

Road Safety Factsheet

July 2020

Driver Fatigue and Road Accidents Factsheet

Driver fatigue is a serious problem resulting in many thousands of road accidents each year. It is not possible to calculate the exact number of sleep related accidents but research shows that driver fatigue may be a contributory factor in up to 20% of road accidents, and up to one quarter of fatal and serious accidents.

These types of crashes are about 50% more likely to result in death or serious injury as they tend to be high speed impacts because a driver who has fallen asleep cannot brake or swerve to avoid or reduce the impact.

Sleepiness increases reaction time (a critical element of safe driving). It also reduces vigilance, alertness and concentration so that the ability to perform attention-based activities (such as driving) is impaired. The speed at which information is processed is also reduced by sleepiness. The quality of decision-making may also be affected.

It is clear that drivers are aware when they are feeling sleepy, and so make a conscious decision about whether to continue driving or to stop for a rest. It may be that those who persist in driving underestimate the risk of actually falling asleep while driving. Or it may be that some drivers choose to ignore the risks (in the way that drink drivers do).

Crashes caused by tired drivers are most likely to happen:

- on long journeys on monotonous roads, such as motorways
- between 2am and 6am
- between 2pm and 4pm (especially after eating, or having even one alcoholic drink)
- after having less sleep than normal
- after drinking alcohol
- if taking medicines that cause drowsiness
- after long working hours or on journeys home after long shifts, especially night shifts

A study conducted by a traffic safety foundation in the US investigated the relationship between the amount of sleep a driver has had and their likelihood of a collision. The study, being the first of its kind, looked at US road data in the form of the National Motor Vehicle Crash Causation Survey, in order to assess the contributory factors of the crash and how much sleep the driver had had recently. This information was used to compare how much sleep drivers who had been involved in crashes caused by their own unsafe action or error had with how much drivers involved in crashes where this is not the case had. The key findings were that the risk of a collision is significantly increased as drivers have less and less sleep, when compared to drivers who had slept for 7 hours in the last 24 hours. For example, those who had slept for between 5 and 6 hours had 1.9x the collision rate, and those who had slept for 4 hours or less had 11.5x the collision rate. These

Road Safety Factsheet: Driver Fatigue

results show just how dangerous a lack of sleep can be, and how even one or two hours of sleep can make a huge difference in determining a driver's collision risk.

A recent study (Mahajan and Velaga, 2020) of male drivers in India investigated the effects of fatigue on how drivers react to hazard scenarios. The study involved 50 participants undergoing 30-35 minute driving simulations under three experimental conditions: after a week of normal sleep (7-8 hours), one day of partial sleep deprivation (PSD: 4.25 ± 0.5 hours), and two days of PSD. During the simulated drive, two hazard scenarios arose: pedestrians crossing the road, and vehicles merging with the road. Response time (RT) and total/overall braking time (TBT) were measured as the drivers interacted with the hazard scenarios. RT is the time between the scenario occurring and the driver's initial reaction, and TBT is the time between the scenario occurring and the vehicle reaching minimum velocity.

For the pedestrian crossing hazard scenario, the first PSD day resulted in a 10% increase in RT, and the second PSD day saw no significant increase. TBT decreased by 25% and 28% respectively. For the vehicle merging hazard scenario, RT and TBT were both delayed by 44% on the first PSD day and 17% on the second PSD day. These results are concerning and illustrate the fact that even one day of PSD can result in significant delays to reaction times. Interestingly, it was also found that drivers who regularly experience PSD, e.g. by sleeping 5 hours or less, were actually at a higher risk than those that do not.

Furthermore, this study may provide evidence that PSD affects decision making, as well as reaction time: the merging vehicle hazard scenario was affected more by PSD than the pedestrian crossing scenario, and this may be because, when a vehicle is merging, the driver has to make a decision whether to brake or begin to release the accelerator, whereas when a pedestrian walks into the road it is a clear decision to brake. It is worth noting that there was no female participation in this study, likely as a result of the fact that only 11% of drivers on India's roads are female.

Drivers most at risk

Young male drivers, truck drivers, company car drivers and shift workers are most at risk of falling asleep while driving. However, any driver travelling long distances or when they are tired is at risk of a sleep related accident.

Young male drivers are most commonly involved in sleep-related road accidents, but this may be because they are more likely to drive in situations which are likely to lead to fatigue rather than because they are more susceptible to falling asleep at the wheel. Similarly, shift workers and commercial vehicle drivers may have a higher risk of sleep-related crashes due to work-related factors.

Many professional drivers, especially HGV drivers report increased levels of sleepiness and are involved in a disproportionately high number of fatigue-related accidents, with around 40% of sleep-related accidents involving commercial drivers. However, two thirds of drivers who fall asleep at the wheel are car drivers. Most (85%) of the drivers causing sleep-related crashes are men, and over one third are aged 30 or under.

There has also been a recent focus on medical professionals and fatigue in the media, especially those who work long night shifts. A recent study has discovered that amongst 2170 trainee anaesthetists in the UK, 84% stated that they had felt too tired to drive home after a night shift and 57% had experienced an accident or near-miss when travelling home from a night shift. A similar study in America conducted by the National Sleep

Road Safety Factsheet: Driver Fatigue

Foundation found that shift workers were more likely to drive when fatigued and were twice as likely to fall asleep at the wheel compared with non-shift workers.

Sleep disorders

Anyone who suffers from a sleep disorder that prevents them from getting sufficient sleep is likely to be excessively tired during their waking hours, and so to be at higher risk of falling asleep when driving. Those most at risk of suffering from a sleep disorder, such as sleep apnoea, include professional drivers. It has been estimated that such drivers are between 6 and 15 times more likely to have a road traffic accident than those without the condition. One study, requested by an Italian truck organisation, interviewed over 900 truck drivers about their measurements, weight, medical history/lifestyle and how much driving they do. It was found that 77% of the interviewed drivers were overweight, 55% were consistent snorers and 43% were at risk of obstructive sleep apnoea (wherein the throat narrows during sleep, disrupting breathing). The study shows that, as a result of the sedentary work that the majority of truck drivers carry out, they are at higher risk of obstructive sleep apnoea, meaning they are more likely to fall asleep whilst driving due to tiredness, potentially causing a collision. Considering these results, the researchers suggested that truck companies should conduct compulsory examinations to detect sleep disorders, as the risk to truck drivers is inherently higher than that of the general population.

This type of medical condition is often undiagnosed, and some drivers may be unwilling to seek help because they fear losing their driving licence. However, there are established treatments for sleep apnoea which allow drivers to retain their licence, and therefore, their livelihood. Anyone suspecting that they have a sleep disorder is strongly advised to contact their GP.

How to avoid falling asleep at the wheel

The Highway Code (Rule 91) gives the following advice:-

Driving when you are tired greatly increases your accident risk. To minimise this risk:

- Make sure you are fit to drive. Do not begin a journey if you are tired. Get a good night's sleep before embarking on a long journey.
- Avoid undertaking long journeys between midnight and 6am, when natural alertness is at a minimum
- Plan your journey to take sufficient breaks. A minimum break of at least 15 minutes after every two hours of driving is recommended
- If you feel sleepy, stop in a safe place. Do not stop on the hard shoulder of a motorway
- The most effective ways to counter sleepiness are to drink, for example, two cups of caffeinated coffee and to take a short nap (up to 15 minutes).

Most of the things that drivers do to try to keep themselves awake and alert when driving are ineffective, and should only be regarded as emergency measures to allow the driver time to find somewhere safe to stop. Drinking at least 150 mg of caffeine and taking a nap of around 15 minutes are the only measures that help to reduce sleepiness. But even these are temporary measures; sleepiness will return if the driver does not stop driving within a fairly short period of time.

Road Safety Factsheet: Driver Fatigue

The safest option is for drivers to avoid driving when sleepy, when they would normally be sleeping or when they are ill or taking medication which recommends not driving or using machinery. It is crucial that drivers plan journeys, especially long ones involving driving on motorways or other monotonous roads.

Drivers should:

- Try to ensure they are well rested, and feeling fit and healthy (and not taking medication which contraindicates using machinery), before starting long journeys
- Plan the journey to include regular rest breaks (at least 15 minutes at least every two hours)
- If necessary, plan an overnight stop
- Avoid setting out on a long drive after having worked a full day
- Avoid driving into the period when they would normally be falling asleep
- Avoid driving in the small hours (between 2am and 6am)
- Be extra careful when driving between 2pm and 4pm (especially after having eaten a meal or drunk any alcohol)
- If feeling sleepy during a journey, stop somewhere safe, have a drink containing caffeine and take a short nap.

RoSPA produces a free guide, "[Safer Journey Planner](#)" which gives advice to drivers on how to avoid the risk of falling asleep at the wheel.

Alcohol and medicines

Even small amounts of alcohol, well below the legal drink drive limit, will exacerbate driver sleepiness, so that a tired driver who has had some alcohol will be even more impaired and likely to crash.

Many over-the-counter medicines, including remedies for coughs, colds, flu and hay fever, cause unwanted drowsiness which might impair driving. Warnings about drowsiness are not always clear so, for example, if the label says "may cause drowsiness", assume that it will do so.

Fatigue detection and warning devices

There are devices to detect when drivers are feeling sleepy and to warn them. However, RoSPA is concerned that drivers would rely on them, and may even be tempted to drive when they are tired, believing that the device will prevent an accident. It is far better for drivers to avoid driving when too tired, to plan their journeys safely and follow the advice in the Highway Code and RoSPA's guides.

Employers

Driving is the most dangerous work activity that most people do. It is estimated that around 150 people are killed or seriously injured every week in crashes involving someone who was driving, riding or otherwise using the road for work purposes. The majority of these tragedies can be prevented. HSE Guidelines, "Driving at Work", state that "health and safety law applies to on-the-road work activities as to all work activities and the risks should be effectively managed within a health and safety system". Therefore, employers must assess the risks involved in their staff's use of the road for work and put in place all 'reasonably practicable' measures to manage those risks.

Road Safety Factsheet: Driver Fatigue

One of the most important things employers must do is ensure that their drivers are not at risk of falling asleep at the wheel.

RoSPA's free guide, "[Driving for Work: Safer Journey Planner](#)" gives advice to employers on how they can do this.

Holiday and travel companies

One of the times when individual drivers may drive in the early hours of the morning is when they are catching, or returning from, an early flight or ship/ferry journey. Drivers returning from long haul flights, or coming off ships and ferries also often drive home after having had very little sleep in the previous 24 hours. Holiday companies, airlines and shipping lines should consider what advice and information they could offer to their customers, particularly as they sell alcohol to their passengers, which exacerbates the risk.

References

Department for Transport (2011) 'Fatigue and Road Safety: A Critical Analysis of Recent Evidence'

URL: <http://webarchive.nationalarchives.gov.uk/20121103213009/http://www.dft.gov.uk/publications/rsrr-theme3-fatigue-road-safety-analysis/>

Department for Transport (2006) 'Interactions between Sleepiness and Moderate Alcohol Intake in Drivers'

URL: <http://dclg.ptfs-europe.com/AWDData/Library1/Departmental%20Publications/Department%20for%20Transport/2006/Interactions%20between%20sleepiness%20and%20moderate%20alcohol%20intake%20in%20drivers%20february%202006.pdf>

Department for Transport (2004) 'Sleep Related Crashes on Sections of Different Road Types in the UK (1995-2001)'

URL:

<http://webarchive.nationalarchives.gov.uk/20100202201109/http://www.dft.gov.uk/pgr/roadsafety/research/rsrr/theme3/sleeprelatedcrashesonsection.pdf>

McClelland et al. (2017) 'A national survey of the effects of fatigue on trainees in anaesthesia in the UK', *Anaesthesia*.

National Sleep Foundation cited in McClelland et al. (2017) 'A national survey of the effects of fatigue on trainees in anaesthesia in the UK', *Anaesthesia*.

Mahajan, K. & Velaga, N.R. (2020) 'Effects of Partial Sleep Deprivation on Braking Response of Drivers in Hazard Scenarios' *Accident Analysis and Prevention*, 142, doi: 10.1016/j.aap.2020.105545

Parveen N, The Guardian (2019) 'Truck drivers should be routinely tested for sleep apnoea'

Tefft BC, AAA Foundation for Traffic Safety (2016) 'Acute Sleep Deprivation and Risk of Motor Vehicle Crash Involvement'

The Sleep Alliance (2004) 'Sleep SOS Report: The Impact of Sleep on Society'

URL: <https://www.rospa.com/rospaweb/docs/advice-services/road-safety/drivers/sleep.pdf>

Think! (undated) 'Fatigue'

URL: <http://think.direct.gov.uk/fatigue.html>