Fatigue-related Crashes in South Australia

Government of South Australia
Department for Transport, Energy and Infrastructure

Fatigue generally refers to a combination of symptoms such as impaired performance and feelings of drowsiness. There are a range of factors that can cause fatigue, but the primary contributors have been identified as prolonged activity, lack of sleep and the time of day (circadian factors). A study by the Centre for Sleep Research in SA has found that a person who drives after being awake for 17 hours has a risk of crashing equivalent to being at the 0.05 blood alcohol level.[1] Driving after 24 hours without sleep increases the risk to a level equivalent to a BAC of 0.10. A comfortable or monotonous driving environment can also induce fatigue.

Defining Fatigue

Fatigue is often ranked with speeding and alcohol as being a major factor in causing road crashes however its contribution is hard to measure.

The Department of Infrastructure, Transport, Regional Development and Local Government (formally Australian Transport Safety Bureau) devised an operational definition of a fatigue-related crash. The criteria include:

- Single vehicle crashes that occur during critical times (midnight – 6am and 2pm – 4pm)
- Head-on collisions where neither vehicle was overtaking at the time
- Excludes crashes that:
  - occurred on roads with speed limits under 80km/h
  - Involved pedestrians
  - Involved unlicensed drivers
  - Involved drivers with high levels of alcohol (BAC over 0.05g/100ml)

The Road Traffic Authority (RTA) NSW also found that the time of day in which fatigue crash rates was highest was early morning 4-8am and afternoon 12noon – 2pm. These key fatigue crash times of early morning and early afternoon were found to coincide with the times when microsleeps are most likely to occur. These times have also been included in the data gathered in this paper.

A microsleep is an unintended period of light sleep that typically lasts between 2 and 30 seconds and intrudes in the midst of ongoing wakeful activity. Microsleeps are common in

[1] *Road Safety in Australia: A Publication Commemorating World Health Day 2004*, ATSB, Canberra ACT.

sleep deprived people in monotonous situations, hence posing an obvious risk for fatigued drivers. During a microsleep, a driver will not see a red light, notice that the road has taken a curve or that the vehicle has travelled onto the incorrect side of the road.

Proportion of fatal/serious injury crashes involving fatigue

Table 1 shows the fatal and serious crashes where fatigue was identified as a contributing factor, as defined on page 1.

Table 1: Fatal and serious crashes involving fatigue, 2005-2009, South Australia.

Year	Fatal	Serious	Total
2005	16	111	127
2006	16	101	117
2007	16	116	132
2008	9	89	98
2009	18	111	129
Total	75	528	603

These crashes resulted in an average of 18 fatalities and 142 serious injures per year. Over the 2005-2009 period, 15% of all fatalities were a result of crashes involving fatigue. Fatigue crashes remained steady over the 2005-2007 period, with a drop seen in 2008, indicative of the overall reduction in fatal and serious crashes experienced that year.

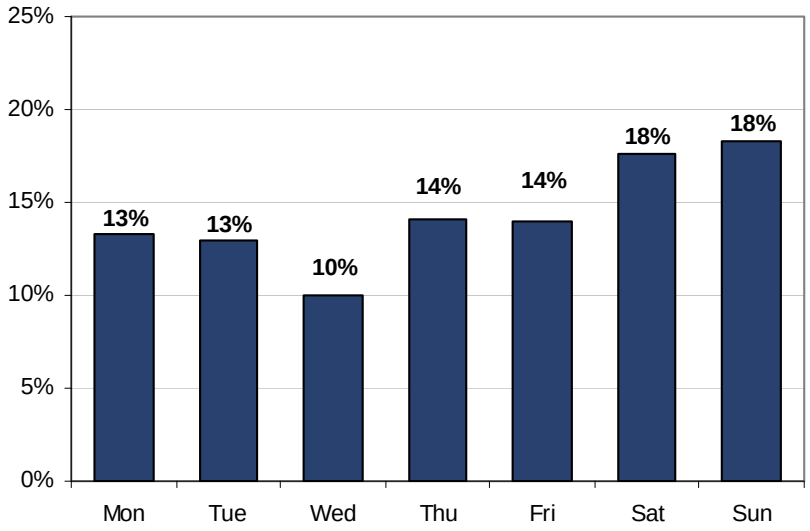
Single versus Multiple Vehicle Occupants

Of the vehicles identified as being involved in fatigue related crashes, 61% occurred when the driver was alone in the vehicle. Fatigue crashes are therefore more likely to occur when a driver does not have other occupants in the car, inferring that the presence of passengers can decrease the likelihood of microsleeps occurring.

Fatigue crashes by days and months

Fatigue crashes are concentrated primarily around weekends, when people may be likely to be undertaking long haul recreational drives or have had less sleep.

Figure 1: Percentage of serious casualty crashes involving fatigue by day of week, South Australia, 2005-2009



Fatigue crashes occur all year round and activity is relatively similar over all months. Slight increases are represented by the shaded boxes in Table 2, with September peaking at almost 11%. Compared to all serious crashes, fatigue related crashes are over represented in these months.

Table 2: Fatigue related serious casualty crashes compared to all serious casualty crashes by month, South Australia, 2005-2009.

	Fatigue serious casualty crashes	All serious casualty crashes
January	9.1%	8.1%
February	6.8%	7.3%
March	9.3%	9.3%
April	7.1%	8.8%
May	7.5%	9.0%
June	9.0%	7.7%
July	7.0%	7.7%
August	7.3%	8.0%
September	10.8%	8.4%
October	8.0%	8.3%
November	9.8%	8.4%
December	8.5%	8.9%
Total	100%	100%

Country versus Metropolitan

As expected the majority of fatigue related crashes took place in rural areas. Just over 86% of serious casualty crashes involving fatigue occurred in rural areas, compared to just 14% in metropolitan Adelaide.

Table 3: Fatigue related serious casualty crashes by area, South Australia, 2005-2009

	Fatal	Serious	Total
Adelaide Metro	74	8	82
Rural	454	67	521
Total	528	75	603

Roads and Speed Limits

About 30% of fatigue serious casualty crashes occurred on just 11 roads.

Table 4: Top 11 roads where fatigue related serious casualty crashes occurred, South Australia, 2005-2009

Road	Fatal	Serious	Total
Dukes Highway	8	15	23
Sturt Highway	5	18	23
Pt Augusta-Pt Wakefield	4	19	23
Eyre Highway	5	13	18
Main North Road/Gawler Bypass/Stuart Highway	1	17	18
Noarlunga-Victor Harbor	3	12	15
South East Highway	1	14	15
Barrier Highway	2	12	14
North East Road/Metropolitan	0	10	10
North East Road/Tea Tree Gully/Mannum	0	10	10
Riddoch Highway	0	10	10

By far the majority of fatigue related serious casualty crashes occurred on roads with a speed limit of 100kmh and over. This involvement of 100kmh and over roads is consistent with the involvement of rural roads seen above. (It is important to note only crashes on roads with a speed limit of 80kmh or over are included in the definition of fatigue crashes).

Table 5: Speed limits of roads where fatigue related serious casualty crashes occurred, South Australia, 2005-2009

Speed Limit	Fatal	Serious	Total
80	10	100	110
90	2	3	5
100	23	200	223
110	40	225	265

Types of crashes

Of the 603 fatigue related serious casualty crashes that occurred between 2005-2009, 88% were single vehicle crashes and 12% head on. The single crashes when broken down by type comprise mainly hit fixed object (61%) and rollovers (32%).

Gender and Age

Of the total number of vehicle operators involved in fatal crashes where fatigue was identified as a factor from 2005-2009, 72% were men and 28% were women.

Table 6: Age of fatigue serious casualty crash operators, South Australia, 2005-2009

	16-24	25-29	30-39	40-49	50-59	60-69	70-79	80+
2005	22%	12%	22%	17%	13%	6%	6%	2%
2006	26%	6%	17%	24%	15%	6%	5%	1%
2007	24%	8%	21%	15%	13%	10%	6%	3%
2008	28%	6%	23%	17%	15%	9%	2%	0%
2009	25%	10%	15%	14%	17%	11%	4%	4%
Average	25%	8%	20%	17%	15%	8%	5%	2%

Other than the over representation of 16-24 year olds the indication from Table 6 is that fatigue is no more common in any one age group. The above distribution is similar to what is observed for all serious casualty crashes.

Type of vehicle

Table 7 sets out the type of vehicles of at fault fatigued operators involved in serious casualty crashes between 2005-2009.

Table 7: Vehicles of at fault controllers involved in serious casualty fatigue crashes, South Australia, 2005-2009

Vehicle Type	Fatigue Crashes	All crashes
Car and Light Truck	78.0%	82.4%
Heavy Vehicles	7.2%	4.7%
Motorcycle	14.2%	11.3%
Bus	0.3%	0.5%
Scooter	0.3%	0.9%

As expected, Car and Light Trucks represent the greatest percentage of vehicle types involved in serious casualty fatigue crashes due to volume. Heavy vehicle operators show a higher percentage of involvement in fatigue crashes than all serious casualty crashes, which may be due to the longer and monotonous journeys, operators of these vehicles have to undertake additionally their presence is more likely on roads with speed limits over 80kmh. Motorcyclists also see a rise in percent of involvement for fatigue related cases, for motorcyclist, the risk rather than going to sleep is a lapse in concentration. As riding is more physical and is mentally more demanding that driving, rider fatigue is more likely to be from exhaustion than to due to monotony.

Definitions of police reported casualty types:

Casualty Crash - A crash where *at least one* fatality, serious injury *or* minor injury occurs.

Casualty – A fatality, serious injury or minor injury.

Fatal Crash - A crash for which there is *at least one* fatality.

Fatality - A person who dies within 30 days of a crash as a result of injuries sustained in that crash.

Serious Injury Crash - A non-fatal crash in which *at least one* person is seriously injured.

Serious Injury - A person who sustains injuries and is admitted to hospital as a result of a road crash and who does not die as a result of those injuries within 30 days of the crash.

Minor Injury Crash - A crash for *at least one* person sustains injury but no person is admitted to hospital or dies within 30 days of the crash.

Minor Injury – A person who sustains injuries requiring medical treatment, either by a doctor or in a hospital, as a result of a road crash and who does not die as a result of those injuries with 30 days of the crash.

Property Damage Only Crash – A crash resulting in property damage in excess of the prescribed amount in which no person is injured or dies within 30 days of the crash.

Data sources

The data presented in this reports was obtained from the Department for Transport, Energy and Infrastructure Road Crash Database. The information was compiled from police reported road casualty crashes only

Figures relating to the current year are preliminary and are subject to revision.

Enquiries

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