

Fatigue

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COMMERCIAL DRIVER HOURS: The Regulators' approach.

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Introduction.

I was fortunate enough recently to attend "The Third International Conference on Fatigue and Transportation" in Fremantle, Australia. It exposed my mind to many of, who I regard as, the World's top researchers in the field of fatigue, their theories, and many international trends and developments in this field. It also provided me with a personal experience of the nature of fatigue. To return to Wellington from Perth required me to leave Perth on Friday at mid-night travelling east, with a stop over in Sydney then travelling on to Wellington arriving early Saturday evening. I estimated I had about 30 hours between sleeps during this trip. I was unaffected on Sunday and Monday, but on Tuesday lunchtime, I went into a bookstore made a purchase then discovered that I had no recollection at all of my PIN number for EFTPOS, despite using it the previous day! This is something that I have never experienced prior to this one-off occurrence and at the time I did not consider myself fatigued, yet it seems the only reasonable explanation. I give this example to dispel a common myth about driver fatigue, it is not just the problem of the "sleepy" driver or the driver falling asleep at the wheel, rather fatigue encompasses a wide spectrum of levels of impairment of which falling asleep is the extreme.

My presentation will provide a "broad brush" view on the means by which regulators have sought to minimise the risk associated with fatigued drivers, both in New Zealand and internationally. Before doing so I will briefly examine some of the difficulties associated with detecting fatigue and the role of fatigue as a causal factor in commercial vehicle crashes. I will not canvass the issue of what is fatigue, nor its effects, as I'm sure this has been, or will be, adequately addressed by Doctors Gander and Feyer.

FATIGUE DETECTION

On approaching this matter, I quickly came to the conclusion that unlike many other road safety risks, there is no quick, objective test for determining the level of fatigue in a driver, during a “normal” roadside stop. Clearly at the extreme end of fatigue, where a driver is asleep at the wheel or their driving is noticeably and seriously impaired, an enforcement officer is able to take action, to prevent that driver from driving. However, it is the “middle ground” where a driver’s reactions may be impaired, similar to my experience with my PIN, but they are able to drive a straight line, as it were, that the detection issue becomes difficult.

We can compare this situation to that existing for the big three current road safety risks:

- Alcohol – a clearly defined and measurable breath or blood alcohol limit exists. It is possible to detect at the roadside (through the use of “sniffers” and the “Blow in the bag”) whether a driver exceeds the pre-determined limit.
- Speed – again, a clearly defined measure; hawk radars and speed cameras are used to detect offenders.
- Restraint use – standards exist for seatbelts and visual inspection during a Warrant of Fitness check can determine whether they continue to meet the standard. Offenders are easily detected on the road, the Police Officer can visually determine whether a seatbelt or approved restraint is being used.

Because of the limitation in providing an objective measure, the common approach by regulators to minimise the risk of driver fatigue has been to restrict the hours commercial drivers are permitted to drive or work, and specify minimum rest periods and off- duty periods. By rest period, I mean those periods within a work period that serve as breaks, such as a meal break. Off duty periods I regard as the periods between work periods which are longer in duration and during which a driver is expected to sleep.

FATIGUE AS A CRASH FACTOR

In New Zealand, the Land Transport Safety Authority (LTSA) maintains a crash database. This is the central collection and analysis point for all traffic crash reports prepared by NZ Police, for road crashes at which they attend.

According to the data, in the period 1989 to 1996 about 4% of reported crashes (that is involving loss of life, or injury to any person) involving vehicles classed as trucks, where the driver was considered at fault had fatigue listed as a crash factor by the attending Police Officer.

Specifically, 6342 truck drivers were identified in the data as involved in these crashes, and of this total 2783 (44%) drivers were recorded as being at fault. Of these at fault truck drivers, 4.2% (119 drivers) were recorded as being fatigued. Overall, of the total 6342 drivers, 1.8% (122) were recorded as being fatigued.

Other Commercial Drivers

In the period 1990 to 1996, according to LTSA crash records, 1079 taxi and shuttle drivers were involved in reported crashes. Of these, 19 drivers (1.8%) were reported as being fatigued. Three-quarters of these fatigue crashes occurred between Thursday morning and Sunday morning and two-thirds of the reported crashes occurred between 4am and 7am.

In the period 1989 to 1996, 895 drivers involved in reported crashes were identified as bus drivers. Of this total, only one driver was involved in a crash where fatigue was recorded as a crash cause. In the same period, there were 29 drivers involved in a crash who were identified as tow truck drivers, none of these drivers was involved in a crash where fatigue was identified as a cause.

To better appreciate the impact on society of fatigue caused crashes, a term called social cost can be employed. Social cost is a measure of all the damage to our society that results from road crashes. Surveys determine how much people would pay to reduce the chances of death, injury and the pain, grief and suffering resulting from

road crashes. The total amount people are willing to pay, together with the loss of earnings, the cost of legal, medical and other emergency services and property damage gives the cost of road crashes in dollar terms to society as a whole. In 1996 dollar terms, the social cost for a fatal crash was NZ\$2,164,000, for a serious injury crash NZ\$365,000 and NZ\$42,000 for a minor injury crash.

TABLE 1. Social Costs (SC) of Fatigued Commercial Driver Crashes in New Zealand 1989-1996

(Expressed in 1996 dollar terms)

	Total SC of all crashes for all vehicle type, and all causes (\$000 000)	SC for truck crashes, driver fatigued (\$000 000)	SC for taxi, and shuttle crashes, driver fatigued (\$000 000)	SC for bus crashes, driver fatigued (\$000 000)
1989	3490.41	17.43	Nil	Nil
1990	3680.74	16.49	0.042	2.529
1991	3377.67	2.14	0.94	Nil
1992	3150.32	16.58	0.126	Nil
1993	2872.32	22.94	0.427	Nil
1994	2910.58	41.65	0.126	Nil
1995	2906.06	37.7	0.533	Nil
1996	2588.83	18.67	2.529	Nil
Total	22066.35	173.6	4.723	2.529

The LTSA is also maintaining a specialised database for truck and bus crashes alone. This is being run in conjunction with the Police Commercial Vehicle Investigation Unit, which is a nation wide group of officers specialised in Heavy Motor Vehicle enforcement. This unit attends as many truck and bus crashes as it is able and provides the LTSA with a crash data form distinct from the usual Traffic Crash Report. This crash data form has additional prompts for the officer as to the crash cause, including the issue of fatigue and compliments the usual traffic crash report.

For 1997, the CVIU attended 370 crashes and of these 25 (6.7%) had fatigue listed as a crash cause. As at March 1998, 644 crashes were logged on the database and of these 43 (7.7%) were listed as fatigue caused.

Both measures provide insight as to the scale of fatigue as a crash cause.

Nevertheless, even given the figure provided by the LTSA/CVIU database, New Zealand's recorded fatigue crash rate for trucks is lower than that estimated or recorded for many overseas jurisdictions.

Possible explanations as to why New Zealand's fatigue related crash figure, expressed as a percentage, is lower than many comparable overseas estimates are:

- Under-reporting of fatigue as a crash cause: This may be the result of the difficulty the attending Police officer has in determining whether fatigue was a crash cause in the absence of a conclusive objective measure. The officer is therefore largely dependent on an analysis of the driver's logbook or an interview with the driver.
- Characteristics of New Zealand's road network and road transport work: Relatively short distances are normally travelled, and there exists a good network of reasonably priced motels for overnight stays along with an extensive network of roadside rest areas for drivers to take a break.
- Effectiveness of the current driving hours' system in managing driver fatigue: The current mix of driving hours and enforcement serves to keep the incidence of fatigue in check.

THE PRESCRIPTION TO MANAGE DRIVER FATIGUE

Given the lack of any easily applied roadside measure of driver fatigue, New Zealand has adopted the use of prescribing maximum driving hours. As earlier mentioned these are restrictions placed on how long a person may drive and work in any set period and provide for minimum periods of rest, during which the person cannot work or drive.

In New Zealand, driving hours were first introduced for:

- Goods service vehicle drivers - through the Transport Licensing (Goods Service) Regulations 1936,
- Passenger service vehicle drivers - other than taxi, through the Transport Licensing (Passenger) Regulations 1936,
- Taxicab drivers - through the Taxicab Regulations of 1939.

- Drivers of heavy motor vehicles – through the Transport Act 1962, in November 1987, and finally
- Tow truck drivers – through the Transport Act 1962, in November 1989

New Zealand's current driving hours' system imposes the following restrictions:

- maximum 5 1/2 hours continuous driving before minimum 30 minute break,
- maximum 11 hours driving in any 24 hour period,
- maximum 14 hours on duty in any 24 hour period,
- minimum 9 hours continuous rest in any 24 hour period,
- a minimum continuous rest of 24 hours when either 66 hours driving or 70 hours on duty has accumulated (which ever comes first), calculated since the last minimum 24 hour rest.

(On duty time includes loading and unloading time and all other forms of paid employment)

Employers of drivers subject to these hours are also made legally accountable for ensuring their drivers correctly observe the restrictions.

There are a number of exemptions from Driving hours, based on the vehicle size, or the driver's activities. In all cases, bar the situation of an urban bus driver, exemptions are restricted to operations conducted within a 50 kilometres radius of the driver's usual business location.

LOGBOOKS

Driving hours are the most important aspect of the prescriptive approach to managing driver fatigue. However, the means by which a drivers adherence to the hours is monitored is through driving hour logbooks, into which a driver enters the following details:

- Driver's name and address (generally recorded in front of book).
- Date.
- Driven vehicle(s) registration number(s).
- Time spent driving.
- Time spent on duty.
- Time spent resting, or off-duty.
- Locations for start and finish of any of the three times noted above.
- Hubdometer readings (if fitted) for start and finish of drive time.

This information has had to be recorded into a book that had carbon pages to provide copies for enforcement staff and the driver's employer. The logbook must be maintained legibly and produced on demand to any enforcement officer for inspection. It must record details of the day for which it was demanded, and as a minimum, show the previous 10 days as well.

In a recent development, the Director of Land Transport approved the use of a computerised logbook, in place of a paper logbook. The computerised system records identical details as a paper logbook, its biggest advantage to a driver is that it almost eliminates the possibility of incurring penalties through forgetting to record those required details.

PENALTIES FOR NON-COMPLIANCE

As with most regulatory environments, failure to comply with the required standards results in sanctions, both to the driver and, depending on circumstances, the operator. Where a driving hour requirement is breached the driver can be fined up to \$2 000 and, upon conviction, they will be disqualified from driving the licence class/classes in which the offence occurred for at least one month. Where a logbook offence is committed, the maximum penalty is again \$2 000, but the driver licence disqualification will only be invoked if no special reasons exist. The maximum penalty for an operator is \$10 000.

Logbook offences are:

- Failing to produce an approved logbook on demand.
- False statement or particulars in a logbook.
- Using more than one logbook at a time. -
- Omitting a material particular from a logbook, and
- Failing to produce previous 10 days' record.

PRESCRIPTION: OVERSEAS COMPARISONS.

By way of comparison, the following table lists the prescriptive hours adopted by a number of other jurisdictions. Please note that the hours for Australia are a proposed national standard only. At present, the Eastern states have their own provisions, and

each State has a different vehicle weight threshold at which prescriptive hours “kick in”.

TABLE 2: Driving hour restrictions for selected jurisdictions

Hours	AUS*	USA	CAN	EC GS	UK GS
A. Max. single cont. drive period	5	N/a	N/a	4.5	N/a
B. Min. rest time after A.	0.5; or 2 x 0.25	N/a	N/a	.75, or 3 x 0.25	Na/
C. Max. drive time 24 hrs	12	10	13	9(10 twice a week)	10
D. Max. On duty time, 24 hrs	14	15	15	N/a	11
E. Min. rest period, 24 hrs	10; at least 6 hrs to be cont.	8 cont.	8 cont.	11 cont. (reduce to 9, 3 times per week)	13
F. Min rest period, 7 days	84, at least 24 to be cont.	48		45, can be 36 or 24	
G. Max. drive time total 7 days	72	60 , or 70 in 8 days	60	56	
H. Max. on duty time, total 7 days	84	N/a	N/a	N/a	

Notes

Jurisdictions. AUS* - Australia, please note that this is the proposed scheme and will exclude the State of West Australia and the Northern Territory
 USA – United States of America
 Can – Canada
 EC GS – European Community rules for goods service vehicle drivers
 UK GS – United Kingdom rules for goods service vehicle drivers (operates only in UK instead of EC rules)

OPTIONS FOR THE FUTURE?

If we continue to accept that driver fatigue is a road safety risk, and that it requires continued regulation and/or management, we can give some consideration as to possible future directions for driver fatigue management.

The following are my brief musings on some of the options I am aware of. They are by no means exhaustive, nor are they especially detailed.

1. Greater use of Technology

The trend for technology in this field is miniaturisation and lower unit costs. This means that now many operators and drivers have the opportunity to employ better technology to either record hours of work, or manage their fatigue. In this section, I will touch on many of the differing types of technology I have been made aware of in this field.

a. Within regulated hours.

- i. The wider introduction of electronic records of hours worked. This can take the form of either - in vehicle computers or perhaps computerised staff management systems where employees' hours of work and vehicle details are securely, and properly recorded and are readily accessible by enforcement staff. In either case, the Director must approve the substitution of paper logbooks with electronic records.

b. Without regulated hours.

- i. Vehicle monitoring systems. These monitor variations in a person's driving of a vehicle, which includes-
 - Proper lane maintenance.
 - Maintenance of proper following distances.
 - Constant speed.

Where irregularities are detected, driver fatigue is considered to a likely cause and appropriate countermeasures are implemented. These could comprise automatic operation of the vehicle's heating system to deliver a blast of colder air at the

driver, the steering wheel gently vibrating, or the radio volume being automatically increased. In extreme cases the vehicle's brakes could be applied.

ii. Driver monitoring systems. These operate in a similar manner to the vehicle system - except that it is the driver who is monitored, for:

- Eye blinking rate.
- Heart and/or Brain activity levels.
- Head position, nodding.

Again, where any irregularities are noted, fatigue is presumed to be the cause, and appropriate countermeasures commenced.

2. Fatigue Management.

This is a system being trialed in Queensland. It operates on the basis that prescribed driving hours are not the most effective means to manage driver fatigue. Instead, operators undertake their own fatigue risk assessment, develop and implement a plan to manage the risk as part of their transport operation and have on-going evaluation of their adherence to this plan, through regular audits. The overall regulation of the system continues to lie with a State agency (the Queensland Department of Transport).

3. Education.

Other than questions regarding driving hours asked as part of the driver licence test, most truck drivers have little formal education or training on driver fatigue, its risks and means to alleviate fatigue's effects. Some measure to alleviate this has been taken by the LTSA through the recent publication of a driver fatigue "fact sheet".

CONCLUSION

I trust that you now have more insight into the manner of regulation of driver fatigue.

You may feel that my "broad brush" approach to this matter has been lacking any passion or great detail as to why we regulate, or the means by which we do. This is intentional. It is because the LTSA has recently embarked on a full review of our approach to managing commercial driver fatigue. Many of the issues I have touched on today, I am sure, will be raised for consideration in this review.

It is a challenge for those of us either interested or involved in this subject to examine and consider the existing system and determine whether it is delivering appropriate levels of safety, and what, if any, changes could or should be made to it. It is a challenge that I hope some of you present today may take up.