Using New Technologies to Evaluate Existing Heavy Vehicle Driver Fatigue Laws

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Abstract

The presentation describes a National Transport Commission (NTC) and Alertness CRC project to scientifically evaluate fatigue provisions in the Heavy Vehicle National Law (HVNL). The two-year research project has an allocated $1 million budget, principally funded by the Commonwealth Government. The research is naturalistic and laboratory-based, utilising alertness monitoring and actigraphy devices to measure alertness and sleep quantity and quality of drivers undertaking maximum hours of work and minimum hours of rest. The presentation focuses on the challenges of evaluating in a laboratory setting the fatigue impact of so-called "nose-to-tail schedules" (whereby a driver works two 12-hour shifts with a seven hour rest break).

Overview of the Heavy Vehicle Driver Fatigue research project

The presentation will summarise the research project, including the 2014 ministerial direction to increase our evidence base before further national reforms to the HVNL are considered. The presentation will outline the research methodology. The research comprises of two phases. <u>Preliminary results from Phase 1 will be described</u>.

Phase 1

is an on-road field trial that will assess drivers' alertness levels, sleep, and driving impairments in naturalistic/real-life driving conditions. Used as an appraisal of available alertness monitoring technologies, such as Optalert, phase 1 drivers will be monitored during work shifts (day, evening and night) across a one month shift cycle, in addition to sleep monitoring during work shifts and on days off. The purpose of phase 1 is to validate the alertness technologies against external indicators (primarily lane departures) and to establish objective alertness bio-markers to be used to translate research data in Phase 2 of the project. 15 drivers will participate in phase 1.

Phase 2

combines laboratory and on-road evaluation of driver fatigue. In the laboratory setting (phase 2a), the study will evaluate how simulated shift patterns impact drivers' alertness levels and driving performance. Following each simulated shift, the participant will be transferred to a closed-loop continuous-driving test track and will undertake a 2-hour fully monitored drive. The participant will undertake two simulated shifts: a nose-to-tail and an alternative schedule against which the fatigue risk of the nose-to-tail is compared. 15 drivers will participate in phase 2a.

In phase 2b, 40 heavy vehicle drivers will each be measured for alertness and sleep monitoring over a one week period. Drivers will undertake routine on-road and related activities and will be selected to ensure a representative sample. The study will target drivers that work maximum hours and have minimum rest allowed under the law. The study will seek a cross-section of urban and rural driving, general freight and livestock transportation, and drivers employed across a range of large- and small-scale operations.

Explanation of the Counting Time Rule and Nose-to-Tail phenomenon

The presentation will concisely explain how 24-hour periods are counted in the HVNL, and how the current rules allow a driver to work up to 16 hours in 24. The presentation will illustrate the complexity of measuring the fatigue impact of a nose-to-tail given that the longer work hours are separated by a minimum rest of seven hours. At issue is the extent to which this minimum rest sufficiently offsets the fatigue risk at the end of the second work period.

Challenges of simulating and comparing a Nose-to-Tail in a laboratory

To scientifically evaluate the fatigue impact of nose-to-tails, the research necessitates a comparative analysis to benchmark the nose-to-tail results. Using this comparative analysis in a controlled environment, we will have the tools to evaluate objectively the degree of impairment attributable to a nose-to-tail schedule.

The presentation will highlight the benefits and disadvantages of a number of alternative schedules canvassed with industry and government stakeholders, including:

- increasing the major rest period in the nose-to-tail
- reducing the second work period in the nose-to-tail
- increasing minor rest periods throughout the two work opportunities
- adjusting night-driving.

A key challenge is to develop a robust and measurable comparison, while seeking to ensure that the alternative schedule does not predetermine a policy intervention.

Potential way forward

The presentation will conclude with a summary of a potential way forward: the nose-to-tail schedule is compared to a driver that is well-rested and has an increased rest breaks from 7 hours to 11 hours. By adopting this approach, the research would be able to evaluate the fatigue of a driver at the end of a 12 hour shift in the 'best case scenario' allowed in the HVNL (completing 12 hours of work after a 24-hour stationary rest break) with the 'worst case scenario' allowed in the HVNL (completing more than 12 hours of work in a 24-hour period, with minimum rest).

In both schedules, the driver is operating legally and in accordance with the current rules of the HVNL and there are no potential policy interventions included in the alternative schedule.

References

National Transport Commission. (2016). Heavy vehicle driver fatigue data: final report. Melbourne.

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