;
- applying resources to OHS;
- seeking good advice; and
- monitoring performance through auditing, feedback and review.

Successful strategies for dealing with these must be built on the features of organisational culture we identified as closely linked with effective implementation.

OHSMS

An effective OHSMS is built on the principles of mindfulness, work group cohesion, trust in management, organisational justice, supervisor support and role clarity. This does not require the development of detailed specifications and standards. The *Future Inquiry* workshop participants agreed that defining the "perfect" OHS system was both unnecessary and diversionary. Instead, the industry should be encouraged to develop a systematic approach to managing OHS, not complex, paper-based OHS management systems. Such an approach must be built upon clear goals and participative strategies to achieve them. The OHSMS can then be a tool that supports achievement of agreed goals and effective risk control, rather than act as an end in itself.

Consultation

Consultation is the cornerstone of effective OHSMS. Given the importance of effective consultation for sound OHSMS, it is disappointing that we did not find any examples of world class consultation. However, many sites - particularly proactive sites - have the essential building blocks in place. Consultation and communication were identified as a key strategy for immediate action by the industry at the *Future Inquiry* Workshop.

Controlling risks at source

While we found excellent examples of engineering risk controls, we also saw some reluctance on the part of the industry to manage risks at source. This was coupled with an increasing take up of strategies that focus on worker behaviour as the primary means of risk control. The industry should strengthen its focus on controlling risks at the source, as the law requires. DPI has a significant role to play in enforcing such an approach. Industry bodies also have a role to play in promoting changes at enterprise level that make the workplace healthy and safe and advising against strategies that focus on worker behaviour as the primary source of risk control.

Applying resources

Both the industry and DPI have critical roles to play in ensuring that appropriate competence, time and money are applied to making the workplace healthy and safe. This will not always require more resources, but simply more strategic application of current resources, for example, through a carefully constructed and fully resourced OHS strategic plan.

A disturbing finding of this research is the lack of good advice on OHS, both external and internal, that is accessed by organisations. To be able to identify, obtain and use competent advice, senior managers need to know enough about OHS to make the most informed choices.

Monitoring performance

Closing the continuous improvement loop of plan, do, check, act, relies on sound processes of monitoring and evaluation. Despite the widespread use of auditing in the industry, we did not find effective evaluation processes. Our research shows the need for greater clarity in goals as the essential underpinning of evaluation.

On many site visits and during the *Future Inquiry* Workshops, people told us how much they valued the opportunity to mix with others in the industry. They expressed a desire for process benchmarking through small workshops where they could share ideas and work through issues of relevance to them.

If you think you are good, you can't improve

The NSW mining industry is well-placed to build on its substantial achievements in OHS management to reach its goal of world class OHS. The barriers we identified through this research are not associated with lack of ambition or lack of information. Rather, we have observed a need to get the basics of OHS management right.

The message to the industry is clear, if uncomfortable. Implementing effective OHS systems and making the workplace healthy and safe is the legal and moral responsibility of management. It requires resources and time. It may be a business expense, but it is an operational requirement for business. It is

appropriate for senior management to declare a high priority for OHS, but in doing so it must be prepared to follow the stated intent with consistent and continuous action at each level of the business.

The problem of improving OHSMS and consultation is not really lack of guidance – we found numerous examples where existing guidance was not applied to key issues. Rather, a strategy that builds effective local action is needed, supported by clear and accessible information.

Conclusion

Our findings across the three research topics set out above reinforce the commitment of the NSW mining industry to world class OHS. The very act of commissioning this research demonstrates the industry's recognition that this commitment requires preparedness to thoroughly review actions in key areas.

We have identified an underlying theme across all three topics: the need to get the basics of OHS management right. *The Platinum Rules* we have prepared codify the fundamental steps the industry should take to more effectively manage OHS. Following these rules would substantially fill the gaps we have identified in OHS management in the NSW mining industry.

The Platinum Rules

- 1. Remember you are working with people—**
 - Don't exhaust them;
 - People aren't machines;
 - Treat them with dignity and respect.

- 2. Listen to and talk with your people—**
 - Be inclusive;
 - Do it frequently;
 - Value and develop people skills in supervisors and managers.

- 3. Fix things promptly—**
 - Don't let issues fester;
 - Keep people informed of progress.

- 4. Make sure your paperwork is worth having—**
 - Keep it current;
 - Make sure it's meaningful.

- 5. Improve competence in OHS—**
 - Particularly at management levels.

6. **Encourage people to give you bad news—**
 - Canaries are the most important workers in a mine.
7. **Fix your workplace first—**
 - Before even thinking about the bells and whistles.
8. **Measure and monitor risks that people are exposed to—**
 - Don't just react to incidents: fix things before incidents happen;
 - Control risks at their source.
9. **Keep checking that what you are doing is working effectively—**
 - Are you achieving what you think you are?
10. **Apply adequate resources in time and money**

Making it happen

To apply these rules, the industry needs to work cooperatively with all stakeholders, across sectors, companies and regions, reinforcing the need for local action. An industry development approach is more likely to support the actions this research has identified as necessary in order to get the basics right. And by getting the basics right, the NSW mining industry can achieve world class OHS.

Recommendations

Recommendation 1

Recognition and reward schemes should be reviewed and developed in line with good practice principles, namely, they should:

- reward and encourage contributions to effective OHS management, not outcomes;
- promote all aspects of a safe and healthy workplace;
- have significant management commitment, which necessarily involves resource allocation;
- be designed, implemented and reviewed in a consultative process;
- be reviewed and evaluated regularly to ensure that the scheme is targeting the desired result and not producing perverse incentives;
- be integrated within broader organisational improvement strategies; and
- encourage effective OHS culture through recognising contributions by teams as well as individuals.

Recommendation 2

The NSW mining industry should no longer pay workers in the industry money or equivalent benefits as a result of achievement of particular targets for outcome data, eg LTIFR, MTIFR.

Recommendation 3

Sites with production bonus schemes should carefully review them to ensure that the payment is not creating a disincentive to address adverse OHS consequences of current working arrangements.

Recommendation 4

DPI should develop an intervention strategy on fatigue management and hours of work. The 'how to' guide provided as Attachment 11 in Volume 2 of this report that is based on guidance promulgated by the NSW Minerals Council should be used as the standard for this strategy.

Recommendation 5

Prescriptive hours of service rules should not be imposed, but sites should use risk management approaches to monitor and address the excessive hours of work at some sites and for some occupations. This requires support from all stakeholders and intervention by the regulator where necessary.

Recommendation 6

Sites should actively monitor and address excessive hours of work for all who work on sites. In particular, contracting companies should monitor and control working hours of their employees who work across and travel to a variety of sites. DPI should not actively fund or promote a smart card system, but encourage employers to use appropriate techniques to monitor hours of work.

Recommendation 7

Existing providers of smart card systems should provide systems that can interconnect so that the hours of work stored on the cards provided by different systems can be downloaded by all readers.

Recommendation 8

MSAC should develop a minimum data set identifying fatigue-related information to be collected in incident investigations and provide it to the industry. This should also be incorporated in existing industry data collection protocols.

Recommendation 9

The industry should adopt a 'no blame' approach to reporting fatigue, responding to reports by addressing work-related causes not by penalising tired workers.

Recommendation 10

MSAC should develop a strategy to address the skills shortage faced by the industry, working with the industry's training advisory bodies and building on the concept developed at the *Future Inquiry* Workshop.

Recommendation 11

MSAC should develop a strategy to support all sites in the NSW mining industry to review the extent to which they have effective OHSMS in place, building on the concept developed at the *Future Inquiry Workshop* and using the findings of this research.

Recommendation 12

Sites should apply the tools currently available, and new tools as these are developed, to review and improve their consultative arrangements in consultation with their workforce.

Recommendation 13

DPI should further develop its intervention strategy on consultation to include assessment of effectiveness. This will require the development of review and evaluation guidelines that should also be made available to the industry. As part of this, DPI should also consider what further inspectorate training may be necessary to support such a strategy.

Recommendation 14

DPI should review their site visit protocols to ensure that they build effective consultation, in particular that they include the imperative to meet with workers and their representatives each time they come on site. Enforcement activity about compliance with legal consultation requirements should increase and sites should be actively encouraged to improve the time and resources expended on this critical area.

Recommendation 15

MSAC should develop a strategy to identify and promote good consultation practices building on the concept developed at the *Future Inquiry Workshop* and using the guidance that has been prepared previously for the industry. This strategy should identify and acknowledge best practice consultation in each sector and in SME as well as large enterprises. Case studies about these examples should be prepared and disseminated widely. Companies that demonstrate best practice consultation should be encouraged to share their experiences with other firms.

Recommendation 16

MSAC should revise and update the guidance for consultation provided as Attachment 12 in Volume 2 of this report to include recent legislative changes to create a *Guideline on Employee Consultation*. This guideline should then be actively and widely disseminated throughout the industry, including via the internet, as a guide to effective consultation.

Recommendation 17

MSAC should derive a set of self-audit tools and self-review tools from the *Guideline on Employee Consultation* for use by the industry.

Recommendation 18

Industry bodies and unions should offer training on consultation based on the industry guideline.

Recommendation 19

DPI should continue to require sites to use risk control strategies that focus on control at source and advise against using strategies focussing on worker behaviour as the primary means of risk control.

Recommendation 20

MSAC should identify where lack of information is inhibiting the ability of sites to develop effective risk controls and address this by improving information provision on such risks.

Recommendation 21

The importance of adequate resourcing should be emphasized in any industry guidance prepared by MSAC to implement the recommendations of this report.

Recommendation 22

MSAC should develop guidance materials to assist enterprises to choose appropriate internal and external advice based on the findings of this research. This should include advice to senior managers on what they need to know in order to select and use the best specialist advice.

Recommendation 23

MSAC should review and revise the performance measurement guidance materials prepared for the NSW Minerals Council to develop a guide to monitoring and evaluating OHS management. MSAC should then actively promote the use of such an approach throughout the industry.

Recommendation 24

As well as conducting audits in its own right, DPI should establish inspection protocols that check whether sites have effective internal and external auditing processes and specify appropriate remedial actions where necessary.

Recommendation 25

MSAC should provide opportunities for benchmarking and sharing industry data and knowledge and establish opportunities for the exchange of ideas, problems and solutions (eg through internet sites, regional meetings and *Future Inquiry* type initiatives).