Submission

PREPARED FOR:

NTC Australia

A response to the Discussion Paper on 'Developing a heavy vehicle fatigue data framework' (August 2015)

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Introduction

Our understanding of the purpose of the report "Developing a heavy vehicle fatigue data framework" is to have industry and government work together to find a better framework in which to collect and analyse fatigue data, to inform future regulations in the industry. Speed, Blood Alcohol Concentration and seatbelts have all been tackled by policy and legislation; however measuring a person's level of alertness/drowsiness has, to date, been impossible. Current legislation is based mainly on hours of duty, with log books and subjective reports. The technology for monitoring a person's drowsiness in real time is now available and being used in many countries. Optalert is a company which specializes in that technology.

The essence of the problem is drivers who "fall asleep at the wheel", even for a period as short as a few seconds, as in a micro-sleep. When this occurs, there is a loss of awareness of the here and now and the risk of performance impairment (a road accident) is high.

Fatigue vs drowsiness

Optalert accepts that NTC Australia has adopted a definition of 'fatigue' to mean 'performance impairment', or perhaps 'that which causes performance impairment'. We believe this definition is unfortunate, given that in common English usage, people understand 'fatigue' to mean weariness from exertion, not performance impairment. For example, most people will experience fatigue after completing a heavy gym session, but they will not necessarily be in danger of experiencing a micro-sleep. Yet micro-sleeps can occur in drivers without them being aware of impending danger, in the drowsy state, before sleep onset. See Figure 1. It is drowsiness, therefore, that is so important for drivers to avoid. That is what Optalert helps to manage, thereby preventing accidents.

Figure 1.

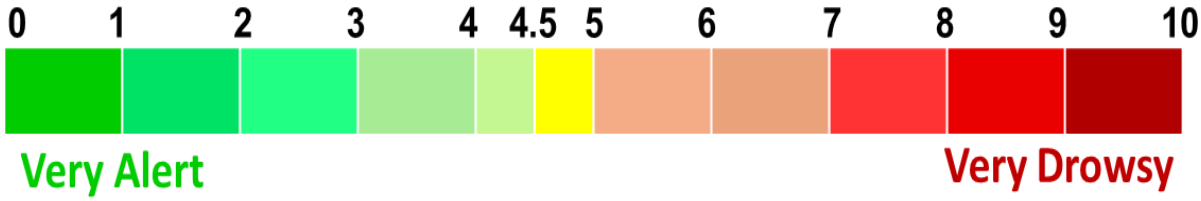
Measuring drowsiness

As a company working in 'fatigue management' for many years, we understand the importance of collecting objective data to inform policy and planning. We are strong advocates of real-time monitoring of alertness/drowsiness in drivers, to prevent them from 'falling asleep at the wheel'. Our early-warning drowsiness detection technology is Australian owned and has been developed through more than 20 years of research into the physiology of drowsiness. Optalert technology has been embraced globally by industry, and has been validated by researchers from Harvard Medical School.

Heavy vehicle drivers are likely to suffer injuries or death because of drowsy-driving accidents. Like other shift-workers, they often work overnight, when their body-clock says they should be resting or asleep. Current regulations about the hours of work for drivers do not adequately address this issue. A solution to this problem requires information that is currently not available to most drivers or their managers i.e. their levels of alertness/drowsiness while driving at any time.

Optalert technology monitors the alertness/drowsiness of individual drivers in real time. That information can also be used by management to influence when breaks are taken, when shifts start and end, and internal 'fatigue management' policy. Like Blood Alcohol Concentration (BAC), drowsiness can be measured. The Johns Drowsiness Scale (JDS™) is one such measure that has been independently validated. This scale ranges from 0 (very alert) to 10 (very drowsy) (Fig 2).

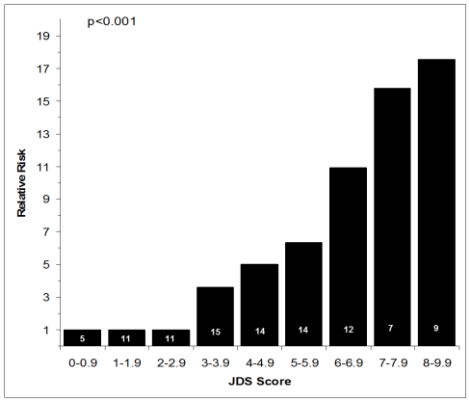
Figure 2.



Johns Drowsiness Scale (JDS™)

The drowsiness scale (JDS) has been calibrated in terms of the relative risk of performance impairment/failure at the time, as shown in Fig 3. In this case drivers, who were sleep deprived, were driving in a car simulator at Monash University. The risk of them driving with all four wheels off the road increased progressively with their JDS scores at the time.

Figure 3.



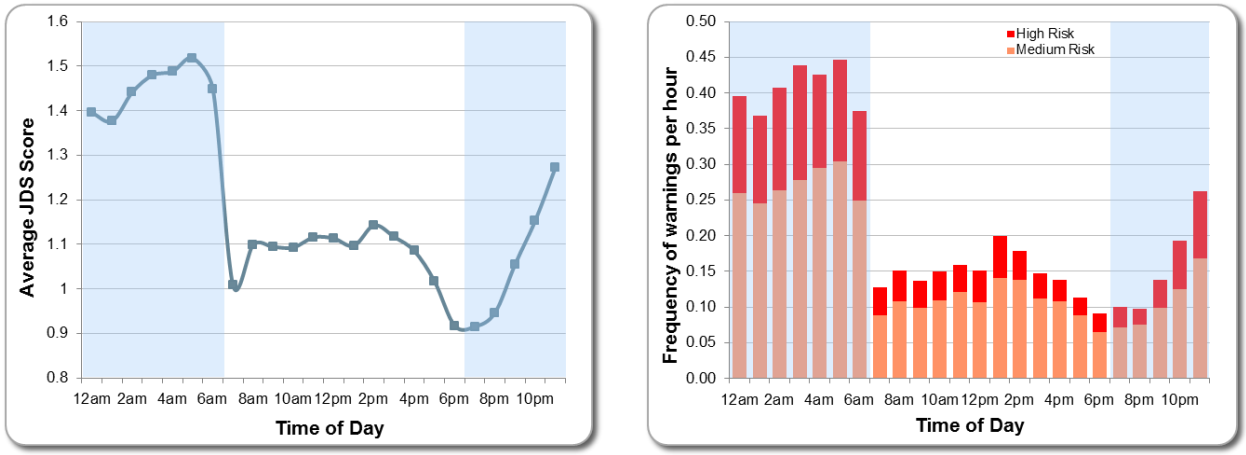
Relative Risk of Driving with all Four Wheels out of the Lane vs JDS™ Score /min 15 people, alert and sleep deprived (27-33 hr) - MUARC Simulator

Data collection

Over several years, Optalert has been collecting JDS™ scores from drivers located all over the world. This data has helped create risk profiles for individual drivers, and has informed companies about their drivers' risks in real-time, as well as their most hazardous driving times, and vehicle locations. It is this kind of objective data that would help inform the NTC about times when the risks were highest, which drivers had the greatest risk, and when, on which routes and specific locations, over a given data collection period.

As an example of this data collection, Figure 4 shows the average JDS™ scores of drivers at a site in East Africa, plotted over a 24-hour period. The circadian variation in JDS scores, and of the timing of drowsiness warnings, is evident.

Figure 4.



238 Drivers, 65 haul-trucks at a mine-site in East Africa 6.2 million JDS scores over 9 months **There were no drowsiness-related incidents or accidents during that time**

Figure 5 is a map which shows the locations where Optalert drowsiness warnings have been issued to drivers on a particular route. This kind of map can be plotted for any road where JDS™ scores have been collected.

Figure 5.

Sample high risk notification locations collated and mapped on a route. Red indicates high-risk warnings.

Advanced Fatigue Management Accreditation

In the specific instance of Advanced Fatigue Management (AFM) accreditation, developed as part of the new NHVR regulations, drowsiness detection technology would be of specific assistance. Rather than relying on subjective reports, Optalert technology would provide the necessary data to make a continuous, objective assessment or risk based on the driver's state of alertness/drowsiness while driving. Real-time objective monitoring of drivers could therefore be an essential part of Advanced Fatigue Management.

Conclusion

Optalert welcomes the fatigue data framework and discussion aimed at tackling the complex issues faced by the heavy vehicle and transportation industries. We are grateful for the opportunity to submit our comments and we would be happy to make ourselves available for consultation and discussion when required.

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