# Part 3 Effectiveness of current fatigue assessment and control measures and practices utilised by management

## Introduction

This section focuses on how effectively the sites have been managing fatigue hazards associated with their roster. This issue was one of the core items of the Review.

As we outlined in Section 2.2.1 and 2.2.2, the criteria against which management practices will be assessed are those outlined in the NSW DMR Guidelines on risk management. At a very basic level we were looking for evidence that the sites had:

- Identified and understood the fatigue hazards that exist at their sites and are associated with their rosters
- Assessed their particular risks in a manner consistent with Australian standards for risk assessment
- Put in place controls that are demonstrably effective

To do this we have drawn on two kinds of information:

First, information collected during the site visits. Various managers were interviewed in person including:

- Mine managers
- Mining managers and supervisors
- process and mill managers and supervisors
- Technical and engineering personnel
- OHS managers and officers
- Ventilation officers where available
- Employees
- Contractors

Information collected from managers was cross–checked with other managers as was information collected from employees.

At every site we used a standard protocol that probed for information about how the sites were currently managing the OHS risks associated with their rosters. The issues we probed for included the following:

- Background to and reasons for the structure and design of the roster
- Consultation that accompanied the introduction of or change to the roster
- The hazards that managers believed were associated with their current roster
- What if any assessment of OHS risks had been undertaken and what this involved
- Whether there had been any analysis of task duration, task scheduling, critical nature of tasks
- Any reassessment or readjustment of exposure limits and other workplace environment hazards

- What controls were in place to manage fatigue
- How the sites managed employees who reported they were fatigued
- Training, education provided to employees
- Future plans with respect to the roster or plans to assess risks.

Second, we also draw on information already analyzed in Section 2.3 of the report that examined the other health issues associated with the roster such as exposure to harmful agents and work processes.

However, while these other hazards are important, in this section we do focus principally on the effectiveness of current fatigue assessment and control measures.

## 3.1 Effectiveness of hazard identification

### a) What is involved in adequate hazard identification

The NSW DMR Guidelines for Safe Mining set out clearly what is involved in hazard identification. It involves:

- Determining and defining what hazards are being investigated and what methods will be used
- Accurately identifying the hazards and understanding the nature of the hazard
- Estimating the initial risk.

The DMR Guide MDG 1010 stresses that hazard or risk identification should:

- Be well planned and resourced
- Use a team with diverse and relevant expertise
- Adopt a systematic and detailed approach
- Be collaborative and consultative in its approach

The Guidelines outline that the processes and methods for identifying hazards can occur in a number of ways, with a combination of processes being recommended as most effective. These can include but are not restricted to:

- Developing a hazard checklist
- Conducting walk-through surveys
- Reviewing information from designers or manufacturers
- Analysing unsafe incidents, accidents and injury data
- Analysing work processes
- Consulting with employees
- Examining and considering material safety data sheets and product labels
- Seeking advice from specialist practitioners, consultants and representatives

The DMR guide suggests that some hazards (such as noise) are inherent in the work processes and suggests that part of the hazard identification process is to locate the source or sources of the hazards. In the case of fatigue, it may involve identifying the kinds of hazards associated with the design of the rosters (such as night work, adequacy of recovery time, adequacy of rest breaks) or appropriateness of the scheduling or nature of the tasks.

## b) Have Tasmanian mining sites adequately identified the fatigue hazards and preliminary risks associated with fatigue?

Information collected from interviews at the sites indicated:

- a low level of awareness among most senior managers of the fatigue hazards present
- a reluctance by the same managers to take seriously or be convinced of evidence about fatigue hazards and risks associated with rosters
- a greater understanding of and concerns about hazards among supervisors and technical managers, but these managers had little input into decision-making
- no evidence that fatigue has ever been the focus or subject of a recognised, systematic approach to OHS hazard identification that would generate the kind of information necessary for a thorough, effective risk assessment
- information collected has focused mainly on cost and operational issues or employee lifestyle issues; this is not the same as identifying potential OHS fatigue hazards associated with the rosters
- where isolated changes have been made, they have sometimes been based on opinions of individual managers or choices by employees from limited options
- even at sites where some changes have been made, the changes have not encompassed all employees or contractors.

The kinds of information we might have expected to see arise from adequate hazard identification would involve:

- **The list of all hazard sources** (for example what aspects of the roster were likely to represent a hazard such as shift length, starting times, night work, adequacy of recovery time, overtime practices, etc)
- **The forms in which the hazard occurs** (for example, individual fatigue, sleep loss, performance impairment, increased exposure to dust or noise)
- **The areas of mine or work processes** where the hazards are located (for example, area of the mill where noise levels are high; critical tasks that are susceptible to fatigue )
- **persons exposed** (for example, all employees, or employees on particular rosters, in particular jobs, contractors, in particular work areas; lifestyle issues).

Table 3.1a below summaries the activities undertaken by sites at the time of writing. This includes the major contracting company and smaller contracting companies. None of the sites or companies are identified.

**Table 3.1a OHS Hazard identification undertaken by the sites**

| Company | Has there been **informal** identification of some hazards | Is there evidence of a **formal** process attempted to identify fatigue hazards | Has this identification process been tested for adequacy in terms of identifying:<br>• All hazard sources<br>• Form of the hazards<br>• Mine or work processes<br>• Persons exposed | Has information collected in the hazards identification process been used to undertake a more structured risk assessment |
|---|---|---|---|---|
| A | Yes | Some | No | No |
| B | Yes | Some | No | No |
| C | Yes | No | No | No |
| D | Yes | Some | No | No |
| E | Yes | No | No | No |
| F | No | No | No | No |
| G | No | No | No | No |
| H | Yes | No | No | No |

As Table 3.1a above indicates, activity to date has been modest, largely informal and the majority of companies have not undertaken any structured or comprehensive hazard identification process.

For those companies where some evidence of activity was apparent, the following was observed:

**Roster design risk factors**

- One company identified shift length for some rosters as being a hazard.
- One site identified the number of consecutive shifts in a row as being a hazard.
- Two sites (very recently) identified contractor hours as a potential hazard.
- One site identified night work as a potential hazard.

**Task and work environment**

- No "fatigue susceptible" task or work processes were specifically identified by any of the sites as a hazard.
- Two sites had readjusted exposure standards for noise and one said they had readjusted dust exposure limits.
- Several of the sites attempted to implement job rotation among operators of heavy mobile equipment, but the effectiveness of this varied considerably between sites and even within sites.
- There appeared to be little understanding of the increased risk associated with exposure to harmful agents (chemicals, dust, noise, etc).

**Individual factors**

- Several of the sites acknowledge that some individuals may have problems with fatigue.
- Several of the sites have identified the need for shift work education and have held information sessions although the quality has been assessed by employees as variable.

In summary, information collection from the sites indicates that:

- The sites have not undertaken a systematic approach to hazard identification of fatigue.
- There appears to be a low level of awareness and understanding of fatigue hazards and how fatigue impacts on performance in a mining environment.

## 3.2 Effectiveness of risk assessment initiatives

### a) What is involved in adequate risk assessment?

Risk assessment is the second step involved in a comprehensive risk management approach. It involves both risk analysis and risk assessment and should be collaborative.

The DMR Guideline MDG 1010 (1997:15) explains that a risk analysis involves:

> **"A systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequence".**

The DMR Guidelines for Safe Mining explains that analysing risks should include but are not limited to aspects such as:

- Assessing the adequacy of training or knowledge to work safely
- Looking at the ways jobs are performed
- Examining work systems
- Determining the size and layout of the workplace
- Assessing the number and movement of people on site
- Determining the type of operation to be performed
- Examining procedures for emergency evacuation
- Storage and handling of materials
- Environmental factors

Risk assessment is defined in the MDG 1010 (p16) as:

> **"The process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria".**

It further explains that assessing risk should result in a list of any potential injury or harm and the likelihood of these occurrences arising from the hazard identification in the first step. In assessing risk, consideration should be given to the state of knowledge about the frequency of injury or disease, the duration of the exposure to the injury or disease source and the likelihood of severity.

It also suggests that the act of assessing risk should be a consultative process and involve managers, technical staff and employees who are involved in the job. If knowledge of the

hazard and risks are not available on site, expert and other technical advice should be sought.

In other words, risk assessment takes us a step beyond hazard identification and assesses the likelihood of harm or injury and the likely severity associated with a particular hazard. It is a structured process that assesses the risks associated with a single hazard or combination of hazards.

## b) Have Tasmanian sites effectively assessed the fatigue risks associated with their rosters?

Given that most sites have not adequately identified the hazards associated with their rosters, it is perhaps not surprising that risk assessment initiatives have been limited.

**Hazard identification had not been followed up at any of the sites with a structured risk assessment that conforms to Australian Standards.**

As noted, the risk assessment phase moves beyond identifying hazards. It is a structured, consultative approach that draws expertise and knowledge across the site and. if need be, outside expertise. The assessment attempts to identify both the likelihood of harm and the severity and consequences of that harm.

A small number of sites and companies had undertaken some limited risk analysis, collecting information that could be potentially utilized in a risk assessment, but none had actually undertaken a risk assessment that conforms to any of the aforementioned industry guidelines or Australian standards for risk assessment. Moreover, where some assessment has been undertaken, questions could be legitimately be raised about:

- The quality and appropriateness of the information
- Whether the information collected is likely to be useful for assessing OHS risks
- How the information has been used (if at all)

Structured and unstructured activities undertaken by the sites have included the following:

- One company had voluntarily undertaken an external assessment of their previous roster, focusing mainly on cost and operational issues.
- One company had been requested by the Tasmanian Industrial Relations Commission to undertake a risk assessment. Included in this was fatigue modeling of the rosters and a focus on individual lifestyle factors.
- One contracting company had been requested by the Australian Workers Union to obtain a risk assessment on one of the smaller operations at a site. The assessment was undertaken by a commercial consultancy firm.
- Partial changes were made to some of the rosters on site but changes to other rosters across the sites have been made without any subsequent assessment.
- One site made a decision after the announcement of the review to introduce even time rosters across the site for all employees including contractors. This decision was made principally for operational reasons by the organisation's senior level organisation and was not the result of a formal risk assessment. However, it was stated that OHS considerations were taken into account.

- Very recently (during the review process), one site agreed to trial an even-time roster in one part of the operation. This was based on employee preference (mainly to avoid job losses).

These results are summarised below:

**Table 3.2b: Risk assessment initiatives across the sites**

| Company | Informal risk assessment of any aspect of the roster | Structured risk assessment that conforms to DMR Guidelines | Has information been obtained in any way from employees | Were employees involved in a structured risk assess process | Were any controls identified and implemented | Were these controls comprehensive (ie did they apply to all risk) |
|---|---|---|---|---|---|---|
| A | Yes | No | Yes | No | Yes, limited | No |
| B | Yes | No | Yes | No | Yes, limited | No |
| B | Yes | No | No | No | No | No |
| C y | No | No | No | No | No | No |
| D | No | No | No | No | No | No |
| E | No | No | Yes | No | No | No |
| F | Yes | No | Yes | No | Yes, limited | No |
| G | No | No | No | No | No | No |

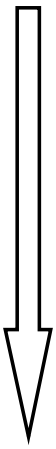
## 3.3 Effectiveness of control initiatives

### a) What are appropriate controls

The risk assessment process is designed to identify risk and lead to the generation of controls strategies that are effective. The MDG 1010 Guidelines (p18) clearly states that a risk assessment should generate the following:

- A list of the actions planned:
    - To reduce high risks
    - To control the likelihood of potentially serious accidents even if the likelihood is seen as low
- A program for undertaking at least the first steps of controls implementation.

There is a recognized 'hierarchy of controls' that is the recommended order in which hazards and risk should be managed. They are listed in terms of their likely effectiveness.



**Elimination** -removing the hazard or hazardous work practice from the mine. This is the most effective control measure. Substitution - **substituting or replacing the hazard or hazardous work practice with a less hazardous one**
**Isolation -** isolating or separating the hazard or hazardous work practice from people involved in the work
**Engineering control –** If the hazard cannot be eliminated, substituted or isolated, an engineering control is the next preferred measure
**Administrative control** – includes introducing work practices that reduce the risk. This could include limiting the amount of time a person is exposed to a particular hazard.
**Personal Protective Equipment** – should only be considered when other control measures are not practicable.

## b) Have Tasmanian sites put in place effective controls for managing fatigue hazards and risks associated with their rosters?

### (i) Effectiveness of fatigue controls

On the basis of information collection from the sites there appears little evidence of effective fatigue controls across the sites.

- Most of the initiatives have been focused primarily on cost and operational efficiency rather than OHS issues. There have been improvements for some employees as a result of these changes but it is unclear that this was the principle intention of management when the changes were made.

- There was no evidence of systematic controls in place for task duration or assessment of task criticality. Very few sites have provided basic education in fatigue management to their employees.

As outlined above, the most effective controls – especially for hazards that are multi-factorial and deeply embedded in work processes – are likely to be the result of a structured assessment process such as those outlined in the mining industry guides.

Most of the sites have *not* undertaken such a process, which is why the few controls that are in place are patchy and generally apply to only one aspect of the roster. Examples include:

- One site recently reduced weekly working hours from an average of 48 to an average of 42 hours per week. This involved replacing an uneven time roster with an even time roster for both core and contract employees. No other controls that the review is aware of are in place to deal with fatigue hazards that are still likely to exist across the block of 5/12 hour shifts in a row.
- One site reduced shift hours from 12 to 10.5 for some roster configurations at the site; however, this change was not applied to all rosters.
- Two sites are currently reviewing limits for contractor hours
- All sites stated that they have informal policies that support employees reporting individual problems with fatigue to supervisors.

- All sites stated that they have informal policies of encouraging employees to request to be moved out of work areas if they are too hot, dusty, fume affected etc.
- Three sites have or are undertaking some degree of shift work education.
- It seems that some other sites may have conducted shift work education in previous years but this could not be confirmed.
- In four of the six main companies there were no identified controls other than informal reporting of fatigue problems.

### (ii) Effectiveness of controls for other hazards associated with the rosters

As we outlined in Section 2.3 of the report, on the basis of written information supplied by the sites, there appears to be inconsistent management of other hazards associated with the roster such as exposure to harmful agents. Some sites are managing some of these hazards well, but as our previous evidence indicated, not all sites were able (or willing) to demonstrate clearly how these hazards were being managed.

This is a serious inadequacy since some of the hazards that are associated with rosters (such as dust, noise and heat) are **core** hazards in a mining environment.

Of particular concern is the way that some sites appear to be neglecting (or unable or unwilling to show how they are managing) some of these core hazards including:

- dust (both respirable and silica)
- heat and diesel exhaust (fumes and particulate)
- vibration
- employee health monitoring
- task duration hazards (such as those associated with continuous operation of some machinery).

In addition, only a small number of the sites appeared to be aware that readjustment of exposure limits for a range of hazards is required for extended and compressed shifts. Some sites indicated knowledge of changed exposure limits for some hazards and not others; some indicated no knowledge of this at all and some simply did not respond to the questions.

### (iii) The adequacy of informal controls

Most sites stated that they had informal controls for managing fatigue, thermal hazards and environmental contaminant exposure. These controls generally required employees to report unsafe conditions or impaired performance to supervisors, who generally respond by removing the affected employee from the environment or the task. Most sites stated that employees had the right to request to be moved out of work areas if they were thermally stressed or exposed to dust or diesel fumes, or if they considered themselves to be unsafe in any way.

However, such controls are considered informal controls and not appropriate as **primary** controls for issues such as heat or environmental contaminants. There are a number of reasons for this:

- First, the effectiveness of administrative controls can be called into question because they rely heavily on the behaviour of individuals and the discretion of management – two elements known to be unreliable as primary controls

- Second, they are reactive controls rather than preventative and place responsibility for identifying and assessing risk purely on individuals who may not have the information or knowledge to assess the risk or the confidence to report

- Third, they rely on there being a willingness and ability among employees to report and a willingness and ability of supervisors to take reports of problems seriously and act upon them.

There was evidence that at two of the sites, the use of these as supplementary controls appeared to be satisfactory. Supervisors and management appeared to take the issues seriously and employees confirmed their confidence in such a process. However, there can be a range of reasons why employees may not report and supervisors may not respond and there was evidence of all of these limitations across the sites:

- Lack of employee knowledge of conditions due to absence of monitoring, inaccessibility of results, and dissemination of information
- Fear of disciplinary action
- Financial disincentives (such as production bonuses being foregone)

As one employee explained:

> **"It will cost you money eventually if you choose not to work in a particular area – they'll get someone else to do the job"**
>
> Employee

- Discretionary behaviour of supervisors
- Management inconsistently dealing with complaints which can send out the message that it is not wise to complain
- The culture of the workplace that assesses employees as 'weak' for not putting up with onerous conditions that are viewed as part of the mining environment

One employee explained that it all depended on the attitude of the particular shift boss – some were supportive and took the issue seriously, others did not. One employee explained that when he had asked to 'pull up' when he was feeling tired, the shift boss says:

> **"Harden up, what are you….a girl?"**

Another employee said that when anyone complains they are told:

> **"She'll be right mate, it's all part of mining"**

In summary, there are serious limitations with using behaviour and rules as the primary form of control for fatigue or any hazard. Certainly they are part of a package of controls,

can be effective if they are used as supplementary controls, but as indicated, they sit low on the ranking of effectiveness.

## Conclusions

This part of the report has provided an assessment of how effectively the sites are assessing and controlling risks associated with fatigue. We can conclude the following:

- The majority of sites were not able (or willing) to demonstrate a systematic approach to the identification, assessment or control of fatigue
- Risk management is not being used as a systematic approach to hazards and risks associated with fatigue.
- Risk management does not appear to be used at all sites as a systematic approach to the management of some core hazards such as dust, heat, vibration, noise
- Many of the managers at sites do not appear to be aware or well informed of the fatigue hazards, nor is management convinced of the risks
- There is an inappropriate reliance on informal and behavioural controls for fatigue management.

In general, parts of the industry appear to be unclear and unsure of how a general duty of care approach actually applies to work system hazards such as fatigue and health hazards.