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HEAVY VEHICLE DRIVER FATIGUE - HOW TO PREVENT IT!

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Summary

This report identifies important factors that contribute to the development of fatigue and provides heavy vehicle drivers with information on how to prevent driving while fatigued.

Recommendations

- Drivers need six to eight hours of continuous, good quality sleep each night.
- Drivers should keep themselves physically fit and stretch regularly throughout the day.
- A diet high in carbohydrates will help drivers maintain concentration levels throughout the day.
- Large amounts of fatty foods should be avoided, as they cause drowsiness and mental fatigue.
- Drivers should drink at least one cup of fluid every hour. Water and isotonic sports drinks are the best; tea, coffee and cola drinks are not recommended.
- Transport companies should introduce a screening programme for the detection of employees with sleep disorders (such as sleep apnoea), to allow the treatment of the problem.

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Introduction

Driving heavy vehicles involves concentrating for long periods of time. This causes mental fatigue. The consequences of fatigue do not differ significantly from those produced by alcohol (e.g. decreasing alertness, slowing of reaction time, missing important danger signs, increasing errors). All these contribute to an increased accident risk. Due to the size and weight of heavy vehicles, when an accident occurs, it can have very serious consequences for the driver and other road users.

In Australia it is estimated that fatigue causes 5-10% of all road accidents, 25-35% of all fatal single vehicle truck crashes and is a contributing factor in up to 60% of heavy vehicle truck crashes (Feyer and Williamson, 1996). The relevant figures for New Zealand are not available, as current police investigations often fail to record fatigue as a contributing factor (Thorne, 1996)

Fatigue is our body's way of telling us we need rest to recover physically and mentally. There are many factors which contribute to fatigue. These factors can be divided into three categories: Environment, Person and Time.

Environment risk factors include:

- unchanging road conditions
- long haul driving
- unexpected delays (e.g. traffic jams, break downs, waiting for loads)
- weather (very hot, very cold, rain, fog)
- poor quality trucks (vibrating, noisy, uncomfortable, hot)
- sharing the road with unprofessional drivers
- driving an unfamiliar route.

Person risk factors include:

- individuals fatigue at different rates
- age (over 50 or under 25)
- medical conditions (e.g. obesity, taking medication)
- sleep disorders (e.g. sleep apnoea)
- driving with a sleep debt or poor quality sleep
- poor diet and lack of exercise.

Time risk factors include:

- driving when normally asleep (especially 2-5am)
- some drivers are drowsy just after lunch
- hours awake before the trip
- length of work before the trip
- length of time since the start of the trip
- driving to a fixed schedule under time pressure.

Preventing fatigue related accidents

New Zealand's prescriptive driving hours' legislation controls one of the causes of fatigue - driving the truck itself. Aside from this, there are a number of methods of approaching the problem of fatigue related accidents, including the use of fatigue monitors (monitoring truck driver alertness), road engineering (audible centre and edge lines, increasing the size and number of rest areas), fatigue management programmes, and educating those at risk.

Truck drivers who continue driving while fatigued are putting themselves and other road users in mortal danger. There are a number of factors that increase the level of fatigue, thereby reducing mental alertness. These are lack of quality sleep, poor diet and poor physical condition.

Sleep

There is only one method of effectively overcoming fatigue and that is through rest and sleep. The human body needs six to eight hours of good quality sleep each night to function efficiently. During the sleep cycle, the physical recovery of the body takes priority. Therefore, any reduction in total sleep usually comes at the expense of mental recovery. A reduction in mental recovery results in a decrease in alertness, vigilance, response time and insight. These all contribute to an increase in accident risk.

Disruptions during sleeping, due to noise or sleeping disorders, reduce the quality of sleep, sometimes to such an extent that the sleep is of little or no benefit. Drinks containing caffeine (coffee, tea and cola drinks) increase alertness for a short period of time. Drinking any of these drinks will delay the onset of sleep. One of

the most common forms of sleep loss is sleep apnoea, which 50-65% of truck drivers suffer (Callinan, 1994).

Sleep Apnoea

Sufferers of sleep apnoea are deprived of proper sleep because their airways repeatedly close off during the night (due to a relaxation of the muscles, and excess tissue at the back of the throat), forcing them awake to restart breathing. There is usually no memory of these brief awakenings, which can occur up to 500 times a night, and the sufferers think they slept soundly throughout the night. At some stage of their life, most people will suffer from sleep apnoea.

The most obvious indicator of sleep apnoea is loud heavy snoring, often interrupted by short periods of silence (where the person has stopped breathing), followed by heavy gasps (as the breathing reflex wakes them up) and the resumption of snoring. You can use your partner to identify this pattern of snoring. Other symptoms may include: memory loss, excessive daytime sleepiness, increase in mistakes and accidents (crash rates 2-7 times greater), decreased interest in sex, reduced ability to concentrate, irritability, frequent headaches, frequent waking (while sleeping) to urinate, and changes in personality. If this pattern of snoring and any other symptoms are identified, you should consult your doctor describing your symptoms.

Treatment

Mild sleep apnoea can be treated by: reducing weight, cutting down on alcohol intake, reducing nasal stuffiness, stopping or reducing the intake of sleeping pills and stopping smoking.

Severe sleep apnoea can be treated by wearing a small nasal mask while sleeping, or having surgery to remove the excess tissue.

Sleep/Wake Cycles

The body has an internal clock that dictates two sleep periods, generally between 2am to 5am and 2pm to 5pm. If working in these periods, you are more vulnerable to loss of concentration and mistakes. The risk of fatigue is much higher while driving at night, with the highest risk period being

between 2-5am. For drivers working at these times, daytime sleep is much less restful than night sleep, due to our body rhythms (circadian) and noise disturbances (e.g. neighbours mowing lawns, cars, aeroplanes, telephones).

To increase the quality and length of sleep during the day, dark, heavy curtains should be used and/or a sleeping mask. These will keep more of the light out, which is one of the factors that causes us to wake. To prevent being woken up by the neighbours (e.g. mowing the lawns, noisy cars going past) ear plugs can be bought from a chemist and you can speak to your neighbours about keeping the noise level down during the hours you are asleep.

Life Style

Smoking and a poor diet have been shown to be a part of the lifestyle of truck drivers (Austroads, 1992). Smoking contributes to the formation of a wide range of cancers, heart disease and the development of sleep apnoea. A regular diet of fast foods, which are normally high in animal fat and salt, is bad for your health. The high fat and salt content will raise the blood cholesterol level and blood pressure, which also increases the risk of heart disease and the development of sleep apnoea.

Along with a fit body and adequate rest and sleep, having a balanced diet goes a long way towards maintaining mental alertness. Having large meals causes the body to divert blood from other areas of the body, such as the brain, to the stomach to aid digestion. This is one of the reasons why most people feel tired after lunch. Therefore, it is better to eat the same amount spread over a longer time period. For example, divide lunch into three parts, eat the first at 10am, the second at 12 noon and the third at 2pm.

To ensure you stay sharp and alert throughout the day, your diet must be high in **carbohydrates**, which help to provide a steady supply of glucose (broken down carbohydrates) to the brain. A low supply of glucose causes feelings of faintness and poor concentration. Excellent sources of complex carbohydrates include: wholegrain (or rye) breads, pasta, rice, porridge, sultana bran and weetbix type cereals, fruit and vegetables. These foods should form the basis of your daily food intake.

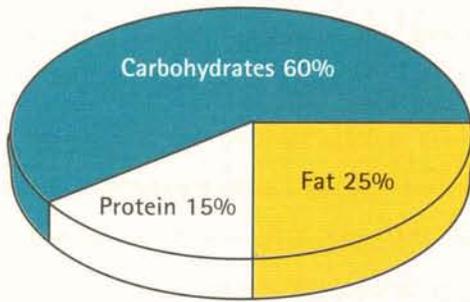


Figure 1 - Daily food intake

Fat is very slowly digested and if eaten in large amounts causes feelings of drowsiness and mental fatigue. Keep your fat intake to a minimum by using small amounts of fat as a spread, low fat cooking methods (boiling, microwaving, olive oil), low fat dairy products (trim milk, edam cheese) and limit takeaways to once a week.

Protein (found in meat, chicken, fish, eggs, and dairy products) should be eaten in moderate amounts at each meal. These foods should be kept low in fat.

To ensure the body is getting the full range of **vitamins and minerals** required, a wide variety of food needs to be eaten each day. Try to eat from each of the four food groups (breads and cereals, fruit and vegetables, meat and alternatives, and dairy products).

Suggested Meals

Breakfast

Option 1 (Cold)

- 1-2 cups of cereal or porridge
- 1 fruit
- 1 cup of trim milk or yoghurt
- 1 glass of fruit juice

Option 2 (Cold)

- 2 toast (wholegrain/rye)
- small amount of margarine/butter
- jam, honey or vegemite
- 1 glass of fruit juice

Option 3 (Hot)

- 2 toast (wholegrain/rye)
- small amount of margarine/butter
- 440g tin of baked beans, spaghetti or creamed corn

Lunch

- 2 bread rolls
- small amount of margarine/butter
- 50g of either lean meat, chicken, fish or cheese in each roll
- salad vegetables (e.g. lettuce, tomato, cucumber, beetroot)
- 1 fruit

Dinner

- 150g of either lean red meat, chicken or fish
- 3-4 potatoes or 1-2 cups of pasta or rice
- 2-3 vegetables
- 1 fruit

Snacks (two per day)

- 2-3 fruit
- 2 fruit buns
- sandwich/filled rolls/scones/muffins
- 2 packets of raisins
- 2 minute noodles
- 2 pottles of yoghurt

Dehydration

Dehydration causes poor concentration and coordination. Therefore, preventing dehydration is vital to maintaining mental accuracy. While driving heavy vehicles, your body needs at least 2-3 litres of fluid a day to function optimally. This should be taken mainly as water or isotonic drinks (e.g. Gatorade or Powerade), but you may have up to four cups of tea or coffee a day. The best way to prevent dehydration is to drink a little often, even if you are not thirsty. Try and drink one cup of fluid every hour at least. This should be increased when it is hot.

Reduce alcohol intake during your working week. Alcohol causes poor concentration, coordination, dehydration and early fatigue. This effect can last up to 48 hours after drinking. Drinks containing caffeine (coffee, tea, cola drinks) also help relieve fatigue for several hours, but with an excessive intake, people can have trouble sleeping (Holmes, 1995). Unfortunately, once a person really tires, caffeine will not help to relieve fatigue.

Exercise/Stretches

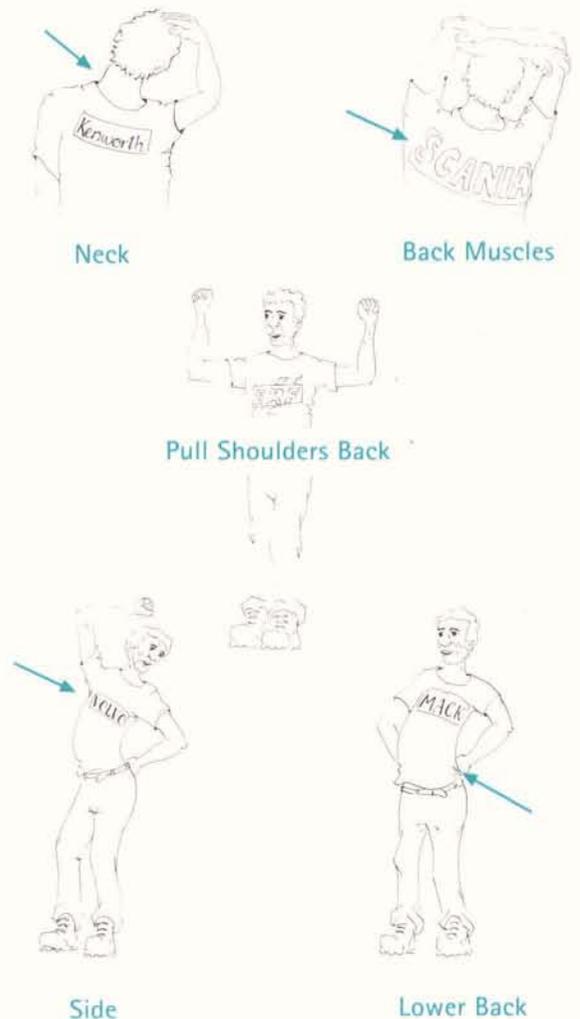
Heavy vehicle drivers are required to sit in one position, performing subtle, accurate movements and maintain peak performance for long periods of time. If muscles are not well conditioned, this may cause muscle tension, muscle fatigue and reduced flexibility, particularly in the neck, shoulders and lower back. To avoid these problems and ensure that correct posture can be maintained, drivers need to perform a regular programme of physical activity which includes stretching and strengthening activities.

To ensure that driving can be performed for extended periods of time, muscles must have a good blood (fuel) supply. This can be achieved by taking a brisk walk during stoppages (loading, unloading, rests, refuelling). Drivers should also perform regular physical activity after work or during weekends (e.g. playing sports, hunting) to maintain a good level of physical fitness.

Sitting for long periods can cause reduced flexibility in the back, shoulders and hips, while poor posture promotes muscle tension, particularly in the neck and shoulders. Tight muscles fatigue more quickly, as the muscle tension restricts blood flow (blood supplies fuel for the muscles and takes away the waste). Therefore, it is important that truck drivers perform a regular routine of stretches to relieve tightness, reduce fatigue and maintain an effective range of movements. Stretches should be performed every 2-3 hours of driving.

Simple Stretch Rules

1. Ensure that stretches are pain free
2. Hold all stretches for 15-20 seconds
3. No bouncing
4. Do each stretch 2-3 times





Shoulders



Neck/upper back

In order to maintain good posture for long periods, drivers need strong trunk muscles. The upper back and abdominal muscles must be well conditioned to allow a comfortable and appropriate sitting position. Poor strength in these areas will cause the shoulders to drop forward (rounded), placing pressure on the neck and shoulder muscles to support the upper trunk. This also places extra strain on the lower back. The following two activities will strengthen the trunk muscles and provide support for good posture. They should be performed at the end of each day to maintain strength levels.



Upper Back



Abdominals

Rest Breaks

The best way to slow the onset of fatigue is to rest regularly. Short rests at regular intervals are more effective than one long rest. However, once a driver is tired, taking more rest breaks will be of no benefit (Anon, 1996).

Several studies have shown that having food during rest breaks improves driver performance by reducing fatigue.

Common Misconceptions

If I drink enough coffee (or let in enough cool air, or turn up the radio loud enough) I can beat fatigue and carry on driving

Wrong! These factors will only increase awareness for a short period of time..

I can tell when I am about to fall asleep and pull over for a quick nap.

Wrong! Although people can tell when they are tired, they cannot tell the precise moment that they are going to fall asleep.

If I try really hard, I can beat fatigue.

Wrong! Fatigue cannot be willed away, it is not possible to force yourself to stay awake beyond a certain level of fatigue.

Acknowledgments

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