

Fatigue Research Summary

Stats

- Fatigue will significantly increase risk of a crash
- Nearly 15% of all road users in Canada admitted to falling asleep while driving¹

Effects of fatigue

Some of the effects of fatigue on driving performance include²

- Decrease in attention while driving
- Slower response times
- Lower level of awareness to road hazards

A study by researchers in Australia showed³ that being awake for 18 hours produced an impairment equal to a blood alcohol concentration (BAC) of .05, and .10 after 24 hours which is beyond legal limit in BC.

Causes of fatigue

Supervisors and drivers should understand the common causes⁴ of fatigue so that they can take appropriate action to prevent driver fatigue. While the primary causes of fatigue are lack of sleep and poor quality of sleep, fatigue can also be caused by the following factors:

Individual or personal factors

- Lifestyle
- Sleep disorders
- Drugs and alcohol

Environmental factors

- Temperature
- Background noise

Work related factors that cause fatigue

- Timing of shifts working against circadian rhythms
- Shift duration
- Rest between shifts

Supervisor responsibilities

Every employee with a supervisory role (supervisor, dispatch, lead hand, etc.) has the responsibility to ensure the health and safety of all workers under their direct supervision. If a supervisor recognizes the signs of fatigue, they must take measures to reduce the risk to a safer level.

It is a challenge to accurately assess another person's level of fatigue. For supervisors to carry out their responsibilities, however, they should be able to recognize the signs of fatigue. If they identify a driver

they think is fatigued, they should have a prompt discussion with the worker to further enquire about their fatigue-related condition.

Below is an assessment tool provided by Transport Canada that a supervisor can use to help assess driver fatigue.

Provided by Transport Canada⁵

An employee who represents three or more symptoms in a short period of time is likely to be experiencing fatigue-related impairment.		
Physical symptoms	Mental symptoms	Emotional symptoms
<ul style="list-style-type: none"> • Yawing • Heavy eyelids • Head drooping • Microsleeps 	<ul style="list-style-type: none"> • Difficulty concentrating on tasks • Lapses in attention • Difficulty remembering what you are doing • Failure to communicate important information • Failure to anticipate events or actions • Accidentally doing the wrong thing • Accidentally not doing the right thing 	<ul style="list-style-type: none"> • More quiet or withdrawn than normal • Lacking in energy • Lacking in motivation to do the task well • Irritable or grumpy with colleagues, family or friends

Driver responsibilities

Workers in BC have the responsibility to carry out their work activities without impairment by any causes, including fatigue.

Workers who feel tired should conduct a self-assessment to help determine if they are fit to safely drive a commercial vehicle. High levels of fatigue should be reported to supervisors and appropriate measures should be taken to avoid operating a commercial vehicle.

Consider the following scenarios extracted from the Epworth Sleepiness Scale⁶ (ESS). If you believe you are likely to doze off during any of the following activities, speak with your supervisor.

- Sitting and reading
- Watching TV
- Sitting, inactive in a public place (e.g. a theatre or a meeting)
- As a passenger in a car for an hour without a break
- Lying down to rest in the afternoon when circumstances permit
- Sitting and talking to someone
- Sitting quietly after a lunch without alcohol
- In a car, while stopped for a few minutes in the traffic

Please note that the ESS is an inexpensive and simple method for measuring average sleep propensity in large numbers of people and across a range of specified situations in daily life. However, it has limitations: any one situational sleep propensity is not always an accurate predictor of another, even in the same person. As a result, its application and results on an individual basis should be used with caution. And, as a subjective measure, it also has the limitations associated with any self-administered questionnaire.⁷

Corrective measures

Preventing a driver from becoming fatigued is far more effective than responding to a driver who is fatigued.

The only way to prevent fatigue is with adequate rest. To achieve this, drivers must be given suitable work schedules. When scheduling driver work shifts, supervisors should consider the following:

- **Time of work day.** Drivers, like all other employees, have a circadian rhythm - also known as the body clock that cycles their sleep pattern. Generally, the highest level of sleepiness occurs early in the morning between 2:00 am and 6:00 am.
- **Number of hours between work days.** Drivers will likely do other activities aside from just sleeping between shifts (e.g., socializing, family time). Therefore, enough time between shifts should be given to allow drivers to partake in other activities and still get adequate rest.
- **Number of consecutive work days.** If inadequate sleep occurs on certain shifts, the risk of chronic fatigue increases with the number of consecutive work days.
- **Number of days between work shifts.** To help drivers recover from any fatigue that may have developed during their work shift and to maintain a healthy lifestyle, they need enough time between shifts to get good rest and do other activities.

Because many causes of fatigue are based on personal factors and lifestyle that are beyond the control of supervisors and managers, it is important to provide drivers with education on the following topics.

- The effects of fatigue on driving performance
- Benefits of a good night sleep
- Personal practices that can improve sleep quality

If a supervisor identifies that a driver is impaired by fatigue, they must take action to ensure that the driver does not operate a motor vehicle while fatigued. Listed below are a few example actions a supervisor can take. The supervisor will have to determine what actions are reasonable given the extent of the employee's level of fatigue and workplace environment.

- **Alternative tasks** – provide the employee impaired by fatigue with an alternative task that is safe for their ability.
- **Take a nap** – some workplaces have a first aid room that has a bed for employees requiring

treatment. The supervisor can offer the driver the opportunity to take a nap to decrease their level of fatigue.

- **Send home** – if the driver is too fatigued to operate equipment, it may be necessary to send the driver home.

References

1. Vanlaar, Simpson, Mayhew, & Robertson. (2008). Fatigued and drowsy driving: A survey of attitudes, opinions and behaviors. *Journal of Safety Research*, 39(3), 303-309.
2. Jackson, Croft, Kennedy, Owens & Howard. (2013). Cognitive components of simulated driving performance: Sleep loss effects and predictors. *Accident Analysis & Prevention*, 50(January), 438.
3. Williamson & Feyer. (2000). Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occupational & Environmental Medicine*. 57, 649-655.
4. Fourie, Holmes, Bougrine, Hilditch, & Jackson. (2010). Fatigue risk management systems: A review of the literature. *Road Safety Research Report*. 110.
5. Transport Canada. (2007). Developing and implementing a fatigue risk management system. *Fatigue Risk Management System for the Canadian Aviation Industry*. TP 14575, 43.
6. Johns, M.. (1991). A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale. *Sleep*. 146(6), 540-545.
7. Johns, M. (1998). Rethinking the Assessment of Sleepiness. *Sleep Medicine Reviews*, Vol 2, No. 1, pp 3-15.

Additional Resources

1. Fourie, Holmes, Bougrine, Hilditch, & Jackson. (2010). Fatigue risk management systems: A review of the literature. *Road Safety Research Report*.
2. North American Fatigue Management Program. Guidelines and materials to enable motor carriers to implement a fatigue management program. *Implementation Manual*.