SUBMISSION TO HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON COMMUNICATIONS, TRANSPORT AND THE ARTS

Inquiry into managing fatigue in transport

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This submission is based mainly on evidence from research by the authors on the effects of fatigue and effectiveness of solutions to manage fatigue in the area of road transport. Many of the points are also relevant to other industry sectors, however, it must be acknowledged that currently the long distance road transport industry permits some of the longest hours of work of any industry sector, so there may be points on which the findings from road transport do not relate to other areas of transport.

This submission will deal with each of the Terms of Reference of the inquiry in turn.

1. Causes of, and contributing factors to, fatigue.

Fatigue is a mental and physiological state that cannot be avoided in many circumstances. These circumstances are common to all people. For example, long periods without sleep, and long periods spent on boring or monotonous tasks will produce fatigue in all people eventually. This means that some features of work in the transport industry are problems for biological reasons in that they are taxing the limits of any person's capacity to function. Other features will vary from sector to sector such that fatigue might be expected to be higher in some sectors due to the nature of the work and work practices.

Research results show that a range of factors are likely to cause fatigue in the transport industry. Evidence for this comes, for example, from a national survey we conducted of around 1,000 long distance truck drivers, Williamson, Feyer, Coumarelos and Jenkins, (1992) drivers reported that dawn driving, long working hours and delays in loading were the most likely causes of fatigue. There is also a great deal of evidence from our research and the research of others, that:

(i) Long periods without sleep and long hours of work will cause fatigue. For example, in our survey, drivers reported feeling fatigued after around 14 hours of work on average.

(ii) An imbalance between work and rest is also an important cause of fatigue. For example, our research has demonstrated that drivers whose rest is limited by operational constraints such as staged or team drivers and

some company drivers were more likely to report fatigue compared to drivers who could take rest as they needed it, such as owner-operators. Similarly, our results showed that the need to drive for very long distances such as a return trip between Perth and Broome can produce high levels of fatigue if rest is not managed appropriately (Feyer, Williamson, Friswell and Leslie, 1995). Our comparison of single and two-up driving (two drivers sharing the driving in which one drives and the other rests in the sleeper bunk on a roughly four-hourly rotating basis) showed that on this long trip single drivers managed fatigue poorly compared to two-up drivers who were getting more rest overall, but that even two-up drivers experienced high levels of fatigue by the end of the trip. If however, drivers were able to get a long overnight sleep at the half-way point in Broome, fatigue was managed well across the entire trip, in fact drivers reported *less* fatigue on the return leg.

(iii) Work done during the midnight to dawn period is likely to lead to greater fatigue than day work. Our research shows that overnight express parcel operators reported considerably more fatigue and earlier in the trip compared to all other types of drivers.

(iv) The payment system for drivers is likely to be an indirect cause of fatigue by promoting long working hours. Our survey of drivers showed that nearly two-thirds were remunerated on a payment by results basis, either by kilometer or by load taken. This system is likely to encourage drivers to work long hours in order to maximise their income.

(v) Non-driving work like loading and unloading must also be factored in as a cause of fatigue. Problems with loading and unloading were reported by drivers in our survey as both a source of fatigue and an area that needs to be improved.

In addition to these work-related causes of fatigue, there is a range of driver-related factors, which will cause fatigue. For example, medical conditions that increase the tendency to fall asleep like narcolepsy could present a significant problem. Of recent interest in the road transport industry is the problem of sleep apnea, which is argued by some authorities to be a major problem amongst drivers, although the evidence for this is lacking. Overall, these conditions are uncommon and while they should be diagnosed and treated where they occur, they are not likely to be a significant cause of fatigue for most drivers in the road transport industry.

Of more importance to all professional drivers is the effect of their current state of health and their daily routine on their ability to combat fatigue. While there is little clear evidence of a link between health status and fatigue in the industry, it is generally believed that unfit and unhealthy drivers are a contributor to the fatigue problem in the long distance road transport industry. The relative contribution of this factor to the overall causes of fatigue needs to be assessed in the context of the long distance road transport industry. It is much more likely that fatigue in the road transport sector will result from the demands of the job to do very long hours

of work during both the day and night with comparatively brief rest periods in between each work period.

2. Consequences of fatigue in air, sea, road and rail transport

In establishing how fatigue affects the transport industry, statistics on accidents and crashes are of limited usefulness as they vary greatly between studies. It is very difficult to establish definitely that fatigue has played a role in an accident after the accident occurred. Usually the role of fatigue is inferred from the accident circumstances, for example; single vehicle, between midnight and dawn, driver has had limited sleep prior to starting the trip.

Driver reports are likely to provide more accurate information about the effects of fatigue. For example, in our national survey, drivers reported being aware of the effects of fatigue on driving. They reported that fatigue reduces their ability to react quickly, and produces poorer steering and gear changing. Fatigue is therefore also likely to reduce productivity through its effect on driving speed.

In a recent study, we attempted to establish how fatigue affects mental performance and the relative importance of these effects by comparing the effects on performance of a long period without sleep with the known effects of alcohol. This study showed that over 28 hours without sleep, abilities that are important in transport operations, the ability to react quickly and to detect infrequent events deteriorated significantly whilst the ability to do higher level thinking was not affected. The study also showed that the extent of the deterioration was equivalent to 0.05% Blood alcohol concentration (BAC) after between 16 and 18 hour so sleep deprivation. These results indicate that the consequences of fatigue are at least as important as the consequences of alcohol use in transportation since they produce similar effects likely to compromise safety after relatively moderate hours without sleep.

Just as the causes of fatigue may be sector-specific, so are the consequences of fatigue. Fatigue is likely to be a major hazard for long distance road users as the task requires continuous attention. In contrast, in the aviation industry, there may be less emphasis on the moment–by-moment effects of fatigue, as aviation incorporates many supporting and failsafe systems, even in small aircraft, although the consequences of error due to fatigue in aviation may be greater. These differences between sectors in causes and consequences of fatigue must necessarily influence the types of initiatives and responsibilities taken to address the problem in each sector. While we are always having to address the problem of fatigue as a biological phenomenon, the ways of doing so will differ between sectors.

Initiatives in transportation addressing the causes and effects of fatigue.

Traditionally, the road transport industry used regulation of working hours to manage fatigue, although this was mainly enforced in the eastern board states. Increasingly, however, it has been recognised that this approach has limited effectiveness because of difficulties in enforcement and because the limits imposed may not be targeting the main causes of fatigue and may even be inadvertently causing fatigue since drivers work to the outer limits of the regulated hours rather than working to their own body state.

A number of recent moves within the industry have attempted to reduce fatigue in the industry. The Road Transport Forum, for example, through their Trucksafe programme have set up a programme for focussing on improving driver health. While this programme will undoubtedly have great benefits for the road transport industry, it is unlikely to act to address the primary causes of fatigue in the industry, as discussed previously.

The Queensland Department of Transport have initiated a Fatigue Management Programme which aims to take operational needs into account by allowing companies to develop their novel work-rest schedules that may deviate from the prescribed working hours if it can be demonstrated that these schedules actually manage driver fatigue. The potential benefits of this programme are that it allows companies and drivers the flexibility to respond to their specific needs rather than a one-size-fits-all regulatory regime.

There have been problems with the programme though because of the lack of good evidence on what are the best work-rest schedules for managing fatigue, so that it is difficult for companies, regulators and researchers to judge what is an effective work-rest schedule. Without evidence on the effect of variations in work-rest schedules, there is potential for these novel schedules to be worse than the current regulated one. Secondly, the programme has experienced difficulties because of differing views between the states on what limits should be imposed on the fatigue management programmes.

Our recent work has involved evaluating work-rest schedules for their effectiveness in managing fatigue. This work is being funded by the Federal Office of Road Safety and has involved a number of stages. The first stage was to determine which methods are most sensitive for measuring the effects of fatigue on performance compared to a known safety standard (the effects of alcohol at 0.05%BAC and higher). These methods are know being used to evaluate the effects of fatigue in a range of different work-rest schedules including schedules that are part of the Fatigue Management Programme.

So far this project has demonstrated that 12 to 14 hour trips do not produce levels of fatigue or performance deterioration that could be judged compromise

safety provided that drivers are well-rested at the beginning of the trip, and do not go much beyond 12 to 14 hours of work in one stretch. Over a working week of up to six consecutive 12 to 14 hour shifts, the results showed that fatigue management was dependent on the number of breaks and the amount of sleep obtained during that time. Drivers who experienced a build up of fatigue across shifts, with little rest and sleep to overcome it, showed poor reaction speed and were less able to notice infrequent visual signals compared to drivers who had more rest and sleep.

It is planned to continue this approach to evaluate further Fatigue Management Programmes as they come through the Queensland Department of Transport process and gain permits. This information will help to:

(i) Demonstrate which work-rest schedules are most effective for reducing fatigue.
(ii) Provide models to industry about how to design effective work-rest schedules.
(iii) Help us to understand how fatigue develops and how it can be managed best.

3. Ways of achieving greater responsibility by individuals, companies and governments to reduce the problems related to fatigue in transport.

Responsibility for fatigue management in transportation lies from consignment of the freight to delivery. This means that freight consignors and freight forwarders play an important role in terms of the demands they make on transport companies to move their freight within a limited time period. These parties need to acknowledge their responsibility to ensure that their demands for timely delivery are not unreasonable. This is slowly being acknowledged by some freight forwarders, but many more need to be reminded of their legal obligations to ensure that their contractors are not put at risk under the occupational health and safety acts of each state.

Companies play probably the largest role in causing fatigue through activities like accepting unreasonable freight tasks, not employing sufficient drivers to cover the work, keeping trucks on the road for business reasons, without accounting for the needs of the people who drive them and giving drivers incentives to work very long hours by paying them by kilometer driven or load carried rather by salary. Companies can take responsibility for reducing fatigue by reducing such activities and by taking steps to review their work-rest schedules in terms of good fatigue management practices.

We acknowledge that the role for companies in managing driver fatigue is a difficult one. The road transport industry is very competitive and profit margins are small. Yet companies need to be encouraged to take a responsible attitude to

fatigue management. Possible ways of doing this include governments targeting companies which regularly have drivers working very long hours with little rest rather than the traditional approach of targeting the drivers. This approach will get more at the heart of the fatigue problem, that is unreasonable schedules rather than the symptom of the problem, the tired driver. In addition, freight forwarders and customers should adopt responsible consignment policies which limit their dealings to transport companies that have demonstrated compliance with fatigue management programmes.

From our experience, it is important to allow drivers to take some of the responsibility for fatigue management but to do so, drivers need flexibility to be able to take rest as needed. There are two limiting forces on driver's ability to be flexible in taking rest as needed. First, company schedules often do not leave enough time for fatigue management. Many companies report that drivers are allowed to take rest whenever they feel the need, however, anecdotal evidence from discussions with drivers indicates that this is often not the case. Second, the working hours limits may not leave enough time for fatigue management. If drivers are working close to the limits of the working hours regulations, as is often then case, then they do not have any flexibility to extend their trips even by an extra 30 minutes, say, if that is all they need to get home.

We do not believe, however, that all working hours limits should be removed. Limits on hours of work are as much to protect the drivers from exploitation as they are to catch drivers who are contravening the working hours regulations. At present, the most practical approach to allowing drivers and companies the flexibility they need is the Fatigue Management Programme approach. While this approach needs further refining and extending, it will allow companies and drivers to work together to develop work-rest schedules which are more suitable for human and operational needs, but also provides a system with checks and balances to ensure that the schedules meet acceptable standards for effective fatigue management.