Coping with Shift Work & Fatigue

A good practice guide for drivers

Rail Safety & Standards Board
Introduction

Shift work is fundamental to successful rail operations. Early shifts are required to provide passenger services and there is an increasing need for night work. These shift patterns can lead to sleep loss and fatigue. The extent of this depends on your scheduled hours of work as well as the behaviour and strategies that you use to cope with fatigue.

Purpose and scope

This guide to shift work and fatigue describes the important factors that affect your sleep and your performance at work. It also suggests ways to maximise your alertness, which will hopefully improve your day-to-day life. This guide is divided into the following sections:

- Know your sleep & body clock
- Managing your sleep at home
- Alertness during your shift
- Health monitoring
- Further information
Who is it for?

This guide has been prepared for use by train drivers who work shifts. It is based on information obtained directly from drivers as part of an RSSB survey on shift patterns. Drivers were asked about how alert they felt on various shifts and what they do to cope with fatigue. RSSB acknowledges and appreciates the contribution of all the drivers who completed the surveys.

You may wish to show this guide to your partner to help them understand why you may find it difficult to fall asleep or stay awake. You may find that their help is especially important when you are trying to sleep during the day.

Other guides about fatigue and shift work are also available from RSSB and ASLEF (see Further information section).
It is important to understand what controls your alertness and ability to sleep. This will allow you to arrange your activities so that you can improve your work and leisure time.

Know your sleep & body clock

Here are some facts about how your body responds to shift work and to changes in sleep patterns. Understanding and applying this information to your own personal circumstances may improve your work-life balance.

Body clock

The body has a natural cycle of approximately 24 hours (circadian rhythm), which is linked to the normal day-night cycle. This cycle affects how your body works, including your:
- Body temperature
- Heart rate
- Alertness
- Reaction time
- Mental ability

Your body clock is disturbed by shifts (e.g. night work) that make you alter your normal sleep pattern. In the early hours of the morning, when you would normally be asleep, all of the above will be at their lowest levels. As far as your work is concerned, it is your levels of alertness that will affect your performance.

Shift work

When you work overnight, you have to cope with working when your levels of alertness are low. Early morning shifts require you to get up in the middle of your normal sleep period and begin work at the worst time for alertness. Going to bed early may not work because you may find it difficult to fall asleep before your normal bed time. When you try to sleep during the day, you are likely to suffer from disturbed sleep (see Managing your sleep at home section).

People who always work the same shift may find it easier to adapt, especially if they maintain the same sleep pattern on days off. However, most drivers work a variety of shift types. Working an early shift and then a night shift is known as a ‘backward rotating’ shift pattern. This is because it involves going ‘backwards’ through the 24 hour clock. Your body will find it harder to adapt to this and you are more likely to experience sleep loss. Forward rotating shifts e.g. ‘earlies’ followed by ‘days’/’lates’, then ‘nights’ tend to involve less sleep loss. However, earlies that follow closely after lates or nights can be particularly fatiguing.
Sleep

Humans have evolved to sleep at night. We usually do not sleep as well when we go to bed outside of our normal hours. Shift workers tend to sleep one to four hours less than non-shift workers in each 24 hour period. When hours of sleep are missed, the need for sleep ('sleep debt') will increase and performance and alertness will decrease. A build-up of 'sleep debt' is often seen in shift workers, particularly when working night and early morning shifts. Commuting can further reduce the time available for sleep – shift workers with long journeys have more accidents going to and from work.

- If you can, try to sleep for seven to eight consecutive hours in each 24 hour period.
- A 'sleep debt' can be 'repaid' by ensuring seven to eight consecutive hours sleep in each 24 hour period over a few days.
- Maintaining a diary may help you keep track of your sleeping habits.
- If you travel to work by public transport, you may be able to take a short nap.
- Consider the effect of commuting on time available for sleep.

Individual differences

Some people (the so-called ‘Owls’) cope better with night work, whereas others people (known as ‘Larks’) are at their best in the early mornings. Our sleep patterns change as we grow older – we are less flexible in our sleeping habits and we cope better with early mornings and less well with night work (see Company-informed shift swapping).

- If you suffer from fatigue, try to determine whether you are an extreme Lark or an Owl and consider whether you are suited to the shifts you work.
Effective management of your sleep at home will help to reduce the time you spend attempting to sleep, as well as improving your alertness at work.

Managing your sleep at home

In the previous section we have explained why you may find it difficult to sleep during the day. In this section we give you some guidelines to help you manage your sleep between your shifts for maximum effect.

Sleeping during the day time (eg. after night work)

- If you are a passenger on your journey home, try to avoid sunlight as much as possible. Wrap-around sunglasses may help to block out light. Light is alerting and, while this is useful if you are driving, it may make it difficult to fall asleep when you get home.

- Do not eat a large meal just before you sleep. Make sure that you eat enough so that your sleep is not disturbed by hunger.

- Use blackout curtains or blinds or a sleeping mask to block out light when you are sleeping.

- Make sure that you are not disturbed by noise – switch off phones and ask the family to help by keeping quiet. Ear plugs may be beneficial if you are disturbed by traffic noise.

- Make sure that your sleeping conditions are as good as they can be – make sure the temperature is right for you and that your bed and pillows are comfortable.

- Do not smoke immediately before trying to sleep or if you wake up early and want to sleep more. Nicotine is alerting and will disturb your sleep (on average a smoker sleeps 30 minutes less each night than a non-smoker).

- Do not use alcohol to help you sleep because it disturbs the normal sleep pattern and may cause insomnia later in the sleep period.

- A warm bath before bed time or practising relaxation techniques can help some people sleep.
Preparing for sleep

- Try to avoid drinking caffeinated beverages within four hours of going to bed.
- A good exercise programme can improve your sleep but exercising close to bedtime can disturb your sleep.
- Some people believe that it is not a good idea to read or watch television in bed. The book or TV programme may capture your interest and you will delay going to sleep.
- Establish a schedule that works best for you and try to maintain it.

Taking naps

- If it is possible to take a nap before the night shift you should do so as it will improve your alertness at work. Sometimes you may feel a little groggy when you first wake up.
- The benefit of any nap is related to its length. Longer naps keep you alert for longer, but the longer the nap, the more grogginess you may feel on waking. Make sure that you have at least 20 minutes to get over the grogginess before travelling to work.
Alertness during your shift

Knowing which strategies are effective ways of counteracting fatigue, as well as how best to use them, will help you to remain alert during your shift.

This section explains the ways in which various strategies can reduce your level of fatigue during your shift. Although you will be familiar with many of these, the information provided will help you get the most benefit from them.

The recent survey of train drivers found that the most popular method for coping with fatigue was fresh air. While it is important to maintain a comfortable temperature in the cab, the use of fresh air to counteract fatigue is very much less effective than the strategies described below.

**Breaks**

As the time spent driving during a shift increases, so does the level of fatigue. This has been found to increase greatly after four hours in the cab, especially when the start of duty is very early in the morning. An effective way of reducing the level of fatigue is to take a break. Additional measures may be helpful on a night shift to maximise the effectiveness of a break (see sections on Caffeine and Napping during breaks).

- Take all breaks that are available to you. Avoid all work-related activities during your break to reduce your levels of fatigue and restore your performance.

**Caffeine**

Caffeine is most often consumed when drinking tea and coffee. Caffeine can maintain alertness, overcome grogginess, and delay the onset of fatigue. The effects of caffeine will begin about 30 to 45 minutes after it has been taken and will last for around three to six hours, depending on the quantity consumed. The amount of caffeine that you would need to keep you alert depends on how much you normally take. Around 200 mg of caffeine, taken at one time, is usually effective for about four hours. However, in those who typically consume large quantities of caffeine (500 mg or more per day), the same amount of caffeine will have less effect.
Taking caffeine on a night shift can be beneficial. It is particularly effective if taken early in the night, before the onset of fatigue.

Taking caffeine before a short nap may help to overcome grogginess upon awakening (a strategy recommended in The Highway Code).

If you take too much caffeine then you may experience symptoms such as shaking, anxiety, increased heart rate, increased blood pressure, nausea, diarrhoea and an increase in urine production. Some people may be particularly sensitive to these adverse effects if they increase their daily caffeine intake in order to cope with fatigue.

If you take caffeine less than four hours before going to bed it may disrupt sleep. However, you also need to consider the need to maintain alertness towards the end of your shift and during the journey home.

Sudden withdrawal from your usual daily intake of caffeine may result in symptoms such as headache, irritability, and sleepiness. However, the frequency and strength of these symptoms varies widely between people.

- If you take caffeine tablets instead of caffeine-containing drinks, then read the patient information leaflet (supplied in the packet) carefully and follow the instructions and advice given.

- DO NOT use caffeine to cope with fatigue if a doctor or health care professional has told you to avoid caffeine for medical reasons.

<table>
<thead>
<tr>
<th>Product</th>
<th>Caffeine (mg)</th>
</tr>
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<tbody>
<tr>
<td>Cup of Coffee</td>
<td>65-110</td>
</tr>
<tr>
<td>Cup of Tea</td>
<td>40-60</td>
</tr>
<tr>
<td>Glass of Cola</td>
<td>40</td>
</tr>
<tr>
<td>Bar of Chocolate</td>
<td>5-20</td>
</tr>
<tr>
<td>Bottle of Energy Drink</td>
<td>50-80</td>
</tr>
<tr>
<td>Caffeine Tablets</td>
<td>50-100</td>
</tr>
</tbody>
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Alertness during your shift

Napping during breaks - if permitted by your company

Napping is an effective way of reducing fatigue, particularly on a night shift, when it will have greater benefits than just taking a break. Naps are more effective if taken during breaks in the early part of the night, before the build up of fatigue. Some people are able to sleep almost anywhere, while others have trouble falling asleep and are more likely to be awoken by disruptive factors such as noise.

- Ideally, naps should be taken in a quiet, dark room. If this is not available, ear plugs and eye shades may be useful for blocking out any noise or light.

- You will find it easier to sleep if your legs are supported and if your chair reclines so that the angle of your back is 40° or more from the upright position.

You may experience grogginess on waking from a nap and this may last between a few minutes and half an hour. During this time you may not be very alert, and you could actually feel more sleepy than before you took the nap. The extent of the grogginess will depend upon how deeply you have slept. For example, deep sleep is more likely if you nap after you have been awake for a long time. Generally, naps of less than 30 minutes are much less likely to lead to reduced alertness on waking.

- You should set an alarm clock or watch before attempting to take a nap. This will make sure that you wake up in time to allow a 20 minute recovery period before you return to your duties.
Company-informed shift swapping

The RSSB survey of train drivers found that those drivers who have greater control over the specific shifts they work, are more satisfied with their shift system. If permitted by your company, you may be able to occasionally swap shifts allowing you to work shifts that you find less tiring. For example, it has been found that older drivers tend to dislike night shifts, but are more able to cope with an early start time. Also, drivers who consider themselves to be Owls tend to dislike early shifts and prefer working lates and nights.

The ease of swapping shifts will, of course, depend upon the preferences of your colleagues. Your company will monitor the shifts that you work to ensure that your duty patterns and the hours worked do not exceed set limits. Your company will also need to check that you do not lose any route or traction knowledge by occasionally swapping your shifts.

Exercise and healthy diet

- Taking regular exercise while you are off duty is likely to improve your levels of alertness at work and on days off.

- Taking a walk or exercising during your breaks at work is not an effective way of coping with fatigue. Any benefits you may experience will last for less than 10 minutes.

- Exercising, together with a healthy diet, can help to reduce weight (see section on Health monitoring).

- You should check with your GP or the Occupational Health Department in your company before starting a new exercise routine, especially if you have not exercised recently.
Recognising health problems that have been linked to shift work is important, as well as knowing when to seek advice from your Occupational Health Department.

Health monitoring

Health problems are more common in shift workers than those who work normal hours. Many shift workers suffer from digestive problems due to the requirement to eat in the late evening and at night when the body’s response to meals is different from during the day. Shift workers are also more likely to put on weight. Heart disease has been linked to shift work.

A large number of shift workers experience sleep problems when they attempt to sleep at unusual times of the day. In addition, some individuals may suffer from other sleep disorders unrelated to shift working. This section explains how two of the more common sleep disorders may affect shift workers.

Sleep Problems Caused by Shiftwork

In America, and more recently in the UK, the term ‘Shift Work Sleep Disorder’ is applied to those shift workers who have severe difficulty in sleeping and/or have severe difficulty in remaining awake at work. It is reported that it affects about 10% of the shift-working population in the USA. Doctors may sometimes prescribe the use of sleeping pills to promote and maintain sleep. Some shift workers who suffer from extreme sleepiness during night work may be prescribed an alerting drug.

- Your Occupational Health Department will need to assess the causes of your symptoms. They will decide whether any drugs prescribed by your GP are compatible with your work.

Sleep Disorders Unrelated to Shiftworking

When you fall asleep, your muscles relax. In some people, the muscles in the airway behind the tongue become very narrow and the airway may close and breathing stops. When this happens the sufferer will wake up for a few seconds before returning to sleep. This may happen many times during sleep, though the sufferer may not be aware of this problem. His/her partner may notice periods of regular breathing and snoring followed by a silence then a snort, possibly combined with movement of the legs, as breathing begins again. The repeated awakenings during sleep may lead to drowsiness and fatigue when commuting to and from work, as well as during the duty period. This condition is known as Sleep Apnoea.
The people most likely to suffer from Sleep Apnoea are overweight men with a collar size of 17.5 inches or more, who are middle-aged or older. However, others, including women, may also suffer from Sleep Apnoea.

The RSSB survey found that most drivers snore and about 15% said that they stopped breathing during sleep. Nearly half of the drivers were overweight and about 15% were very overweight (obese).

Losing weight may help to reduce breathing problems during sleep. To treat severe Sleep Apnoea, a medical device is placed over the nose at bedtime. This supplies a continuous air pressure to keep the airway open. This improves sleep, which in turn, reduces drowsiness the following day. The RSSB are carrying out a research project aimed at increasing understanding of the prevalence of sleep apnoea in the driving population and developing a screening tool.

- If you are suffering from severe sleep problems or extreme sleepiness at work, you should contact your Occupational Health Department and your GP for advice.

You can use the following Body Mass Index (BMI) to indicate whether you are considered to be overweight. However, this index does not distinguish between weight due to body fat or due to muscular physique.
Further Information

Feeling tired? RSSB Human Factors fact sheets
http://www.rssb.co.uk/hffacts.asp

Shiftwork, lifestyle and health. London: Associated Society of Locomotive Engineers and Firemen (ASLEF)

National Sleep Foundation
http://www.sleepfoundation.org/

Sleep Council
http://www.sleepcouncil.com/

Talk about sleep
http://www.talkaboutsleep.com/

Sleep Apnoea Trust
http://www.sleep-apnoea-trust.org/

Working Time Society
http://www.workingtime.org
British Snoring and Sleep Apnoea Association
http://www.britishsnoring.co.uk

Sleep disorders
http://www.sleepdisorders.com/

BBC Science and nature
http://www.bbc.co.uk/science/humanbody/sleep/

BBC Health
http://www.bbc.co.uk/health/healthy_living/health_at_work/physical_shiftwork.shtml

Owl / lark questionnaire
http://web.ukonline.co.uk/bjlogie/test.htm

Caffeine calculator