



# *Module 1*

# *Overview*



© Microsoft®.



© Microsoft®.

### Things to think about ...

What if there were no rules limiting how many hours a driver could drive a commercial vehicle?

What would happen to the commercial vehicle driver?

What affect would it have on highway safety?

Although most people don't like rules, there are reasons for rules. Hours of service rules take into account current sleep and fatigue research along with input from the trucking and bus industry. The rules help to ensure driver and highway safety.

### What will I learn in this module?

- History and reasons for Hours of Service legislation
- How the human body clock affects fatigue
- How to identify driver fatigue
- How to avoid sleep debt

## Why do we need Hours of Service legislation?

Hours of Service regulations are the rules that truck and bus drivers follow when driving a commercial vehicle in Canada. These rules include maximum allowable driving times and minimum required off-duty times. Hours of Service rules have not changed very much since before the Second World War. Unfortunately, Hours of Service rules were not based on sleep and fatigue research.

From 1989 - 1996, Transport Canada and the US Department of Transportation conducted a \$6 million study on driver fatigue and alertness. The study found that some drivers were driving long hours, day after day, resulting in serious levels of fatigue caused by “sleep debt”. This fatigue resulted in numerous commercial vehicle collisions.

The research found that the only way to combat fatigue is to obtain adequate sleep. However, commercial vehicle drivers can't obtain adequate sleep if they don't have the opportunity to sleep. Therefore, in order to reduce the number of fatigue-related commercial vehicle collisions, the Hours of Service regulations needed to change to allow opportunities for additional sleep.

Changing the Hours of Service regulations is not a simple task. Representatives from the trucking and bus industries, sleep research experts, road safety advocates and regulators, public interest groups, law enforcement agencies, labour organizations, and the federal and provincial governments worked for the past 10 years to make changes to the regulations. They wanted the new regulations to help commercial vehicle drivers identify and combat fatigue.



© Microsoft®.

## What is fatigue?

Fatigue is what happens when we work, exert ourselves or experience stress for long periods of time. We contribute to our fatigue simply by being awake. When we are fatigued, we become tired and drowsy.

When we are drowsy, there is an increased chance that our body will have a microsleep. A microsleep can last from a few seconds to several minutes and we may not even be aware that a microsleep has occurred. During a microsleep, we fail to respond to outside information. For example, during a microsleep, we would not see a red signal light or notice that the road has taken a curve.

The Canadian Safety Council states:

“Fatigue is a factor in about 15 percent of motor vehicle collisions, resulting in about 400 deaths and 2,100 serious injuries every year.”

“Someone who has not slept for 18 hours is as impaired as someone with a .05 blood alcohol level (for which, in most provinces, police can take away your driver’s license for 12 to 24 hours).”

(Source: [www.safety-council.org/info/traffic/fatigue-06.html](http://www.safety-council.org/info/traffic/fatigue-06.html))

Drowsy drivers become dangerous drivers to themselves and other highway users. Fatigue creates a risk for anyone driving and is a major concern for the transportation industry.

## How does the human body clock affect fatigue?

To understand fatigue, we need to understand circadian rhythms. These rhythms influence body processes so that they peak and have low points during every 24-hour period. Many body processes follow these rhythms but sleep and wakefulness are the most important.

The body’s internal biological clock controls circadian rhythms. This clock, located in the brain, tells body processes when to have peaks and when to have low points. For example, from midnight to dawn, the clock tells the body to lower body temperature, slow the heart rate, and lower blood pressure. Surprisingly, the body makes these changes whether we are asleep or awake!



© Microsoft®.

Although circadian rhythms vary from person to person, cues such as daylight/darkness and work/rest schedules keep the clock “set”. However, crossing time zones or changing day and night shifts forces the clock to adopt a different schedule.



© Microsoft®.

Despite what people think, the internal clock does not easily adapt to night shift work. Disrupting the clock can lead to a lack of sleep and increase in fatigue. Even though they are tired during the day, night shift workers usually have trouble sleeping because their body clock expects them to be awake during this time.

In addition, most shift workers experience a decrease in alertness from midnight to dawn. Research shows that during this low point in circadian rhythms, there is an increase in fatigue-related vehicle accidents. These accidents occur even though there are lower traffic volumes during this time.

## What are the symptoms of fatigue?

In order to reduce the risk of fatigue, people need to know how to identify it. People display several symptoms when they are fatigued:

- *Decreased judgment.* People aren't as capable of doing their jobs.
- *Decreased decision-making ability.* People have trouble making decisions.
- *Diminished memory, reaction time and concentration.* People have shorter attention spans and are unable to react as quickly or accurately.
- *Worsened mood.* People get depressed and cranky.

## How can we avoid sleep debt?

Research confirms that the only way to combat fatigue is to obtain adequate sleep. The required amount of sleep varies from person to person but, on average, people need between 6 - 8 hours of sleep per day. People who do not get sufficient daily sleep build a "sleep debt".

This sleep debt continues to grow every day that we fail to get the daily sleep requirement. As sleep debt increases, we become less alert and more drowsy which affects our performance.

This sleep debt does not go away or suddenly decrease on its own. We must repay our sleep debt. We can repay this debt (i.e., "catch up" on sleep) in one of three ways:

- 1) Take 20 - 30 minute naps
- 2) Sleep for a longer period of time
- 3) Relax so that you have deeper sleep



© Microsoft®.

Effective January 1, 2007, the *Federal Commercial Vehicle Drivers Hours of Service Regulations* give commercial vehicle drivers the opportunity to combat fatigue with adequate amounts of sleep. Specifically, commercial vehicle drivers must:

- In a 24-hour period:
  - Not drive after accumulating 13 hours driving time
  - Not drive after accumulating 14 hours of on-duty time
  - Have a minimum of 10 hours off-duty time
- In a work shift:
  - Not drive after accumulating 13 hours driving time
  - Not drive after accumulating 14 hours of on-duty time
  - Not drive after 16 hours of elapsed time
- In a cycle:
  - Not exceed 70 hours on-duty time in 7 consecutive days, if following Cycle 1
  - Not exceed 120 hours on-duty time in 14 consecutive days (with at least 24 hours off-duty time after reaching 70 hours of on-duty time), if following Cycle 2
  - Have a minimum of 24 consecutive hours off-duty in the preceding 14 days, regardless of Cycle

Although these regulations cannot make commercial vehicle drivers sleep when they need it, these rules give drivers adequate opportunities to rest and are consistent with research on fatigue, the human body clock and sleep debt. If commercial vehicle drivers take the opportunity to sleep, it will reduce the number of fatigue-related commercial vehicle collisions and have a positive impact on highway safety.



© Microsoft®.



## Module Self-Check Questions

If you can answer the following questions, you are ready to move to the next module. If you can't answer the questions, please review the module again before continuing.

1) What is the purpose of the Hours of Service legislation?

---

---

---

---

2) What influence does our body clock have on fatigue?

---

---

---

3) How do we know if we are fatigued?

---

---

---

---

---

4) How many hours of sleep does the average person need?

---

5) How can a person repay "sleep debt"?

---

---

---



## Answers to Module Self-Check Questions

- 1) What is the purpose of Hours of Service legislation?
  - Reduce fatigue-related commercial vehicle collisions by providing drivers with opportunity to obtain additional rest
  - Rules that commercial vehicle drivers follow in Canada (include maximum allowable driving times and minimum required off-duty times)
- 2) What influence does our body clock have on fatigue?
  - Body clock, located in the brain, tells body processes when to have peaks and low points (low points = increase in fatigue-related accidents)
  - Disrupting the clock can lead to a lack of sleep and increase in fatigue
- 3) How do we know if we are fatigued?
  - Tired and drowsy; microsleeps
  - Decreased judgment
  - Decreased decision-making ability
  - Diminished memory, reaction time and concentration
  - Worsened mood
- 4) How many hours of sleep does the average person need?
  - 6 - 8 hours of sleep per day
- 5) How can a person repay “sleep debt”?
  - Take 20-30 minute naps
  - Sleep for a longer period of time
  - Relax so that you have deeper sleep



## Where can I learn more?

If you are interested in learning more about the topics discussed in this module, please refer to the following:

- Federal Commercial Vehicle Drivers Hours of Service Regulation and Regulatory Impact Analysis Statement  
<http://canadagazette.gc.ca/partII/2005/20051116/html/sor313-e.html>
- Commercial Motor Vehicle Driver Fatigue and Alertness Study – Executive Summary, November 1996  
<http://www.tc.gc.ca/tdc/summary/12800/execsummary.htm>



© Microsoft®.