

FATIGUE MANAGEMENT IN NEW ZEALAND: Wake up to Driver Fatigue

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INTRODUCTION

Driver Fatigue is fast approaching as one of the main road safety risks. As the number of vehicles on our roads continues to grow, the level of concentration required by all drivers increases. And the consequences of a driver being fatigued can therefore be fatal. This paper discusses; what is driver fatigue, what causes fatigue and the reasons why fatigue may occur, the size and nature of heavy vehicle fatigue in New Zealand, and what the Land Transport Safety Authority (LTSA) is doing toward managing driver fatigue especially in the heavy vehicle and truck driver industry.

WHAT IS DRIVER FATIGUE

Driver fatigue is commonly thought of as falling asleep at the wheel however this is an extreme stage of fatigue. Fatigue will usually affect your driving performance and your driving will be impaired well before you actually fall asleep at the wheel.

There are a number of signs and symptoms of fatigue and when a driver exhibits a few of these at the same time, this is a good indication that the driver is fatigued. Some of these include:

- Forgetfulness
- loss of concentration
- poor decision making
- slowed reaction times
- taking unacceptable risks (not normally considered)
- reduced mental or physical alertness
- moodiness
- poor communication
- nodding off.

WHAT CAUSES FATIGUE

The main causes of fatigue are:

- sleep debt or deficit
- the length of time between sleeps
- the circadian rhythm

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a) Sleep debt or deficit

The amount of sleep the average adult requires is normally between seven to eight hours continuous sleep. The number of hours of sleep required does however vary from person to person and it is not uncommon for truck drivers to have less than the recommended seven to eight hours. Sleep that is interrupted or does not meet the needs of the individual will generally result in fatigue. Sleep debt is the term for inadequate sleep, or sleep loss and this can result after one night or after several nights of restricted sleep. Where sleep debt occurs the brain will often go into an involuntarily sleep (micro-sleep) and this is when a driver is most at risk. Micro-sleeps often last for a brief period of a few seconds but when driving this is obviously extremely dangerous.

- One cause of sleep debt are sleep disorders. There are 84 recognised sleeping disorders, of which the most common is sleep apnea. Sleep apnea affects approximately five percent of the middle-aged population and disrupts the quality and quantity of sleep.

There are a number of other reasons why a truck driver may not get the

recommended hours of sleep and these could be due to:

- early morning starts or late night finishes
- unplanned or disrupted schedules resulting in longer than anticipated trips or on-duty time
- illness, emotional, physical or personal issues

b) Length of time between sleeps is the length of time that a driver is awake until his or her next sleep.

These extended periods of time between sleeps can often result in sleep debt because the amount of sleep a driver gets is reduced. Some reasons for extended length of time between sleeps could include:

- dispatchers or employers changing or planning drivers schedules that do not allow the driver sufficient time off-duty or break from driving.
- time taken to commute to and from work
- payment systems enticing drivers to work longer hours

c) Circadian Rhythm

The circadian rhythm is the natural body clock that every human being has. This cycle is broken into two

high-energy periods and two low-energy periods. The high periods are between 6am and 1pm, and 4pm to midnight. The low periods are generally between 1pm and 4 pm during the day and midnight and 6am, and is when we tend to feel tired. During the low-peak periods, the body's temperature, heart rate, blood pressure, breathing rate and adrenal production slow down. These natural body changes can affect the physical and mental performance of a driver and where a driver is fatigued his or her performance is usually impaired. A combination of the circadian rhythm, sleep debt and possibly extended work or any one of these factors alone can result in driver fatigue.

FATIGUE AS A CRASH FACTOR

Between 1997 and 2001, driver fatigue was identified as a contributing factor in 224 fatal crashes and 2243 injury crashes. This represents approximately 10 percent of fatal crashes and 5 percent of injury crashes annually. It is important to note that since driver fatigue is difficult to identify or recognise as contributing to a crash, it is likely to be higher than reported figures.

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.

a) Truck drivers

Specifically, in the period 1997 to 2001, 3563 truck drivers were identified in the data as involved in these crashes, and of this total 1601, (45%) drivers were recorded as being at fault. Overall, of the total 3563 drivers, (2.8%), 98 were recorded as being fatigued.

b) Taxi drivers

In the period 1997 to 2001, 542 taxi and shuttle drivers were involved in reported crashes. Of these, 13 drivers (2.4%) were reported as being fatigued.

c) Bus drivers

In the period 1997 to 2001, 553 drivers involved in reported crashes were identified as bus drivers. Of this total, only two drivers were involved in a crash where fatigue was recorded as a crash cause.

SOCIAL COST

Crash causes can also be based on social cost as a statistical value.

NZ\$3,173,000, for a serious injury crash NZ\$723,000 and NZ\$63,000 for a minor injury crash.

In 2001 the dollar terms for the social cost of a fatal crash was

TABLE 1. Social Costs (SC) for all fatigued Commercial Driver Crashes in New Zealand 1997-2001

| Year | Total SC of all crashes for all vehicle types, not specific to fatigue (\$000 000) | SC for truck crashes, driver at fault and fatigued (\$000 000) | SC for taxi, shuttle crashes, driver at fault and fatigued (\$000 000) | SC for bus Crashes, driver at fault and fatigued (\$000 000) |
|--------------|--|--|--|--|
| 1997 | 3343.3 | 13.4 | 0.07 | 0.0 |
| 1998 | 3105.1 | 11.9 | 3.3 | 2.6 |
| 1999 | 3125.0 | 14.6 | 0.0 | 0.0 |
| 2000 | 2864.2 | 6.2 | 5.2 | 0.1 |
| 2001 | 3003.3 | 26.9 | 0.8 | 0.0 |
| Total | 15441.1 | 73.0 | 9.3 | 2.7 |

(Expressed in 2001 dollar terms)

The LTSA also maintains a database specific to truck and bus crashes.

The Police Commercial Vehicle Investigation Unit (CVIU) shares this database, which is a nation wide group of officers specialised in Heavy Motor Vehicle enforcement. The CVIU attend truck and bus crashes wherever possible and provides the LTSA with a crash data form distinct from the usual Traffic Crash Report. This crash data form includes fatigue as one of the causes or contributing factors to an accident.

For 1997-2001, 2137 crashes were logged onto the CVIU database. Of these 109, (5.1%) had fatigue listed as a crash cause.

It should be noted that the figure provided by the LTSA/CVIU database, for fatigue related crashes 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
- Characteristics of New Zealand's road network and road transport work
- Effectiveness of the current driving hours' system in managing driver fatigue
- 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

MANAGING DRIVER FATIGUE

REGULATED DRIVING HOURS

Fatigue is taken very seriously in the commercial vehicle industry. Most drivers of commercial vehicles are required by law to comply with driving hours regulations.

New Zealand has adopted the use of prescribing maximum driving hours as a measure by which to set the length of time a driver can drive and work in any set period. It prescribes the minimum periods of rest that a driver must take.

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,

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 (whichever 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 driving hours are made legally accountable for

ensuring their drivers correctly observe the restrictions.

LOGBOOKS

Driving hours is an important aspect as a prescriptive approach to managing driver fatigue. Drivers subject to driving hours must record their driving, on-duty and rest hours in an approved style of logbook (unless exempted). The logbook provides a record of a driver's work activity and enables enforcement officers to check compliance with the driving hours requirements. The logbook must contain background details such as the driver's name, and the driven vehicle's registration number as well as times and locations for the start and finish of driving, time spent driving, and time spent resting. 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. A driver must produce their logbook to any enforcement officer for inspection, when requested. An enforcement officer is entitled to remove pages from your logbook, and most logbooks contain a special duplicate or triplicate copy for this purpose.

The 'driving hours and logbooks' factsheet on the LTSA website <http://www.ltsa.govt.nz> provides drivers with guidance on legal requirements and the LTSA 'study guide on logbooks' provides general information for drivers and to assist with the completion of required licensing courses.

EDUCATION

The LTSA identifies driver fatigue as a specific issue and has produced a driver fatigue 'fact sheet'. This is available on the LTSA website or from any LTSA regional office.

Information is also available in the Heavy Vehicles version of the publication 'The Official New Zealand Road Code'. These publications provide information on what fatigue is, as well as suggestions on how to manage it.

The LTSA is also becoming increasingly involved in promoting awareness of driver fatigue issues. Community funding obtained for promotions such as 'driver reviver' campaigns encourage all road users to take stops on long journeys, but this is not aimed specifically at heavy vehicle, commercial, or truck drivers. These promotions often take the form

of billboards. Funding has been provided for volunteers to operate rest stops for drivers by providing free snacks and drinks, as well as information on driver fatigue.

FATIGUE MANAGEMENT PROGRAMME (FMP)

Driver fatigue is a road safety issue, particularly for heavy vehicle drivers. Regulated driving hours are one means to address this but a 'one size fits all' solution may not always address all the known risk factors.

FMP is a possible alternative to driving hours, allowing greater operator and driver flexibility, and is designed to complement but not fully replace driving hours. It is seen as an alternative to managing risk - for "Good or Superior" operators. A FMP trial is currently being undertaken by the LTSA with a group of five good/superior operators. These operators were carefully chosen and have volunteered their time to participate in the trial based on specific requirements. Operators are required to submit a proposal for approval by the LTSA and Project Control Group (PCG), based on the FMP Operators

manual. The operators proposal should include:

- An application form
- Policies and procedures for addressing fatigue management and assurance system standards.
- A template outlining normal and outer operating limits and the corresponding countermeasures.
- A brief or summary of the companies operation.

These items are externally audited by the LTSA.

All drivers who take part in the FMP trial are required to fill out a driver survey. This survey is filled out prior to the trial, at three months and again at six months. It is a key indicator for any changes in self reported fatigue of participating drivers. Analysis of these surveys will be used for reporting on the FMP trial. All drivers of the trial also undertake a Driver Fatigue Awareness Training (DFAT) package and are provided with their own personal workbook and manual. The DFAT package consists of two modules; 'What is FMP' and 'Driver Fatigue'.

Feedback from drivers who have attended this training has been very positive. Drivers explained that the

course confirmed some of the fatigue management strategies that they already had in place. Driver evaluations of the training showed that drivers thought they would now be able to explain what driver fatigue was and some of the causes and reasons for driver fatigue. The majority of drivers believed that they could adopt some changes to improve current operating or driving methods. The main emphasis of the FMP trial and training is safety first.

Findings from the FMP trial to date.

- The level of interest in FMP. 53 companies attended a meeting on FMP last year. From this meeting 16 companies completed a Registration of Interest form and of these 16 companies 5 operators were chosen for the FMP trial. These five operators have shown a high level of enthusiasm about FMP and the trial.

- Understanding and Managing driver fatigue

Of the five FMP trialists, the operators that have completed the initial application process show that they are aware of driver fatigue and the associated issues. These operators have shown that they try to plan their

operations in a way that best addresses driver fatigue and their driver's needs.

- Time and Resources

The LTSA has spent quite some time with trialists to date, however more time and resources are required of the LTSA, PCG and operators, to have all 5 operators up and running in the trial.

CONCLUSION

Driver Fatigue is acknowledged as becoming one of the main road safety risks. Driver fatigue effects a driver's performance and driving is usually impaired. Lack of sleep is the main contributing factor to driver fatigue and falling asleep at the wheel is usually the final stage of fatigue.

The LTSA acknowledge that heavy vehicle drivers and truck drivers are at risk of driver fatigue and if care is not taken by these drivers, they will contribute to being a road safety risk. Regulated hours and logbooks can control the affects of driver fatigue but other factors must be considered.

Setting the maximum hours a driver of a heavy motor vehicle or truck driver can work, and the minimum hours of rest that the driver can take is a sound approach, however it should be recognised that other factors need to be taken into consideration.

The LTSA through the FMP trial, hopes to identify other factors that may contribute to road safety risk and countermeasures that effectively address these risks. The FMP trial will enable the LTSA to assess whether FMP is a safe alternate system to the current regulated driving hours for good or superior operators and whether it would be a practicable system for managing driver fatigue in New Zealand.