



TP 14572E  
April 2007

Fatigue Risk Management System  
for the Canadian Aviation Industry

# An Introduction to Managing Fatigue



Canada

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Une traduction de ce document est également disponible en français : «*Système de gestion des risques liés à la fatigue pour le milieu aéronautique canadien : Introduction à la gestion de la fatigue*», TP 14572F.

# Preface

This document is part of the Fatigue Risk Management System (FRMS) Toolbox for Canadian Aviation.

The FRMS toolbox includes the following components:

1. *FRMS for the Canadian Aviation Industry: An Introduction to Managing Fatigue*, TP 14572E: introductory material intended to raise awareness about fatigue
2. *FRMS for the Canadian Aviation Industry: Fatigue Management Strategies for Employees*, TP 14573E: provides the knowledge and skills required to apply appropriate fatigue management strategies at the individual level
3. *FRMS for the Canadian Aviation Industry: Employee Training Assessment*, TP 14574E: an optional module intended to assess employee competence in topics covered in the Fatigue Management Strategies for Employees workbook
4. *FRMS for the Canadian Aviation Industry: Developing and Implementing a Fatigue Risk Management System*, TP 14575E: explains how to manage the risks associated with fatigue at the organizational level within a safety management system framework
5. *FRMS for the Canadian Aviation Industry: Policies and Procedures Development Guidelines*, TP 14576E: proposes a policy structure while providing examples and guidelines to help organizations through the process of designing fatigue risk management policies and procedures
6. *FRMS for the Canadian Aviation Industry: Fatigue Audit Tools*, TP 14577E: provides an overview of tools available to employers to help determine whether scheduling provides employees with adequate opportunities to get sufficient sleep.
7. *FRMS for the Canadian Aviation Industry: Trainer's Handbook*, TP 14578E: in addition to a training presentation on fatigue, fatigue management systems, and individual fatigue management strategies, the package includes background information for delivery of the workshop, learning outcomes, and questions frequently asked by participants

These documents are available on the Transport Canada web site at [www.tc.gc.ca/CivilAviation](http://www.tc.gc.ca/CivilAviation) and [www.tc.gc.ca/TDC](http://www.tc.gc.ca/TDC).



# Introduction

Being tired at work can be just as dangerous as taking alcohol or drugs. You can lose concentration, misjudge speed and distance, react more slowly – you might even fall asleep. Being tired can also make you moody and irritable, and can cause you to take risks. Any one of these problems could put you and other people in danger.

When you work shifts, you're bound to feel tired sometimes. You're out of step with your body's natural sleeping and waking rhythms. This booklet gives you an overview of the risks associated with fatigue, and offers some strategies to help you manage the effects of fatigue at work and make sure you get the rest you need to be fit for duty.

Fatigue is widely recognized as a significant safety hazard, not just to you and your coworkers, but to the general public. That's why Transport Canada commissioned a set of tools and guidelines to help the Canadian aviation industry set up fatigue risk management systems.

Fatigue risk management systems recognize that it's everyone's responsibility to manage fatigue risk. Employers should make sure that work schedules give employees adequate opportunities for rest between shifts. In turn, employees are responsible for making sure they use those opportunities to get the sleep they need to be fit for work.

An important part of any fatigue risk management system involves teaching employees and managers about fatigue as a safety hazard and how to better manage their own fatigue. This booklet can be used as an introduction to the more detailed, competency-based training workbook called *Fatigue Management Strategies for Employees* (TP 14573E).

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# Causes and consequences of fatigue

## What causes fatigue?

How much sleep we need varies from person to person, but most people need an average of seven to nine hours of sleep a night. If you get less than you need over several days, that lack of sleep will build up into a sleep "debt." Losing two hours of sleep a night for four days can make you as tired as though you lost a whole night's sleep. The only way to pay back your sleep debt is by getting some additional "recovery" sleep.

The human body runs on a 24-hour clock, programmed to sleep at night and be awake during the day. Working when your body is supposed to be sleeping can make it hard to get good quality sleep. Not only do you not sleep as well, some research suggests that night shift workers can lose one to three hours of sleep per day compared to day shift workers. Six hours of sleep during the day is not the same as six hours of night sleep.

Your body clock also controls your body's daily cycles, such as hormone production, digestion, temperature, and sleepiness. There are two times during the day when you're more likely to feel drowsy: in the

early morning between midnight and 6 a.m., and in the mid-afternoon.

Your sleep too runs in cycles. Over the course of the night, you move several times from a light sleep to a deep dreaming sleep and back to a light sleep. How long each cycle runs varies from person to person, but it's usually somewhere from 60 to 90 minutes. It's the deepest sleep that you need to recover best from fatigue.

It is not true that we need less sleep as we get older - we simply have more trouble getting what we need.

Beyond not getting enough sleep, feelings of fatigue can also be brought on or made worse by conditions in your workplace. High-pressure demands, long shifts, stress, and even things like poor lighting, constant noise, and poor weather can make you feel more tired. Not taking breaks during your shift will also increase your feelings of fatigue.

Balancing the demands of shift work with your family and social life can also be stressful and make it hard to get the sleep you need to be fit for duty.

## Consequences of fatigue

Being fatigued can have an effect on many aspects of your life. Many people suffer from mood swings, which can hurt your relationships at work and at home. Some people gain weight. Others find it harder to get motivated at work or at home. You can become frustrated trying to balance the need for more sleep with the need to spend time with friends and family. Many people who work shifts feel socially isolated, which only adds to the stress and overall feeling of fatigue.

In the long term, shiftwork can lead to more serious health problems, such as heart disease or gastrointestinal problems such as ulcers.

On the job, fatigue can be a serious safety hazard. Research has found that losing just one night of sleep can impair your performance almost as much as having too much alcohol to legally drive. Your reaction time is slower, you have trouble concentrating or remembering things – you may even fall asleep on the job. There's a much greater risk that you'll make a safety-critical mistake. Being fatigued can make you a risk to yourself, your co-workers, and even the public.

It's not just at work that being fatigued can be dangerous. There's a real risk that you'll fall asleep at the wheel while driving home after a long shift.

## Consequences of fatigue

Individuals	Organizations	Communities
<ul style="list-style-type: none"> <li>• Increased sleepiness</li> <li>• Increased risk of accident</li> <li>• Increased stomach upsets</li> <li>• Decreased motivation</li> <li>• Mood swings or depression</li> </ul>	<ul style="list-style-type: none"> <li>• Increased safety risk</li> <li>• Increased sick leave</li> <li>• Increased staff turnover</li> <li>• Decreased productivity</li> <li>• Decreased morale</li> </ul>	<ul style="list-style-type: none"> <li>• Increased safety risk for general public</li> <li>• Increased use of medical services</li> <li>• Decreased community participation</li> </ul>

# Strategies to manage fatigue

## **Get a good night's sleep**

To help your body get ready to sleep, keep to a regular routine. Doing little things like brushing your teeth every day in the same order before bed can train your body to associate them with bedtime and sleeping, even if it's daytime and your body is normally awake.

Spend a few minutes winding down before bed. A little light exercise can sometimes help, although avoid anything strenuous at least an hour before trying to fall asleep.

Your body is programmed to digest food best during the day, so it's better not to eat a big meal just before bedtime. A light snack may be okay. Avoid anything with caffeine, such as coffee or energy drinks. Alcohol is not a good idea either, because you won't sleep as deeply and won't wake up feeling as refreshed.

Make your bedroom as comfortable a place to sleep as possible. Because light makes your body think it's time to wake up, your room should be dark. And not too warm – somewhere between 18°C and 24°C is a good temperature for sleeping.

Some fresh air can help as well. Try to use your bedroom only for relaxing, sleeping, and sex. Move potential distractions such as televisions and computers to another room.

Make sure you won't be disturbed. Use an answering machine for the telephone. If there are children around, make sure they won't wake you – tell your family about your schedule and put a sign on your fridge or bedroom door. If noise is keeping you awake, try using ear plugs. Because noise can sometimes disturb your sleep without actually waking you, some people use "white noise," such as a fan or an untuned radio, to help dampen other sounds.

If you can't get to sleep, it's sometimes better to get up and do something relaxing instead of tossing and turning. Try reading or taking a bath.

If your work schedule changes, try changing your bedtime by an hour or two each day to get your body gradually used to your new shift.

## Take a nap

While a nap is no substitute for a good night's sleep, it can help you recover from fatigue and make you feel refreshed. How long you should nap depends on how much time you have available. You'll feel more refreshed if you wake up naturally at the end of a sleep cycle. However, a nap should be at least 10 minutes long.

Remember that when you wake up, you may feel groggy and disoriented for about 20 minutes. This is especially true if you're wakened by an alarm instead of waking up naturally, or if you awaken from a particularly deep stage of sleep. This is known as sleep inertia. If you're planning a nap, make sure you build in time to properly wake up before taking on anything that requires full concentration, such as driving.

Although it doesn't seem to matter what time of day you take a nap, it's easiest to fall asleep when your body is most tired mid-afternoon and between midnight and 6 a.m.

## Sleep disorders

If you don't feel refreshed despite getting lots of sleep, or if you have ever been told that you stop breathing in your sleep or that you wake with a choking noise, you may suffer from a sleep disorder. Other warning signs include heavy snoring, restless legs, and sudden "sleep attacks" during the day. Sleep disorders disrupt your sleep, leaving you fatigued and unable to concentrate. Over time, they can lead to serious health problems.

Talk to your doctor. More information on sleep disorders is available on the Canadian Sleep Society's website ([www.css.to](http://www.css.to)), which also includes a list of sleep medicine clinics in Canada.

## Use drugs intelligently

Caffeine is one of the mostly widely used drugs in our society. Many people use the caffeine in a strong cup of coffee or tea to get their day started and to fight off feelings of fatigue as the day wears on.

Caffeine is also found in cola drinks, such as Pepsi or Coke, and in energy drinks such as Red Bull. You can also buy caffeine pills such as No-Doze. Keep in mind that you can develop a tolerance to caffeine – if you drink coffee regularly, you may need more than a cup to keep you alert when you're really fatigued. You can also develop a dependence. Many people develop withdrawal symptoms such as headaches when they try to go without.

The sugar in caffeinated drinks can actually work against the stimulating effect of the caffeine and reduce your alertness after the initial effect wears off.

Remember that stimulants only hide or postpone the effects of fatigue. They do not replace the need for sleep.

Some people use alcohol to help them relax before bedtime. While a couple of drinks may help you fall asleep more easily, alcohol tends to disrupt your sleep cycle and often produces a light, restless sleep that leaves you less refreshed.

There are a variety of over-the-counter and prescription sleeping pills available to help you get to sleep. However, like caffeine, your body can develop a tolerance and a dependence. After about a week, you may have difficulty falling asleep without them. Over time, you may need a larger and larger dose to fall asleep. Sleeping pills are best used occasionally or for only a few days at a time.

You should be aware that while cold or flu medications that contain pseudoephedrine may dry up your runny nose, they can also act as a stimulant to keep you awake. And they may leave you dehydrated, which will also affect the quality of your sleep. Use a night version if you need to relieve cold symptoms.

One drug that is not available in Canada but can be purchased over the counter in the U.S. is the hormone melatonin. Your body makes melatonin naturally around the same time of day as your natural drive to fall asleep. Some people report that taking melatonin pills helps them sleep. Others, however, report that it causes headaches, occasional depression, daytime drowsiness, dizziness, and reduced alertness. There is still little evidence that it is effective as a sleeping aid.

## **Stay fit and healthy**

Regular exercise helps you sleep well, stay healthy, and feel fit. It may not be easy to find a regular time to exercise if your work schedule keeps changing, but you don't need to join a gym or a local sports team to enjoy the benefits of exercise. Even going for regular walks can

help improve your energy levels and stamina, reduce the risk of heart disease and other health problems, and help you feel better and sleep better.

## **Stay alert at work**

As well as getting the sleep you need, there are other ways to make sure you're wide awake and alert when you need to be.

*Take regular breaks.* Don't take your coffee or lunch break at your work station. Get up, walk around a little, get some fresh air. A change of scene can help you relax for a moment and leave you feeling more awake and energized.

*Eat properly.* Snack bars or sugary foods can give you a rush of energy – a sugar high – but that's usually followed by a low that makes you feel tired again. Foods like potatoes, pizza, and white bread have a high glycemic or sugar index and can make you feel sluggish. It's better to eat a sandwich on brown bread, which will keep you going longer without getting tired. Foods with a low glycemic index include low-fat yogurt or cottage cheese, lean beef and chicken, and canned fish packed in water.

*Stay hydrated.* Not drinking enough can make you feel sleepy. But be careful what you drink – drinks that contain caffeine or alcohol can actually make you more dehydrated. Sugary drinks or fruit juices can make you feel more thirsty. It's often said that you should drink about two litres of water per day. You should pay particular attention if you work in a hot,

dry, or air-conditioned environment. Or if your job is physically demanding and makes you sweat. Eating high fat or high salt foods can also make you dehydrated.

*Make smart use of caffeine.* Coffee, tea, colas and energy drinks can help you stay alert. Just remember that the more regularly you use them, the more you will need if you really need help staying alert.

### **If you start to feel sleepy at work...**

Research has found that we're not very good judges of how sleepy we are. In fact, the more tired we are, the less able we are to judge our own levels of fatigue.

If you find yourself constantly yawning, your thoughts keep wandering, you suddenly realise you haven't been concentrating, your eyes close for a moment or go out of focus, and you have trouble keeping your head up, you have all the danger signs of being drowsy.

Take a break, if you can. Or a nap, if possible. Try rinsing your face with cold water. Have a sandwich and something to drink. Don't start work again until you feel fully alert.

If you can't take a break, you could try the usual tricks such as opening a window or drinking a cup of strong coffee. These may help for a while, but they are not dependable strategies.

### **Be careful on the drive home**

One of the most dangerous things you can do when you're fatigued is drive to or from work. Depending on your shift, you may be driving during the very times that your body most wants to sleep.

You could have a coffee before leaving work, but remember it may affect your ability to get to sleep when you get home. You could also have a nap before you leave work, but don't forget about the effects of sleep inertia. Be careful to wait until you're fully awake before getting behind the wheel. Drive carefully, don't speed to get home faster, and don't be shy about stopping to take a break or nap if you find yourself feeling sluggish.

# Maintaining a healthy, balanced life

## **Get enough sleep**

Managing your fatigue does not mean you should spend all your time away from work trying to sleep. At the same time, it can be tempting to give things like family responsibilities, going out with friends, or even watching TV a higher priority than sleep.

Many people who work shifts feel socially isolated. They work while friends and family are socializing. Friends may stop calling because they assume you're not available. This can be frustrating, which can affect your overall health and get in the way of being well rested.

Remember that it's your responsibility to get enough rest to be fit for work. And don't forget that you need to be rested to fully enjoy your family and social time.

## **Spend time with friends and family**

Finding the right mix of work, sleep, and family and social time can be a real balancing act. It may mean that you have to plan your time more carefully, and make

more of an effort to stay in touch with friends. Let your family and friends know your work schedule. Try to plan events well in advance. You may have to organize activities yourself, rather than waiting for others to include you.

It's possible, too, that your work schedule allows you to participate in school or community activities that other working people aren't able to. Try exploring volunteer activities as a way to maintain contact.

Finding time for intimacy in your relationship may be difficult too. You may have to plan ahead – make a date for sex. Or you may have to learn to be more spontaneous. Whatever the best solution for you, be aware that you may have to make an effort for you and your partner to adjust to your work schedule.

## **Enjoy time for yourself**

Some people report that working shifts leaves them a lot of time by themselves. This isn't a bad thing, if you can use it doing things you enjoy. Take advantage of the fact you don't need to compromise or

negotiate for time alone to relax, enjoy a hobby, plan a trip or event, get some exercise – or even catch up on some much-needed sleep!

### **Stay fit and healthy**

Research has found that a higher percentage of shift workers suffer from a variety of health problems than the general population. Aside from being more likely to feel fatigued, they're more likely to report difficulties sleeping, mood changes such as depression, gastrointestinal problems

like ulcers, heart disease, nutritional problems that can result in weight gain or loss, and even reproductive problems such as miscarriages or difficulty getting pregnant. One study suggests that over the long term working shifts may shorten your life by as much as five years.

Taking care of your health can combat these problems. Get regular exercise and eat a nutritionally balanced diet. Learn to relax, manage your fatigue, and get the sleep you need. Pay attention to your overall health and visit your doctor regularly.