

# **FITNESS FOR DUTY - AN INDUSTRY PERSPECTIVE**

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## **ABSTRACT**

In keeping with the spirit of the new "duty of care" mine safety legislation passed by the Queensland Parliament on 1 September 1999, it is important that mines manage their own health and safety issues without unnecessary external control and regulation.

The new acts require that a mine puts in place systems to ensure that a worker's fitness for duty is not impaired through fatigue, stress, psychological disorder, or the use of drugs or alcohol. This brings in the interaction between a worker's private life and his/her working life. Whilst the mine can influence the change in fitness for duty of a worker during work hours, a mine does not have the right to interfere in the private life of an individual except to require that he/she presents himself/herself in a fit state to undertake the tasks of their job.

This paper outlines the Queensland Mining Council response to the DME call for submissions on the development of guidance notes for the management of shiftwork (Cliff D, Beach R, and Leveritt S, (2000)).

## **INTRODUCTION**

Duty of care requires a mine to take all reasonable steps to ensure that workers safety and health are not impaired through their occupation. Workers also have a responsibility to exercise reasonable care in their execution of their work tasks not to harm themselves or others. This mutual responsibility is necessary for the management of worker fitness for duty.

Whilst there is a wealth of literature on the potential health and safety impacts of shiftwork, they do not agree on the factors affecting safety and health of shiftworkers. Certainly shiftwork can affect the levels of fatigue and worker health if not properly managed. However, it is important to acknowledge that there can be substantial benefits from appropriate management of the risks of shiftwork which are often not mentioned. These include the extended break periods and associated potential social benefits. In addition, changing from traditional roster patterns to compressed work week rosters can have reduce disruption to circadian rhythms leading to improved health and safety. Many jurisdictions opt for guides or handbooks on how best to manage shiftwork (The Chamber of Minerals and Energy of Western Australia Inc, (1998) ) - many such as those emanating from the USA focus on how the individual can manage the issues (Rosa R.R, and Colligan M. J (1997)).

Most mines when designing shift roster arrangements already use risk management processes including extensive consultation with the workforce and external expertise as appropriate. The management of shiftwork needs to be integrated into the overall fitness for duty management at the individual mine, taking into account its own site specific influences and factors.

## **GENERAL**

A model depicting the interaction between the some of the factors and fatigue is shown below in figure 1. Many of the factors need to be managed in their own right as well as for their contribution to fatigue, eg drugs and alcohol. Missing from the debate is the role of the physical fitness of the individual, which must influence the ability of the individual to cope with fatigue.

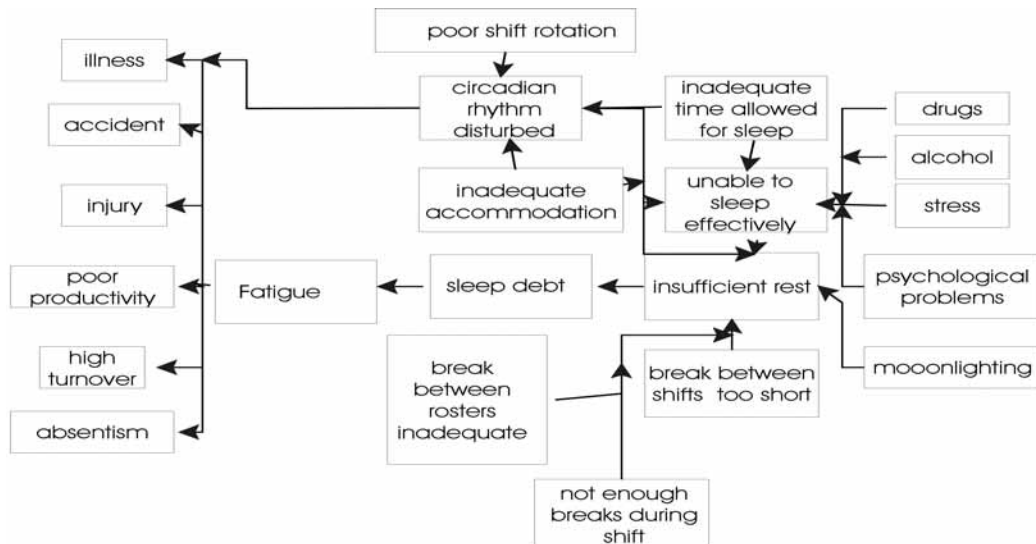


Figure 1. Fatigue model

Many of these factors can be managed by the mine site management. Examples of this are: the standard of on site accommodation, monitoring shift length, shift breaks, and good roster design etc. Others are the responsibility of the individual eg consumption of alcohol, drugs, activities off site and during rest periods. Mine management can educate the workers on the need for responsible behaviour.

There is plenty of evidence that mine management are managing shift arrangements responsibly. The QMC submission to the DME on shiftwork demonstrates that despite all the pressures on the industry including: lower commodity prices, increased labour and material costs, and the need to increase productivity, there has been a continuing improvement in the safety performance of the industry, as measured by the Lost Time Injury Frequency Rate (see figure 2 below). Over the past ten years the LTIFR for each sector of the mining industry in Queensland has more than halved.

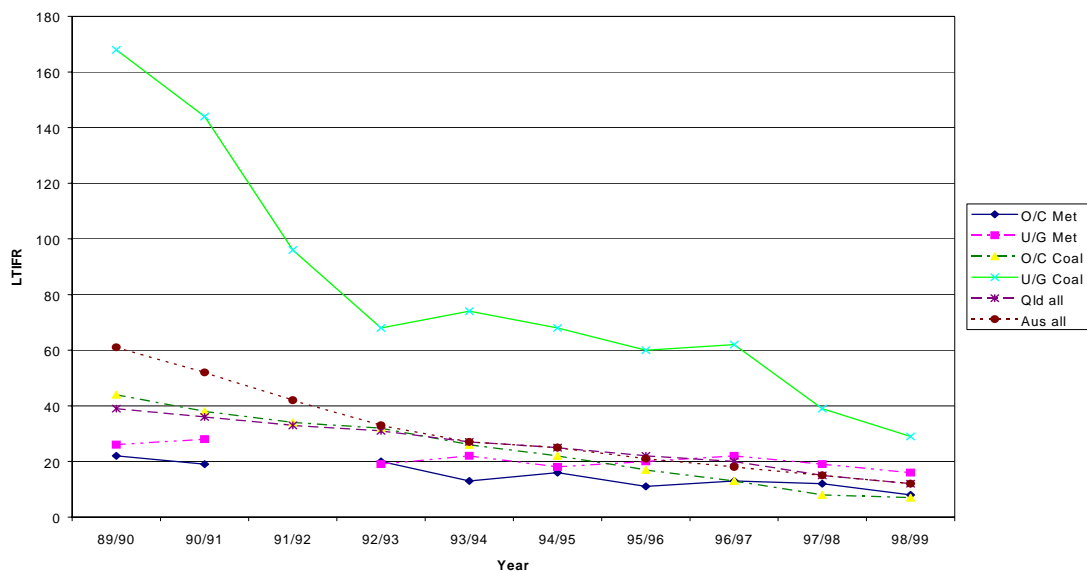


Figure 2. LTIFR for the past 10 years in Queensland

At the same time there has been a trend toward longer shifts - up to 12.5 hours per shift. Analysis of the 1998/99 LTI data of the DME against shift length has shown that for each sector, open cut metalliferous, underground metalliferous, open cut coal, and underground coal, 12 hour long shifts have on average much lower LTIFR (figure 3 below). The effect is most noticeable for underground metals and least noticeable for underground coal. Due to the limited number of rosters in some sectors, this diagram should only be used to indicate the consistency of the trend across all sectors.

Whilst the data come from 12500 persons there are only 194 rosters in total and in some cases the division of the analysis brings the number of rosters used as the basis for individual analysis below a statistically valid threshold (the data are listed in table 1 below).

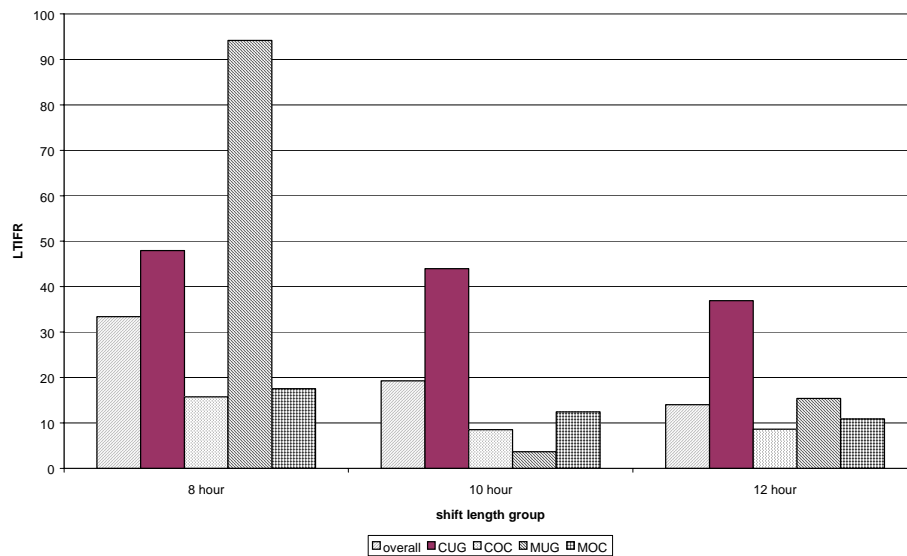


Figure 3. LTIFR as a function of shift length and mining sector

Type of mining	8 hour shift length grouping		10 hour shift length grouping		12 hour shift length grouping	
	No. of persons	No. of rosters	No. of Persons	No. of Rosters	No. of Persons	No. of Rosters
Coal u/g	723	14	368	7	934	11
Coal o/c	1073	26	120	3	3396	41
Metals u/g	135	4	116	3	1966	24
Metals o/c	108	4	335	8	2458	34
Metals Other	60	2	193	4	436	4
Quarries	0	0	94	5	0	0
Total	2099	50	1226	30	9190	114

Table 1. Summary of shift length roster information

In addition, using averages can be deceptive. In the figure 4 below the individual roster information is displayed showing the high degree of variation between apparently identical shift rosters across different mines. This goes to emphasise the complexity of the factors affecting safety performance at a mine site and the inappropriateness of attempting simple generic regulation of it. Multivariate analysis of the LTI data only identified the shift length as a significant factor, and it with a significant negative correlation. Even this only explained a small percentage of the variance of the data.

The limitations of using LTIFR as an indicator of safety performance are well known. These limitations limit the depth that the analyses can be applied to. In addition there are other contributions to LTI other than fatigue. The LTI analysis is, however, supported by the intensive studies carried out when mines have changed from traditional rosters to compressed work weeks support the change both in Australia - eg Woodlawn (Campbell, M (1993)), and overseas - eg USA (Duchon J, Keran C, Nelson B, Smith T.J, Robinson D, Trites D, Walsh M, Beswick E, Murray D, Alvarez J, Parker A, and Forjan I (1992)).

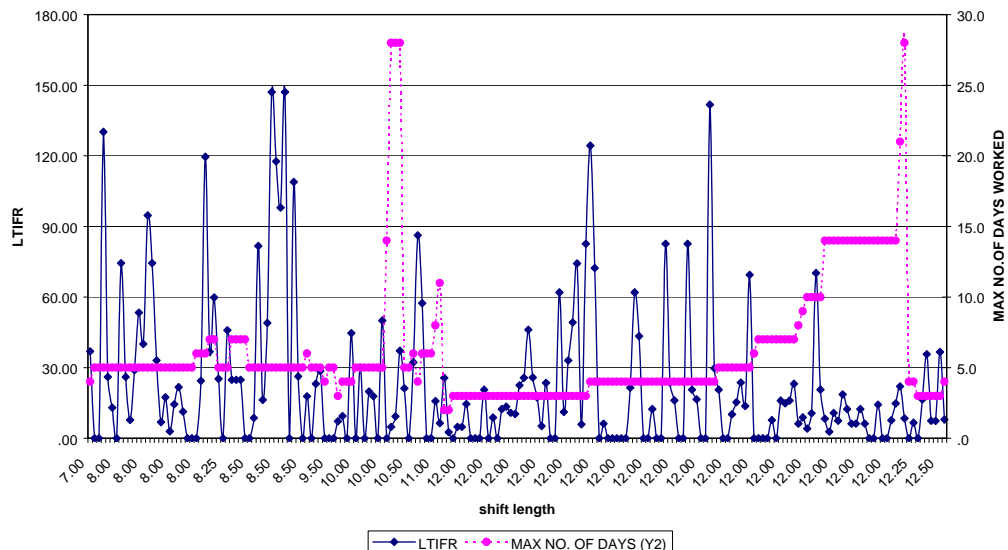


Figure 4. LTIFR versus roster type

It is important to recognise that the factors affecting the safety and health impacts of a shift roster at a mine can vary significantly from site to site and hence the methods of dealing with them will need to be site specific. For example 27 % of rosters identified in the QMC study had a zero LTIFR, yet apparently identical rosters at adjacent mines could have LTIFR of up to 150. This individual variance makes the general principles of risk management well suited to managing safety performance, provided local conditions are taken into account. Care should be taken to tailor the implementation of the risk management process to suit to needs of fitness for duty and not just follow the standard risk management approach of ranking the risks by frequency times consequence and dealing with the highest rank risks. The process needs to be ongoing and adaptable so that as issues are identified they can be treated appropriately. Instead of regulations or advisory standards or guidelines, industry needs accurate information and continuing consultation with key stakeholders to refine management mechanisms and safe work practices. It is also not appropriate to attempt to deal with issues solely in isolation because of the interrelationship between them. Fatigue should be managed as part of the overall fitness for duty of the workforce. Shiftwork should not be treated as a problem rather as a complex set of factors that can influence fitness for duty in both positive and negative ways. Workers and management both have responsibilities.

#### ACKNOWLEDGEMENTS:

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