

NATIONAL TRANSPORT COMMISSION
Level 3, 600 Bourke St
Melbourne Vic 3000

Submission to NTC on “Effective Fatigue Management”. 16th August 2019.

I am co-founder and CEO of a technology company, GlobalWhere, with a particular interest in applying technology to eliminate industrial workplace accidents and improve health & wellbeing of workers. I wish to provide input on just a couple of the questions posed, where I believe I have something to add.

Question 3: What are the key risk factors associated with long hours, night shifts and other work schedule factors? How do we account for the fact that not all work hours have the same risk without introducing excessive complexity?

Hours of service rules are based on “rules of thumb” based on some simplistic assumptions, the most dangerous in my opinion being as long as there are enough rest breaks, drivers will obtain enough sleep.

There are now a number of biomathematical models available that calculate a fairly accurate alertness/fatigue level based on either measured or estimated sleep in the previous days. Some models are more sophisticated than others, taking into account the timing and duration of sleep, sunlight hours, and sometimes additional factors. For further analysis see CASA’s Biomathematical fatigue models guidance (<https://www.casa.gov.au/files/biomathematical-fatigue-models-guidance>).

Several of these biomathematical models have been implemented within smartphone apps, in at least one case with an associated wristband that provides accurate sleep-input data (SAFTE model, implemented by Fatigue Science with an associated Readiband™ wearable used to record sleep/wake data, <https://www.fatiguescience.com/applications/industry-transportation-fatigue-risk/>).

A validated biomathematical model can assist in measuring the risk of different hours/shifts. To reduce the complexity for operators, methodologies for applying these tools could be registered and pre-approved by the regulator as an element of accreditation schemes.

Question 6: How can we better accommodate emerging technologies? How can the new HVNL get the best value from technology and data? Do you think fatigue monitoring technology can supersede work and rest hour requirements?

I would like to see new laws providing the option for a hierarchy of performance based, and technology-enabled, options for fatigue management, with a prescriptive fallback for operators who don’t want the complexity of technology-enabled solutions.

Tier 1: Use a validated methodology to identify impairment before it reaches an unacceptable level¹, and escalate interventions.

¹ An “unacceptable level” refers to a quantifiable threshold that has been demonstrated to correlate with a certain level of risk, similar to using a threshold level of blood alcohol concentration as a proxy for unacceptable risk of alcohol impairment. The idea of an unacceptable level of risk acknowledges that fatigue is a spectrum and risk is elevated before current technologies are able to identify it, through slower reaction times, lapses in concentration, impaired judgement.

For example, use of real-time monitoring of on-board systems to identify when the operation of a vehicle exceeds a set level of tolerance for indicators of impairment. The indicators could be things like lane departures, harsh braking, harsh cornering, erratic speed changes (not caused by speed limit changes or other traffic), excessive speed, electronic stability control activation. The interventions could include audible warnings, seat vibration, triggering check-in by monitoring body, even up to controlled slowdown/stop of vehicle.

Note: As far as I'm aware this technology doesn't exist yet in its entirety, but it would be good to see it allowed for in the law.

Tier 2: Use a pre-approved scheme that contains a combination of preventative controls and mitigation controls.

Where the preventative controls are demonstrated to ensure drivers rarely reach an unacceptable level of fatigue, and the mitigation controls are demonstrated to reliably ensure that high-risk fatigue² is identified and mitigated. For example, a scheme might use the Fatigue Science Readiband™ and SAFTE biomathematical model to ensure drivers do not drive with a SAFTE alertness score below a specified threshold. The scheme could also include the mitigation control of Seeing Machines, to identify when symptoms of high-risk fatigue are identified and interventions are used to mitigate the risk.

For compliance purposes, electronic logging devices/EWD may be a necessary element of this approach to capture vehicle operating data that can be correlated with other data sources as part of the management methodology and any required compliance investigation.

This approach would also allow for reporting of electronic data to the regulator to demonstrate compliance. Such data could be reported at the operator-wide level so as to protect individual privacy.

Tier 3: Prescriptive hours of service (with more flexibility than the current NHVR rules).

This would be the default for operators who don't wish to take on the overhead of joining an accreditation program.

Regards,

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Disclosure of association

I have mentioned the Fatigue Science Readiband™ and associated SAFTE biomathematical model as an example – I have been a champion of this technology because I believe it (and technologies like it) have the potential to underpin a genuine risk-based framework that allows drivers to drive when they meet a threshold level of alertness, rather than imposing artificial constraints.

² "High-risk fatigue" refers to the situation when a driver is so impaired that they are in imminent danger of falling asleep involuntarily.