

Table of Contents

1	Purpose.....	3
2	Definitions	3
3	What Causes Fatigue	4
3.1	Work-Related Causes.....	4
3.2	Non-Work Related Causes	4
3.3	Why Is Fatigue a Problem.....	4
3.4	Circadian Rhythms	4
3.5	Sleep Debt and Sleep Loss.....	5
4	Effects of Fatigue.....	6
5	Managing Fatigue.....	7
5.1	Identify Factors That Contribute to Fatigue	7
5.2	Assessing The Risk	7
5.3	Deciding on Control Measures.....	8
5.4	Implement Control Measures	8
5.5	Monitor and Review	9
5.6	Factors to Consider when Managing Fatigue.....	9
5.6.1	Roster Design.....	9
5.6.2	Commuting	9
5.6.3	Shift Rotation	10
5.6.4	Sleep Inertia	10
5.6.5	Breaks	10
5.6.6	Occupational Exposure Levels.....	10
5.6.7	Manual Tasks	10
5.7	Tips for Shift Workers	10
5.8	Tips for Eating, Health and Physical Fitness.....	11

SAMPLE

1 PURPOSE

To help Calsta management, supervisors and personnel develop strategies to effectively control the risks of fatigue.

To provide information about fatigue, and factors that contribute to it, so that all are aware of associated hazards and how they can be controlled.

To ensure all personnel receive appropriate information in relation to the management of fatigue that they may be exposed to when working for Calsta including contractors and sub-contractors. This Procedure defines the minimum requirements for fatigue management whilst working for Calsta.

2 DEFINITIONS

The following definitions apply throughout this document:

- **Shall** - A mandatory task that must be completed.
- **Should** - A recommendation that is advantageous to complete.
- **Personnel** - All employees, subcontractors and representatives currently engaged by Calsta to perform duties.
- **Workplace** – All project/client sites, camps and all offices and facilities where Calsta personnel conduct business.
- **Fatigue** - Mental or physical exhaustion that stops a person from being able to function normally. This is normally caused by lack of sleep and it is more than just feeling tired or drowsy.
- **Circadian Rhythms** - Also referred to as internal body clock. These are the body's natural rhythms that are repeated approximately every 24 hours and affect the body temperature, digestion, hormone levels, sleeping patterns and other body functions.
- **Active Work** - Total time spent at work including overtime. Does not include travelling to and from work site or rest breaks during shifts.
- **Extended Work Hours** - Any working hours in excess of established rostered hours and including overtime.
- **Rostered Hours** - The hours which an employee is rostered to work.
- **Work Roster** - The working period scheduled between any significant break from work.
- **Work Schedule** - The hours worked for each day, shift, week, month, or year as scheduled by management.

3 WHAT CAUSES FATIGUE

Fatigue results from insufficient or poor quality rest and sleep between activities. Inter-related causes of fatigue include, though are not limited to:

- The time of day that work takes place
- Workload
- The length of time spent at work and in work related duties
- The type and duration of a work task and the environment in which it is performed
- Previous hours and days worked
- The quality and quantity of rest obtained prior to and after a work period
- Activities outside of work, such as partying, second job, family commitments etc
- Acute fatigue is caused by immediate episodes of sleep deprivation such as long periods of wakefulness from excessively long shifts or night shifts without adequate daytime rest.

3.1 Work-Related Causes

- Work-related causes arise from Roster design, e.g. too many consecutive night shifts.
- Aspects of the tasks being undertaken, e.g. greater workload within standard shifts
- Features of the working environment e.g. noise or extreme temperature

3.2 Non-Work Related Causes

These include:

- Sleep disruptions due to ill family members
- Strenuous activities outside work such as second jobs
- Sleep disorders
- Inappropriate use of alcohol, descriptive and illegal drugs
- Stress associated with financial difficulties or domestic responsibilities

3.3 Why Is Fatigue a Problem

Fatigue causes increased risk of incidents due to tiredness and lack of alertness. When workers are fatigued, they more likely to exercise poor judgement and have a slow reaction to signals.

The risk of incidents increases on site as fatigued workers are less able to respond to changing circumstances due to human error. Fatigue can also result in long-term health problems such as digestive problems, heart diseases, stress and mental illness.

3.4 Circadian Rhythms

Human beings are day oriented, designed to work during the day and sleep at night due to the Circadian rhythms. Therefore, most body functions show maximum activity during the day and minimum activity during night causing the human body to experience different levels of wakefulness depending on the time of day. The body experiences a reduction in activity in the midnight to dawn period and this cannot be changed.

Long work hours and night shifts disrupt the Circadian rhythms and these:

- Adversely impact on the quality and quantity of sleep
- Adversely impact on task performance
- May also create a sense of personal dislocation and imbalance.

Consequently, incidents are more likely in the night period when the circadian circle is at its lowest.

3.5 Sleep Debt and Sleep Loss

Muscles recover with rest; the brain can only recover with sleep. Therefore, sleep is the only effective long-term counter measure to fatigue.

Therefore, maintaining sufficient levels of sleep will prevent fatigue.

The optimum amount of sleep required by a person varies, with seven to eight hours of daily sleep as an average for adults. Workers who continually get less sleep than that necessary for them will accumulate a sleep debt.

A sleep debt is the difference between a person's required amount of sleep and the actual amount of sleep obtained e.g.

Required hours of sleep = 8 Actual hours slept = 6 Sleep debt $8 - 6 = 2$

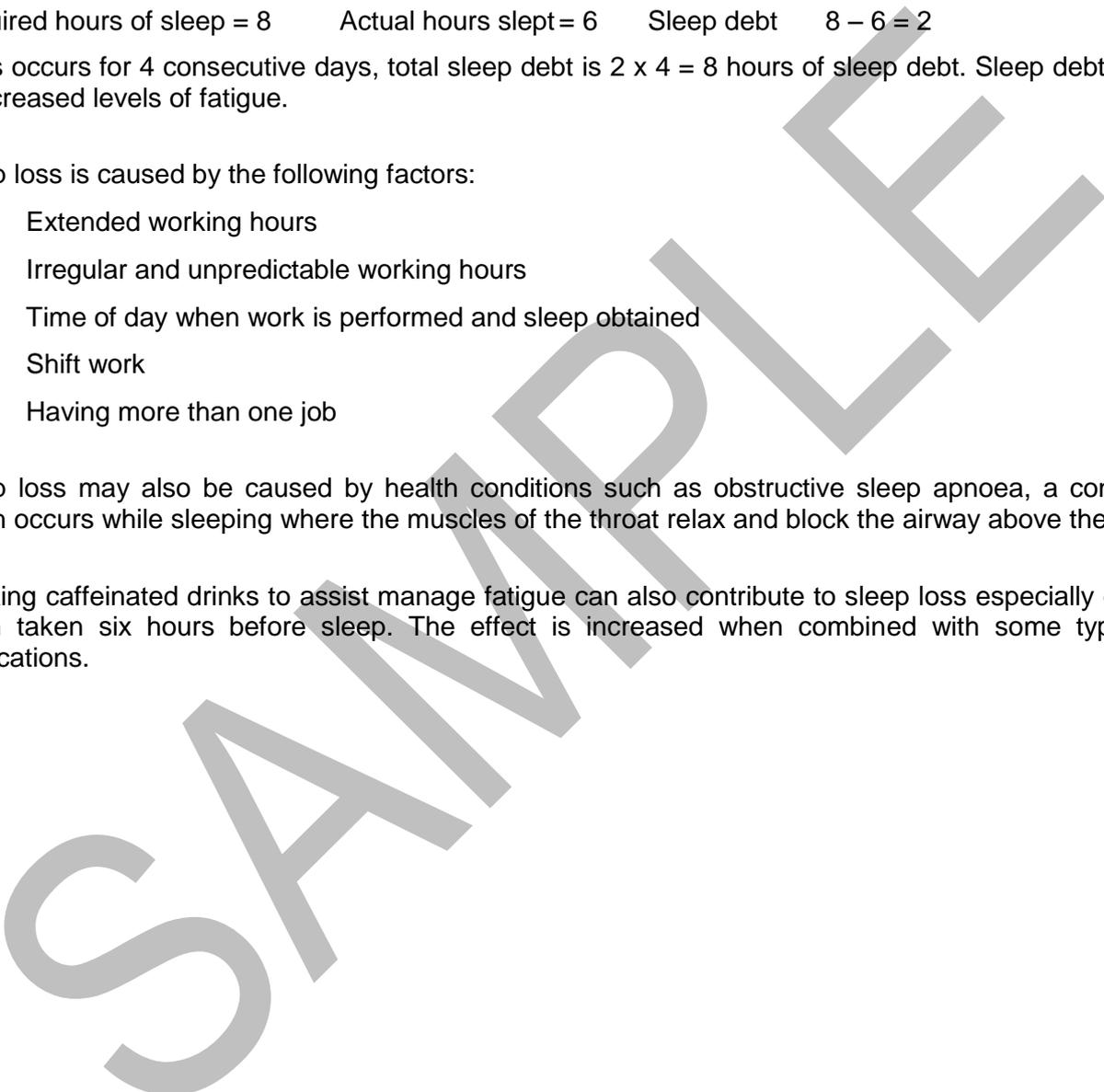
If this occurs for 4 consecutive days, total sleep debt is $2 \times 4 = 8$ hours of sleep debt. Sleep debt leads to increased levels of fatigue.

Sleep loss is caused by the following factors:

- Extended working hours
- Irregular and unpredictable working hours
- Time of day when work is performed and sleep obtained
- Shift work
- Having more than one job

Sleep loss may also be caused by health conditions such as obstructive sleep apnoea, a condition which occurs while sleeping where the muscles of the throat relax and block the airway above the voice box.

Drinking caffeinated drinks to assist manage fatigue can also contribute to sleep loss especially coffee when taken six hours before sleep. The effect is increased when combined with some types of medications.



4 EFFECTS OF FATIGUE

High levels of fatigue cause reduced performance and productivity at work and increase the risk of incidents and injuries occurring. Fatigue also affects the ability to think clearly, which is vital when making vital safety-related decisions and judgements.

Fatigued workers are unable to gauge their own level of impairment as they are unaware that they are not functioning as well or as safely as they would normally. This can place themselves and others at risk especially:

- When operating machinery (including driving vehicles)
- When performing critical tasks that require a high level of concentration
- Where consequences of error are serious.

A fatigued person may experience micro sleeps, which is a brief nap that lasts for about 4 to 5 seconds that the person may not even be aware. This also has significant impact on safety.

Performance levels drop as work periods become longer and sleep loss increases. Staying awake for 17 hours is equivalent to impairment arising from blood alcohol content of 0.05%. Staying awake for 21 hours is equivalent to 0.1% blood alcohol content.

The most common effects associated with Fatigue are:

- Desire to sleep
- Lack of concentration
- Impaired recollection of timing and events
- Irritability
- Poor judgement
- Reduced capacity for effective interpersonal communication
- Reduced hand-eye coordination
- Reduced visual perception
- Reduced vigilance
- Slow reaction times
- Lack of sleep is indirectly linked with the following health effects
- Heart disease and High Blood Pressure
- Stomach ulcers and other gastrointestinal disorders
- Depression
- Lower fertility

5 MANAGING FATIGUE

Fatigue management shall be managed with a risk management approach using five basic steps outlined below:

5.1 Identify Factors That Contribute to Fatigue

Develop a list of factors with your work that have potential to contribute to fatigue within the workplace. Attention should be paid to shift length and roster design. When designing the roster consider the following:

- Length of shift worked
- Previous hours and days worked – effects of fatigue are cumulative, workers may have sleep debt arising from previous days worked.
- Type of work being performed – attention should be paid to the level of physical and / or mental effort that is required
- Time of the day when work is being performed – remember that disrupting the body's circadian rhythms can cause fatigue and impact on task performance

The following are ways that can be used to identify the factors that contribute to fatigue.

- a) Inspecting work place rosters
- b) Consulting with workers
- c) Conducting a safety audit
- d) Analysing injury and incident reports
- e) Undertaking worker surveys

5.2 Assessing The Risk

Risk, in this context, is the likelihood that death, injury and illness may result because of the factors that contribute to fatigue. For each risk, consider both likelihood and consequences as follows:

- The rates of each risk should be prioritised to determine the likelihood of an incident occurring at the workplace, bearing in mind the existing control measures
- Determine the consequences of an incident occurring at the workplace, bearing in mind the existing control measures
- Quantify risk action

When assessing factors that contribute to fatigue the following should be considered:

- a) Time of day – incidents are more likely in circadian low points i.e. night shift
- b) Length of shift worked
- c) Lack of opportunity to recover from fatigue
- d) How often the situation occurs
- e) How many people are fatigued
- f) The skills and experience of people fatigued
- g) Any special characteristics of the people involved
- h) The duration of exposure to fatigue and
- i) The level of risk inherent in the work

5.3 Deciding on Control Measures

Control measures should be introduced according to the hierarchy of control. The ideal solution to managing fatigue is to eliminate factors that contribute to fatigue i.e. eliminating night shift and extended working hours. Since it is not possible, a number of or a combination of measures can be used to minimise the effects of fatigue such as:

- Limiting shift work to essential jobs and tasks that must be completed at night
- Redesigning work practises so that routine administrative tasks are minimised at night
- Scheduling later start times so that maximum night sleep can be obtained before starting work
- Scheduling low risk work during work periods of high fatigue such as night shift and / or in the latter half of the shifts.
- Scheduling complex tasks to be performed only during day shift.

Administrative controls are last on the hierarchy of control and should be only when there are no other primary means of control. They should only be used when there are no other practical control measures available as temporary measures until a permanent solution is found.

To supplement other controls Examples of administrative controls include:

- Sufficient supervision in periods of high fatigue and hazardous work
- Contingency plans if worker becomes fatigued
- Sufficient emergency responses
- Strict controls and procedures during periods of high fatigue and high hazardous work
- Job rotation for repetitive or monotonous works or work involving heavy physical demands.

5.4 Implement Control Measures

Undertake activities that allow measures to operate effectively. These activities include:

- a) Developing work procedures
- b) Control measures
- c) Providing training and instruction
- d) Supervision

Work procedures need to be developed to ensure that fatigue control measures are effective. Fatigue control measures should define and communicate responsibilities e.g. for ensuring a shift system that provide sufficient opportunity for rest and recovery.

Workers should be informed about control measures being implemented clearly and should be consulted whenever changes are to be introduced that would affect their workplace and safety. This consultation should be achieved through Safety Committees, including the workplace Safety Representative.

Training and instruction for workers on fatigue should be undertaken. This should include information about:

- Common causes of fatigue including shift work, extended working hours and roster patterns
- Potential health and safety impacts of fatigue
- How workers are responsible for making appropriate use of their rest days and how they should ensure they are fit for duty on rostered shifts.

Training should be arranged so that it is available to all workers on all shifts

Adequate supervision should be provided to ensure new control measures are implemented correctly.

5.5 Monitor and Review

The effectiveness of the control measures should be monitored and reviewed. The following should be taken into account:

- Have the chosen control measures been implemented as planned?
- Are the chosen control measures working?
- Are there any new problems?

In answering these questions consideration should be given to the following:

- Consultation with workers, supervisors and Safety representatives and officers and safety committees
- Measurement of exposure to fatigue – whether workers are still being fatigued
- Monitoring on incident reports

On-going monitoring and evaluation of workplace fatigue and regular review is paramount.

5.6 Factors to Consider when Managing Fatigue

5.6.1 Roster Design

Consider the following factors when designing the roster:

- Number of consecutive night shifts worked – few night shifts rostered in succession
- Starting and finishing time of shifts taking into consideration circadian rhythms
- Length of shift depending on physical and mental load of work
- Distribution of leisure time to allow for adequate rest and recovery
- Regularity of shift system to allow workers to prepare for work and minimize the potential of arriving to work fatigued.

Successful management of fatigue depends on workers having sufficient time for invigorating sleep between shifts i.e. 7 to 8 hours of daily sleep.

5.6.2 Commuting

Commuting also plays a role in managing fatigue. Excessive hours spent travelling to and from work can extend the length of a shift and reduce the time available for sleep and recovery between shifts. Driving can be a mental and physically fatiguing activity. When combined with work-related fatigue from, driving to and from work becomes a significant Hazard.

To minimize this bus transport is provided to enable workers get home safely after a long shift.

5.6.3 Shift Rotation

If the starting times of shifts vary throughout the cycle of shifts, the cycle should begin with an early start and move progressively later e.g. from day shift to night shift for two shift systems or day shift to afternoon and then night shift for three shift system.

5.6.4 Sleep Inertia

Sleep inertia can occur when a person is woken up from sleep for more than 40 minutes. The person may be slow to respond. Some people will feel drowsy and disoriented and it may take up to 30 minutes before complex tasks can be performed.

Sleep inertia has implications for safety when workers on call-out for emergencies. To control inertia the following measures can be used:

- Minimising naps taken at work that exceed 40 minutes
- Planning for recovery times up to 30 minutes, for workers who may be subject to sleep inertia, before they perform hazardous tasks.

5.6.5 Breaks

Breaks are an important fatigue control measure. Time spent away from the work environment has the potential to allow workers to recover from fatigue and improve work performance, vigilance, safety and efficiency. Breaks should be taken during work shifts and should not be traded for an early finish time for the shift.

The following should be taken into account when deciding on the length and frequency of breaks during a shift:

- Type of work being performed – the greater the physical and /or mental effort required to perform the work, the longer the total break time required per shift. Regular rest breaks are also needed
- Length of shift worked – the longer the shift, the longer the total break time. Regular rest breaks are also required.

5.6.6 Occupational Exposure Levels

Extended work hours may increase the risk of health effects that are generally associated with work. Exposure to hazards such as noise, heat, and chemicals may be increased and should be carefully monitored.

5.6.7 Manual Tasks

Manual tasks i.e. activities requiring the use of force or exerted by a person to grasp, manipulate, strike, throw, carry, move (lift, lower, push or pull) or hold or restrain an object, load or body part. The prolonged performance of repetitive tasks without adequate chance of rest and recovery may result in an injury. The risk of musculoskeletal injury increases with extended shifts due to cumulative effects of muscle fatigue, strains and sprains. Workers involved in manual tasks should have regular breaks.

5.7 Tips for Shift Workers

If one works shifts, it is possible to have trouble getting sufficient sleep and the quality of sleep will be poor. It is important to get as close as possible to the average amount of required daily sleep (or rest in bed).

Because day sleep is lighter than night sleep, it is important to ensure conditions during the day are as favourable as possible. The following can be considered to avoid unwanted disruptions during the day when trying to sleep:

- Reduce light in the room using curtains or blinds. Heavy curtains and sound proof on doors and windows can also reduce noise levels.
- Cool conditions in the room.
- Inform relatives and friends of your work schedule and sleep times to avoid unwanted disruptions.
- Turn the phone down or use an answering machine.
- Develop ways of “unwinding” after shift work e.g. take a walk or watch some television.
- Take a shower or a relaxing bath before going to bed.
- Go through all of the normal rituals of going to bed as you would before a normal sleeping night.
- Avoid having a television in the bedroom.
- Do not get upset if you cannot sleep straight away. Reading the paper or listening to music may help.
- Be cautious with the use of sleeping tablets, which may appear useful in short term but can actually be quite harmful to health in a long term.
- Avoid using phones or tablets while trying to sleep as the light in the screen confused the brain into thinking it is time to wake up.

5.8 Tips for Eating, Health and Physical Fitness

Tips are available in the SharePoint: **Fitness for Work Standard CPL_PRC_XXX**.