

Safety In Mines Research Advisory Committee

Project Summary: SIM 02 05 02

Project Title:	Factors affecting driver alertness during the operations of haul trucks in the South African mining industry (1 volume, 77 pages)		
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Summary

Alertness during extended or undemanding tasks is essential for safety and productivity. Over the past decade attention has been increasingly focused on sleep and problems related to sleeplessness. It is now recognised that sleepiness and fatigue are becoming endemic in the populations of industrialised societies, contributing to human error and consequently many (sometimes catastrophic) accidents. Long hours of undemanding and monotonous driving, such as during certain mining operations, facilitate the onset of sleepiness as does any other tedious task. A number of accidents, which may be attributed to loss of control due to sleepiness of the drivers, have been reported at mines where haul trucks are used.

In view of the seriousness of such accidents, SIMRAC initiated research to identify factors affecting haul truck driver alertness during mining operations. The information obtained during the risk analysis was used to identify possible countermeasures and detection devices to reduce the identified risks.

Risk analyses of the tasks of haul truck drivers were carried out at four mines, with the focus on factors that influence operator-equipment interface, physical stressors, work organisational factors, and a number of lifestyle issues that could influence sleep susceptibility. Subjects were also required to rate their subjective sleepiness at work at different times during the shift by means of the Wits SleepWake Scale.

Conclusions

On the basis of the findings of the study, it is concluded that the following factors may affect the alertness of drivers of haul trucks during mining operations:

- ? Disruptions in circadian rhythms associated with phase shifting in sleep/wakefulness cycles
- ? Inadequate (shortened) sleep
- ? Poor quality of sleep between shifts

- ? Fatigue
- ? Daytime sleepiness
- ? Sub-optimally designed shift schedules (unusual work schedules)
- ? Time of day
- ? Night shift driving (greater tendency towards drowsiness)
- ? Extended driving times
- ? Monotonous nature of tasks
- ? Certain medical conditions (e.g. obstructive sleep-apnoea syndrome) and medications
- ? Poor awareness of the causes and consequences of fatigue, and the importance of sufficient sleep and ways to achieve it
- ? Lifestyles.

Recommendations

It is recommended that interventions and countermeasures be investigated to address these identified risk factors as a matter of priority, preferably on a site-specific basis. Managing sleep and designing work schedules are of critical importance and will require participatory planning and implementation.

The following countermeasures could form the basis of a strategy to reduce driver sleepiness:

- ? Well-designed work schedules
- ? Sufficient rest days
- ? Structured breaks during shifts
- ? Sleep management
- ? Health screening and counselling
- ? Educational programmes
- ? Food and fluid intake
- ? Devices for measuring driver wakefulness
- ? Environmental stimulation