

Workplace Health and Safety Queensland

Managing fatigue

A guide for the workplace

What is the guide about?

The *Managing fatigue* guide gives general and practical information about managing fatigue in the workplace. It is relevant to workers, employers, the self-employed and contractors.

What is fatigue?

There are many definitions of fatigue. In this guide, fatigue is defined as the increasing difficulty in performing mental and physical activities as a consequence of inadequate restorative sleep.

What causes fatigue?

There are many factors contributing to fatigue, including:

- sleep loss
- long periods awake (greater than 17 hours)
- inadequate amount of sleep (less than 7 to 8 hours) or poor quality sleep
- sustained mental or physical effort
- disruption to circadian rhythms (internal biological clock)
- inadequate rest breaks (varies with the task)
- health and emotional issues
- time of day when work is performed (e.g. shift workers).

However, this guide only contains advice on fatigue related to:

- sleep loss (sleeping less than 6 hours in any one 24-hour period)
- sleep debt (averaging less than 7 to 8 hours sleep over a number of 24-hour periods)
- sleep quality (getting enough deep sleep and feeling refreshed on waking)
- circadian rhythms
- shiftwork (any work that is **not** done Monday to Friday between 6am and 6pm)
- extended hours of work (any work that is more than 8 hours a day and/or more than 6 days a week).

Being awake for 17 hours is the equivalent of having a blood alcohol level of 0.05

Being awake for 20 hours is the equivalent of having a blood alcohol level of 0.1.

How does fatigue affect health?

Long-term effects of fatigue on health which are associated with shiftwork and chronic sleep loss may include:

- heart disease
- diabetes
- high blood pressure
- gastrointestinal disorders
- depression.

The factors that contribute to fatigue also disrupt an individual's circadian rhythms. Disruptions in circadian rhythms can also have a significant impact on the effectiveness of certain medications used for asthma and diabetes. The quality of our sleep is reduced as we get older. Lack of sleep can worsen depression and also affects people with epilepsy, increasing their risk of having a fit.

How does fatigue affect safety?

Fatigue leads to poor judgement, poor performance on skilled tasks and slower reaction times. Fatigue stops you appreciating how serious a situation has become. It is harder to undertake complex tasks when fatigued.

Poor decision-making as a result of fatigue leads to accidents. Research has shown that the risk of work-related injuries and illnesses is increased in people working more than 60 hours a week, or working 12 hours or more in a day. Compared with an eight hour shift, accident rates are doubled after 12 hours at work. A 17 per cent increase in accident rates occur after the fourth day shift. There are also 30 per cent more incidents on the fourth night shift compared with the first, unless other measures such as frequent rest breaks, are put in place.

What are the safety consequences of fatigue?

The safety consequences of fatigue include:

- decreased alertness
- slowed reaction time
- poor hand-eye coordination
- poor communication
- higher error rates
- reduced vigilance
- reduced decision-making ability
- poor judgement of performance, especially when assessing risks
- being easily distracted during complex tasks
- difficulty responding to emergencies
- loss of awareness of critical situations
- inability to remember the sequence of events.

What are the signs and symptoms of fatigue?

The signs and symptoms of fatigue include:

- blurred vision
- difficulty keeping your eyes open
- head nodding
- drowsy relaxed feeling
- irritability
- not feeling refreshed after sleep (waking tired)
- falling asleep at work
- microsleeps - falling asleep for less than a second to a few seconds, and being unaware that you have done so (usually due to sleep loss).

Who should manage fatigue?

Fatigue management is a **shared responsibility** and should be managed by both individuals and management at the workplace.

There are two main sources of fatigue:

Work-related fatigue – associated with activities at the workplace	Non-work-related fatigue
<ul style="list-style-type: none"> • extended hours of work • shiftwork • inadequate time between shifts for sleep • time of day • work design • second jobs 	<ul style="list-style-type: none"> • commuting times • family and social obligations • community activities • emotional issues • age • health and fitness level

Work-related fatigue needs to be managed by employers or those in control of a workplace or business undertaking. This can be done using a risk management approach – see references at the back of this guide.

Non-work-related fatigue factors are best managed by individuals.

Employers should protect the opportunity to sleep.

What can employers do to manage fatigue?

Factors to consider	Recommended control measures
Extended hours of work	Ensure sufficient cover for workers who are on annual or sick leave. If overtime is necessary, plan for it so workers can schedule their activities around it. Note that exposure standards are based on 8 hour days – seek expert advice on noise and chemicals in the workplace if you have longer shifts.
<ul style="list-style-type: none"> • work shift that is 8 hours long 	<ul style="list-style-type: none"> • limit overtime to 4 hours
<ul style="list-style-type: none"> • work shift that is 10 hours long 	<ul style="list-style-type: none"> • limit overtime to 2 hours
<ul style="list-style-type: none"> • work shift that is 12 hours long or a work week that is 55 hours or more 	<ul style="list-style-type: none"> • do not allow overtime • limit total hours per week to 55
<ul style="list-style-type: none"> • working a second job 	<ul style="list-style-type: none"> • have a policy on second jobs – ensure that the worker understands the obligation to get sufficient sleep and to be fit for duty
Shiftwork	<ul style="list-style-type: none"> • Ensure the roster provides for a continuous 7 to 8 hours sleep in each 24 hours, and at least 50 hours sleep for every seven days • If on a rotating three shift roster system, forward rotation (day, afternoon to night shifts) is tolerated better

Factors to consider	Recommended control measures
<ul style="list-style-type: none"> poorer sleep during the day for night shift workers, leading to an acute sleep debt on the first few nights cumulative sleep debt (e.g. less than 7 to 8 hours of sleep between each work shift over several shifts) people who have had less than five hours sleep have an increased risk of a car accident when driving 	<ul style="list-style-type: none"> limit number of consecutive night shifts to four end night shifts by 8 am ensure there is a minimum of 12 hours between consecutive shifts ensure that roster allows for at least two full nights sleep after the last night shift allow short naps of no longer than 15 – 20 minutes if it fits in with the type of work that is being done
<ul style="list-style-type: none"> accident risk increases by 30 per cent by the fourth night shift accident risk increases by 27.5 per cent on 12 hour shifts, compared with 8 hours on duty 	<ul style="list-style-type: none"> consider whether 12 hour night shifts are really necessary use additional control measures, such as two hourly breaks of at least 5 to 10 minutes duration have a room for workers to sleep before commuting home
<ul style="list-style-type: none"> night shift workers have a greater risk of developing obesity, diabetes and heart disease 	<ul style="list-style-type: none"> encourage healthy eating at work provide access to healthy food options at work
Time of day	Minimise early morning starts before 6 am
<ul style="list-style-type: none"> early start times before 6 am give workers less time to get adequate sleep, as it is very difficult to go to sleep during the early evening (6-9 pm), as our internal body clocks are set for alertness 	<ul style="list-style-type: none"> avoid more than five consecutive early morning starts encourage car pooling or provide transport
Work design	Minimise safety critical tasks at circadian low points.
<ul style="list-style-type: none"> low alertness on night shift at 3-5 am, with increased accident risk 	<ul style="list-style-type: none"> avoid safety critical tasks during the early hours of the morning, have greater supervision, have regular breaks

Workers need to ensure they get enough sleep and come to work fresh and alert

What can individuals do to manage fatigue?

Factors to consider	Control measures
Diet for night shift workers	<ul style="list-style-type: none"> • Stick to normal day shift meal times as far as you can • Don't eat after 3 am • Avoid large meals 1 to 2 hours before sleeping • Avoid high energy (high fat), high carbohydrate meals during the night shift
Recovering or preparing for work	<ul style="list-style-type: none"> • have an afternoon nap before the first night shift
Personal factors affecting sleep	<ul style="list-style-type: none"> • drink alcohol in moderation as it can disturb your sleep • avoid caffeine after midnight when on night shift
Medical conditions affecting sleep, such as sleep apnoea	<ul style="list-style-type: none"> • seek medical advice
Poor sleep environment	<ul style="list-style-type: none"> • install heavy curtains that keep the light out • reduce the volume of the telephone and the television – keep them in another room not the bedroom • insulate your house and/or have air-conditioning on to drown out background noise • let neighbours and friends know if you are a shift worker and when you need to sleep so they don't mow lawns or visit at these times
<ul style="list-style-type: none"> • Poor sleep hygiene – watching television in bed, drinking coffee or alcohol or eating a heavy meal before going to bed • Poorer sleep quality, more fragmented and less deep restorative sleep in people over 45 years of age 	<ul style="list-style-type: none"> • get into a routine for going to sleep (e.g. take a warm shower or relaxing bath before going to bed, listen to soothing music) • avoid heavy meals, alcohol and tea or coffee before going to bed • consider moving out of shiftwork if you find you are more a 'morning' person and cannot get enough sleep when on night shifts
Hectic social life	<ul style="list-style-type: none"> • plan your social activities and ensure you get sufficient sleep before starting work

Second jobs	<ul style="list-style-type: none">• follow your employers' procedures about disclosure• ensure you get adequate sleep in relation to both jobs
-------------	---

References and other sources of information

- Information on sleep loss and circadian rhythm from the [Better Health Channel](#).
- Risk calculator to test rosters against – see the website of the [Health and Safety Executive](#) in the UK. **Note:** this risk calculator does **not** apply to day shift only rosters.
- Information on fatigue management, drawing up policies, managing shiftwork, educational presentations on fatigue and other resources, see [Professor Drew Dawson's](#) website.
- Information on the [risk management process](#).
- Doctors who work shift work, test your own fatigue risk on the [Australian Medical Association's](#) risk calculator.
- Drivers of commercial vehicles, information on fatigue management plans:
 - [Heavy vehicles](#)
 - [Guidelines For Managing Heavy Vehicle Driver Fatigue](#)
- Workers in the maritime industry, the [Great Barrier Reef pilotage fatigue risk assessment report](#) prepared for the Australian Maritime Safety Authority (AMSA).
- Workers in the forestry industry, visit [Fatigue management for the forest industry](#).
- Workers in the mining and minerals processing (although every worker would find the [Work Design, Sleep and Fatigue](#) document practical and informative) will find that these documents are an excellent summary of all the research into sleep loss and practical measures at the workplace, including roster design.
- OHS managers and those in the mining and minerals processing industry (although every industry would find this document practical and informative), should read chapter 11 of [Digging Deeper](#) on fatigue risk management.
- General information on fatigue management from [Worksafe Victoria](#).
- Try the [Epworth Sleepiness Scale](#) and assess your risk of sleep apnoea.
- Fact sheets on sleep disorders from the [Australian Sleep Association](#).

© *The State of Queensland (Department of Justice and Attorney-General) 2011*

Copyright protects this document. The State of Queensland has no objection to this material being reproduced, but asserts its right to be recognised as author of the original material and the right to have the material unaltered.

The material presented in this publication is distributed by the Queensland Government as an information source only. The State of Queensland makes no statements, representations, or warranties about the accuracy or completeness of the information contained in this publication, and the reader should not rely on it. The Queensland Government disclaims all responsibility and all liability (including, without limitation, liability in negligence) for all expenses, losses, damages and costs you might incur as a result of the information being inaccurate or incomplete in any way, and for any reason.