

**Tracking Stress and Fatigue at**  
**Consolidated Rutile**  
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**Introduction**

Consolidated Rutile Limited, (CRL), introduced a Fit For Work Policy in July 1999, as per its responsibility under the new Mining and Quarrying Health and Safety Act. The system that was put in place was the Fit 2000 Fit for Duty system. Whilst the Fit 2000 system is able to record the behaviours of individuals for drug and alcohol, it is also able to provide CRL with a non-invasive process that can also monitor stress and fatigue. This paper will examine the way fatigue and stress are monitored and controlled at CRL.

For CRL, the benefits the Fit 2000 system has over other systems are:

- It is relatively easy to monitor. After the system is set up it is relatively easy to run and will only require 10 to 15 minutes per day to maintain. Managers and supervisors receive an e-mail to observe the results for their work groups.
- Unlike random drug /alcohol testing, which does not detect stress or fatigue, the Fit 2000 is a holistic approach to fitness for work.
- It is non-invasive and body fluids are not taken.
- It is quick, at less than 30 seconds per test.
- It also detects other forms of impairment such as alcohol and drugs, (legal or illicit).
- Individuals can be monitored to ensure that behaviours align with the company's Fit for Work procedure.

The initial outlay for the system was substantial, however was a one off cost, and compares favourably to random urine testing. For example: if each member of the workforce is tested three times a year the costs will be approximately \$120 per person. The amortised cost of the FIT 2000 system per year equates to approximately \$100 per employee with the benefit of each person being tested and a report available daily. A further benefit is that the result is available instantly compared to other testing regimes such as saliva or urine where the results may take much longer to obtain.

The FIT 2000 process involves measuring four involuntary reactions of the eye to light. By measuring these reactions against a baseline of data for each employee, the Fit 2000 can indicate whether there is an issue regarding a person being fit for work. The four involuntary reactions measured are:

- Amplitude: the time the pupil of the eye takes to react to light, (closing).
- Latency: the time the eye takes to return to normal when the light source is removed.
- Pupil Diameter: the size of the pupil as measured in a controlled environment.
- Saccadic Velocity: the reaction time of the eye in following a light from side to side.

Based on the sequence and the index score against each of these measures, the data can indicate that a person may have impairment, which may render them unfit for work. This may include fatigue or stress.

## **Fatigue**

The US Army has conducted extensive trials over a four-year period to determine whether a person could be suffering from fatigue due to lack of sleep.

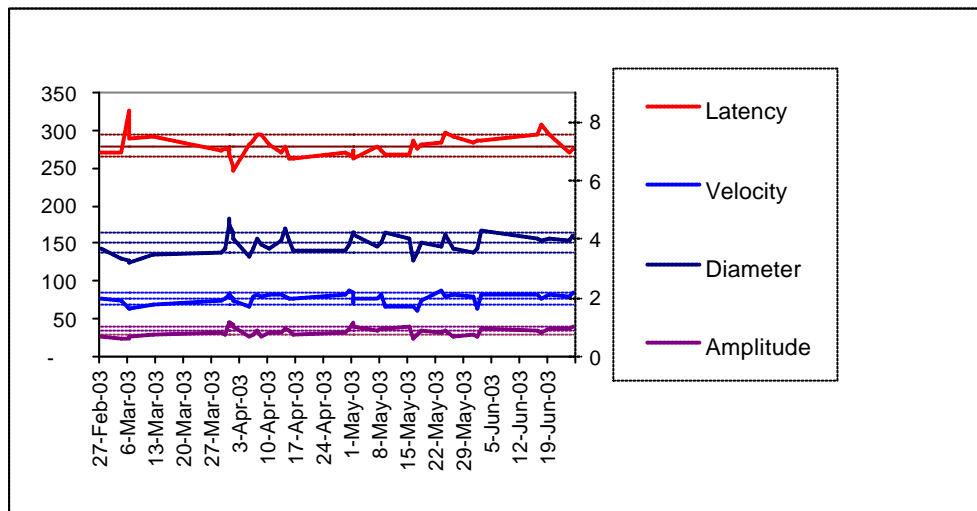
A recent study conducted by Russo et al (2002), using the Fit 2000, to determine whether a person is impaired as a result of fatigue, indicated that sleep deprivation does effect the eye and these effects can be measured. The Fit 2000 achieves this by giving each of the involuntary eye reactions weighting. Baseline data is established for each employee and subsequent deviation from the baseline will determine whether the person is likely to be fit for work or not.

The Fit 2000 enables fatigue to be identified through a sequence or pattern such as lower saccadic velocity, enlarged latency and a slightly enlarged pupil. This pattern needs to occur over a period of time. Usually the person would need to return a “high risk” to bring them to the attention of their supervisor/manager and the person who is responsible for the data

collection. This “high risk” report would be e-mailed out to the relevant supervisor for immediate action.

However, recent changes made to the report generator that is now linked to an Excel spreadsheet allows us to track the sequence and patterns of individuals over a period of time. Where the data indicates that there may be a problem with an employee’s sleep patterns then this can be followed up with the employee.

*The following graph is indicative of an individual who returned a “high risk” for fatigue. (Note the changes around the beginning of April, end of May)*



Fatigue in all industries is a cause of injuries, which in most cases could be avoided. Research in the field of fatigue management has proven the longer a person remains in the workplace the greater risk, especially when working extended hours over days or weeks.

CRL has an “Hours of Work Policy” that limits the amount of hours an individual can remain in the workplace without a break. This policy was developed from information gathered from a number of sources, including the “Guidance Note for Management of Safety and Health Risks associated with Hours of Work Arrangements at Mining Operations” issued by the Queensland Department of Natural Resources and Mines in April 2001. The minimum required break from the workplace is 10 hours, with longer periods stipulated depending on the amount time an individual has been on the job.

## Stress

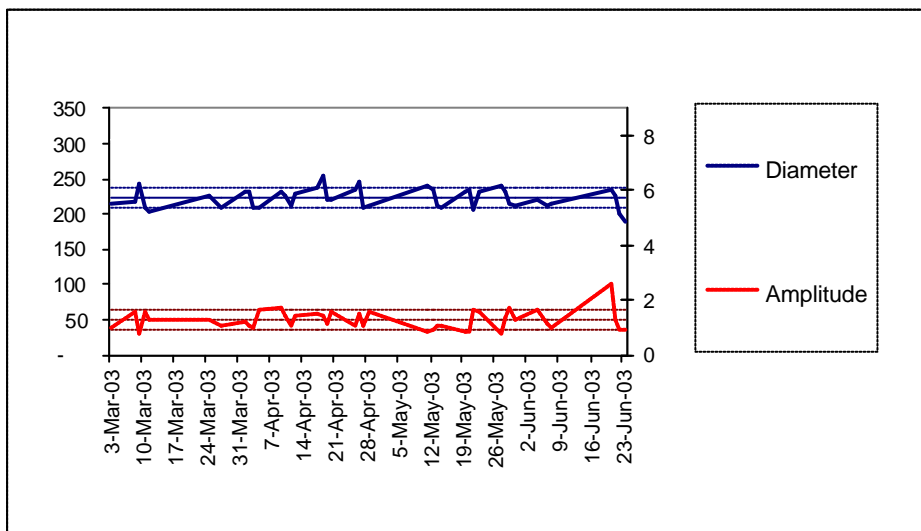
Like fatigue, stress can be a risk to all persons in the workplace. A number of factors such as organisational change, poor management practices, lack of resources, domestic problems, workload, bullying and fatigue can cause stress.

Indications of stress in an individual include absenteeism, sickness, increase in incidents and anti social behaviour all of which can lower productivity in the workplace and the team.

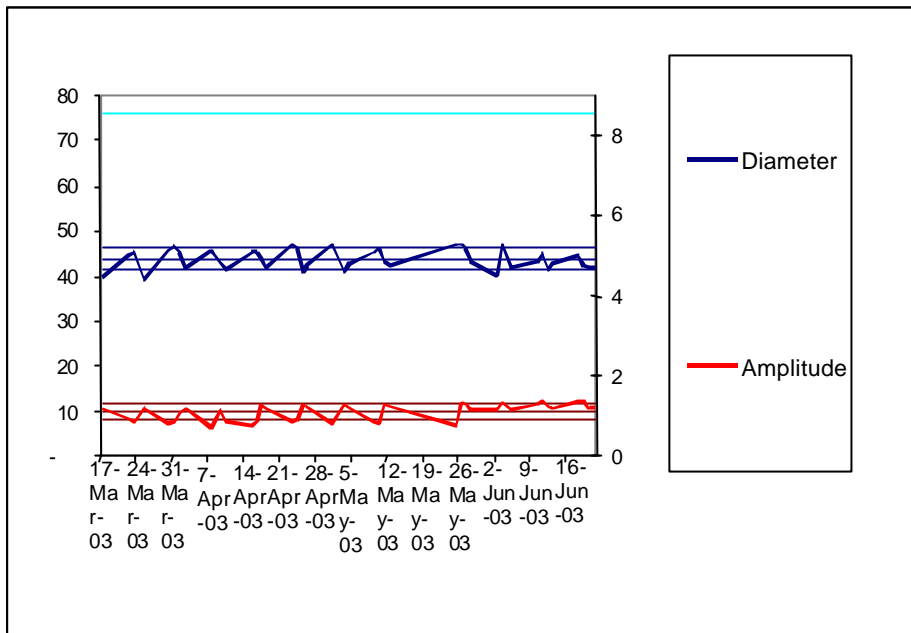
A comparison of results for operators at two separate mine sites indicates that the operator at one site may be experiencing more stress than the other. This is indicated by changes in the diameter and amplitude of the pupil.

*The following graphs are a comparison of the operators at two mine sites*

Graph Indicating Possible Stress



## “Normal Graph”



*Note the difference between the amplitude and diameter of the two graphs.*

CRL manages this type of stress by interviewing those affected to ascertain possible causes and to develop interventions. Interventions may include utilising our Employee Assistance Provider to support employees. One of the best techniques is to speak one on one with the individuals. This assures them that you understand that they may be experiencing difficulties and that you are concerned for their well being and safety.

## SUMMARY

Like all Fit for Work systems that are introduced, unless they are managed correctly, they will fail. Supervisors are a key element to the successful management of a fit for work system and program. Training needs to be conducted to facilitate a greater understanding of people's behaviours and signs and symptoms of fatigue and stress, in addition to the other, possibly more obvious, indicators that an individual is not fit for work. Supervisors also need to know that they have back up resources they can call on and the full support of management to make decisions regarding fit for work issues.

Most important however, using the FIT 2000 system means that the first task a person does when they enter the workplace is a safety act, to ensure they are fit to be there.

## Bibliography

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