

# PUBLICATION

---

## Sleep Deprivation Concerns in the Transportation Industry

February 18, 2008

No matter the field, the issue of driver safety is a common and continuous concern for companies involved in any form of the transportation industry. This is particularly true as it concerns the various type of vehicle drivers employed to transfer, deliver or haul goods on a daily basis. This article focuses on a very specific safety element or safety concern for these drivers – adequate sleep, or said another way, the perils of sleep deprivation. Though it sounds so basic and fundamental, companies who are engaged in any realm of the transportation industry must work to ensure that their drivers do not fall victim to insufficient rest, or a sleep deficit, prior to, and during, the course of their daily work activities. If they do not, then in the unfortunate case of an accident resulting in injury to a third party, the driver's lack of adequate sleep may come back to haunt his or her contractor or employer when litigation inevitably ensues.

It is estimated that driver fatigue is a factor in anywhere from 10% to 30% of vehicular accidents. Otmani, Sarah et al., *Effect of Driving Duration and Partial Sleep Deprivation on Subsequent Alertness and Performance of Car Drivers*, Physiology & Behavior 84: 715-724 (2005). Sleep deprivation can obviously impact a driver's reaction time, vigilance, attention, and ability to process information.

For companies at work every day in the business of transportation, the outline below provides a basic checklist of important factors to keep in mind when training and monitoring the individuals who carry out their business, or in dealing with a lawsuit where their driver's negligence is at issue. For effect, the outline is prepared as if an accident resulting in litigation has already occurred. To prevent sleep deprivation from becoming an issue in such future litigation, or where the problem already is at play, consider the following:

- The most logical factor to consider when evaluating sleep deprivation is likely whether the driver had sufficient sleep prior to the accident.
- The amount of sleep the driver had in the twenty-four hours prior to the accident is an integral factor in deciding whether the driver suffered from sleep deprivation.
- The recommended level of sleep per day is eight hours.
- Six or fewer hours of sleep in a twenty-four hour period can significantly affect a driver's performance.
- In addition to the twenty-four hour sleep history, the amount of sleep the driver has lost over a matter of days (also known as the driver's cumulative sleep debt) can also factor into the driver's ability to function properly. Loss of sleep in small intervals can eventually accumulate into a sleep debt that impairs performance. As little as two hours of accumulated sleep debt over one week can cause deficient performance.
- The second major factor in evaluating sleep deprivation is how many hours the driver had been awake prior to the accident.
- Sleep homeostasis, or the body's neurobiological need for sleep, makes it more difficult for the body to stay awake the longer the body goes without sleep.
- Seventeen or more hours without any sleep can negatively affect a driver's performance.
- The time of day that the accident occurred is another consideration in determining whether sleep deprivation is a contributing factor of an accident.
- The body's circadian pacemaker, working in conjunction with homeostasis factors, causes a genetically predisposed need for sleep during certain times of the day:

- The primary circadian trough occurs from approximately 3:00 a.m. to 6:00 a.m.
- A secondary circadian trough occurs from approximately 3:00 p.m. to 5:00 p.m. This mid-afternoon trough appears to have more of an affect on older adults.
- The final major factor pertinent to sleep deprivation is whether the driver suffers from a sleep disorder.
  - There are over ninety recognized sleep disorders.
  - Some of the more common sleep disorders are sleep apnea and insomnia.
  - A person can actually have a sleep disorder and not know it, which is even more dangerous.
- Depending on the circumstances, other factors relevant to sleep deprivation should also be considered if sleep deprivation is at issue in a particular case involving a driver's alleged negligence.
- The environment surrounding a driver who is already sleepy can further impair his ability to function normally. For instance, darkness, quietness, boredom and monotony are all environmental conditions that could aggravate an already sleep deprived driver.
- Whether the driver is alone when the accident occurs can also be significant. One study revealed that 82% of drowsy-driving accidents occurred when there were no passengers in the vehicle.
- A driver's driving history, including how many hours he has driven on the day of the accident and how many hours the driver had gone without stopping, are also important.
- Age is another consideration that could be an issue in evaluating sleep deprivation.
- Consumption of alcohol or other types of depressants by a driver who is already fatigued can exacerbate performance deficiencies.
- Caffeine consumption, on the other hand, can stimulate a sleepy driver and thereby positively impact the driver's alertness. However, the amount of caffeine and how soon before the accident it was consumed must be taken into consideration.

The issue of driver sleep deprivation, while an obvious concern for the transportation industry, cannot simply be considered from an elementary or common sense standpoint. Rather, as more specifically discussed below, a great deal of research has been undertaken to pinpoint the negative effects and consequences of sleep deprivation on drivers.

Numerous studies have been conducted throughout the scientific community regarding sleep deprivation and the effect it has on a driver's performance. Most notably, several studies on this topic have compared the performance impairment resulting from sleep deprivation with impairment that results from alcohol intoxication. A comparison of sleep deprivation to blood alcohol content, for instance, provides an effective way to quantify the effect of sleep deprivation on a driver's performance. Alcohol consumption has long been recognized as a performance impairing agent. Evidence of a driver's blood alcohol concentration ("BAC") has been widely accepted by courts as a means of quantifying the effect that alcohol has on a driver's performance. Equating a sleep deprived driver's performance capabilities to the performance capabilities of an individual with a hazardous blood alcohol level provides tangible scientific evidence that a driver's fatigue was a contributing factor of an accident.

A 1997 study by Dr. Drew Dawson and Kathryn Reid of the Centre of Sleep Research at the University of South Australia (Dawson study) revealed that a person's performance capabilities at approximately eighteen hours of continued wakefulness is equivalent to performance capabilities of an individual with a .05 % BAC. Dawson, D. and Reid, K., *Equating the Performance Impairment Associated with Sustained Wakefulness and Alcohol Intoxication*, J. Centre for Sleep Research, 2: 1-8 (1997).

The Dawson study further found that when the hours of continued wakefulness are extended to twenty-four hours, an individuals' performance is equivalent to that of an individual with a .096 % BAC.

In reaching these correlations, the Dawson study tested the cognitive psychomotor performance of individuals who remained awake for twenty-eight hours. The individual's performance was tested at thirty minute intervals throughout the twenty-eight hours. Using the same performance testing methods, Dr. Dawson evaluated individuals who consumed ten grams of alcohol in thirty minute intervals until their BAC reached .10%. A comparison of the sustained wakefulness testing with the alcohol testing revealed that the deterioration in performance for each hour of sustained wakefulness between the tenth and twenty-sixth hour of wakefulness was equivalent to the performance impairment experienced after a .04% increase in BAC.

A similar study conducted by A.M. Williamson and Anne-Marie Feyer (Williamson study) confirmed the findings of the Dawson study. Williamson, A.M. and Feyer, Anne-Marie *Moderate Sleep Deprivation Produces Impairment in Cognitive and Motor Performance Equivalent to Legally Prescribed Levels of Alcohol Intoxication*, *Occup. Environ. Med.*; 57:649-655 (2000). The Williamson study includes a series of performance tests that measured, among other things, vigilance, reaction time, hand-eye coordination and perception of the subjects as well as several memory and cognitive reasoning tests. Similar to the Dawson study, the Williamson study revealed that the overall performance of subjects after 16.91 to 18.55 hours of continued wakefulness was equivalent to a .05% BAC. And performance of individuals with a BAC of .10% was equivalent to performance after 17.74 and 19.65 hours of continued wakefulness.

Studies such as the Dawson and Williamson studies present compelling scientific evidence that sleep deprivation negatively impacts driver performance. That is why it is so important to guard against it. It is also worth noting that these two studies were only designed to evaluate performance impairment caused by continued hours of wakefulness. The effects of other factors such as sleep debt, circadian factors, and sleep disorders were not the focus of the studies. In fact, subjects with known sleep disorders were excluded from the Dawson study. Moreover, in the Williamson study, the performance impairment equivalent of a .05% BAC was reached between 10:00 p.m. and 12:00 a.m., well before the circadian trough could impact the subjects of the study. As for sleep debt, one recent study found that cognitive performance impairment after restricting sleep to between four and six hours per night for two weeks was equivalent to the impairment experienced by someone who had been totally sleep deprived for one to two days. It can therefore reasonably be assumed that in cases where fatigue factors other than continued wakefulness are present, these additional factors are likely to further exacerbate performance impairment, thereby increasing the BAC equivalent.

Why is it important to understand and guard against sleep deprivation for drivers in the transportation industry? The answer is simple. Depending on the severity of the above described fatigue factors, evidence of a driver's sleep deprivation can be damaging contributory negligence evidence against your company and driver in litigation. Evidence that a driver suffers from fatigue when an accident occurred is clearly probative as to the driver's negligence and should therefore be easily admitted into evidence.

A sleep deprivation expert may be employed by the plaintiff to assist in explaining the fatigue factors and more importantly proving that a driver's fatigue was at such a level that his or her performance was impaired. Based on the few reported decisions where a sleep deprivation expert has been challenged, courts seem to be receptive of the scientific evidence on which a sleep deprivation expert relies. Be sure to keep this in mind if you are dealing with an applicable situation where full blown litigation has already commenced.

In *Darling v. J.B. Expedited Services, Inc.*, 2006 WL 2238913 (M.D. Tenn. Aug. 3, 2006), a sleep physiology expert withstood a Daubert challenge where the expert planned to testify that a driver's fatigue was a contributing factor in the death of a pedestrian. In *Darling*, the plaintiff's husband was struck and killed by a passing truck as the man was exiting his van, which was parked on the side of the road. The sleep deprivation expert in *Darling* held the opinion that the truck driver was fatigued at the time of the accident, the fatigue altered the driver's performance, and the fatigue therefore was at least a contributing cause of the accident. *Id.* at \*6. In reaching his opinion, the expert, among other things, relied on published articles and scientific studies,

including his own studies, regarding sleep and fatigue. *Id.* In denying the Daubert challenge of the expert, the court in *Darling* implicitly found that the publications and studies upon which the expert intended to rely were sound and reliable. *Id.* at \*11.

The United States Court of Appeals for the Seventh Circuit has also affirmed a trial court's decision to allow a sleep deprivation expert to testify. *Miksis v. Howard*, 106 F.3d 754, 761-62 (7th Cir. 1997). In *Miksis*, the plaintiff, while in a bucket truck changing a traffic light bulb at an intersection, was struck by the defendant driver who was passing through the intersection. *Id.* at 756. At trial, a sleep deprivation expert was allowed to testify that the defendant suffered from sleep deprivation when the accident occurred and that the sleep deprivation ultimately caused the accident. *Id.* at 761. The Seventh Circuit in *Miksis* concluded that the trial court did not abuse its discretion in allowing the expert to testify, considering there were factual disputes as to whether the driver was fatigued and whether fatigue caused the accident. *Id.* at 762.

Without a doubt, driver sleep deprivation is a major, but preventable, concern in the transportation industry. Please allow this basic background information on the issue to guide your efforts in ensuring that sleep deprivation does not pose a problem in the future for your company and drivers.