

# A.THE ASSOCIATED RISKS OF FATIGUE, UNDERSTANDING AND MANAGING FATIGUE:

## 1.1 What is fatigue?

Fatigue is more than feeling tired and drowsy. In a work context, fatigue is a state of mental and/or physical exhaustion which reduces a person's ability to perform work safely and effectively.

It can occur because of prolonged mental or physical activity, sleep loss and/or disruption of the internal body clock.

Fatigue can be caused by factors which may be work related, non-work related or a combination of both and can accumulate over time.

## 1.2 Why is fatigue a problem?

Fatigue can adversely affect safety at the workplace. **Fatigue reduces alertness which may lead to errors and an increase in incidents and injuries**, particularly when:

- operating fixed or mobile plant, including driving vehicles
- undertaking critical tasks that require a high level of concentration
- undertaking night or shift work when a person would ordinarily be sleeping.

The effects of fatigue can be short or long term. In the short term a person may show the signs or report the symptoms of fatigue.

The longer term health effects of fatigue can include:

- heart disease
- diabetes
- high blood pressure
- gastrointestinal disorders
- lower fertility
- anxiety
- depression.

## 1.3 How can you tell if someone is fatigued?

The following signs or symptoms may indicate a worker is fatigued:

- excessive yawning or falling asleep at work
- short term memory problems and an inability to concentrate
- noticeably reduced capacity to engage in effective interpersonal communication
- impaired decision-making and judgment
- reduced hand-eye coordination or slow reflexes

- other changes in behaviour, for example repeatedly arriving late for work
- increased rates of unplanned absence.

A fatigued worker may also experience symptoms not obvious to others including:

- feeling drowsy
- headaches
- dizziness
- difficulty concentrating
- blurred vision or impaired visual perception
- a need for extended sleep during days off work.

## **HOW TO MANAGE RISKS ASSOCIATED WITH FATIGUE**

### **1.4 Factors that may contribute to and increase the risk of fatigue**

The first step in the risk management process is to identify all reasonably foreseeable factors which could contribute to and increase the risk of fatigue. There may not be obvious signs of fatigue at the workplace but this does not mean it is not occurring or factors which may increase the risk of fatigue are not present.

Fatigue is often caused by a number of inter-related factors which can be cumulative. The major factors contributing to and increasing the risk of fatigue involve:

#### **1. Work schedules –shift work, night work, hours of work, breaks**

Work schedules which limit the time workers can physically and mentally recover from work may cause fatigue, for example early shift start times or late finishes, short breaks between shifts, shifts lengthened by overtime or double shifts and not enough non-sleep rest breaks during a shift. Working at night when the body is biologically programmed to sleep can interrupt a person's body clock. The body clock is the body's natural rhythm repeated every 24 hours. It regulates functions including sleeping patterns, body temperature, hormone levels and digestion. As it is programmed for different levels of wakefulness, people experience different levels of alertness depending on the time of the day. When a person's body clock is out of step alertness decreases making them feel fatigued. This increases the risk of making errors and causing incidents and injuries, either in the workplace or outside of work, including on the way to and from work.

#### **2. Job demands**

Some types of work, for example concentrating for extended periods of time, performing repetitious or monotonous work and performing work requiring continued physical effort can increase the risk of fatigue. Workers can be mentally and physically fatigued at the same time. Work which is reactive and performed under high pressure, for example emergency services, may also increase the risk of fatigue.

### 3. Sleep –length of sleep time, quality of sleep and time since sleep

While tired muscles can recover with rest, the brain can only recover with sleep. The most beneficial sleep is deep undisturbed sleep taken in a single continuous period. The optimum amount of sleep varies for each person, however, an adult generally requires seven to eight hours of sleep daily. When individuals get less sleep than they need in a day, they build up a sleep debt which accumulates until they can get enough sleep to overcome the sleep debt. Each extra day without enough sleep increases the debt, and when it becomes large enough fatigue can occur. It may take several days before a person recovers from a sleep debt. Sleep debt is common with night shift workers as they often experience difficulty getting enough undisturbed sleep during the day. **One sleepless night can have similar effects on someone as drinking too much alcohol.**

### 4. Environmental conditions

Working in harsh and uncomfortable conditions can contribute to fatigue, for example, exposure to heat, cold, vibration or noisy workplaces can make workers tire quicker and impair performance.

### 5. Non-work related factors

Factors occurring outside of work may also contribute to fatigue. A worker's lifestyle, family responsibilities, health (e.g. insomnia, sleep apnoea, some medication), other work commitments, and extended travel between work and home may all increase the risk of fatigue.

#### 1.5 How to identify factors that may contribute to or increase the risk of fatigue

Methods to identify factors which may contribute to or increase the risk of fatigue can include:

- *Consult with workers*, including managers, supervisors and health and safety representatives (if any) about the impact of workloads and work schedules, including work-related travel and work outside of normal hours (for example work a person has taken home to complete).
- *Examine work practices* and systems of work, for example:
  - the degree of choice and control workers have over work hours, the pace of work and rest breaks, and
  - the type of work culture, for example where there is an accepted practice of working long hours.
- *Examine worker records*, for example sign in-out sheets, billing sheets and shift changeovers, to determine working hours and in particular whether excessive hours have been worked or hours have been worked at times which may have led to body clock disruption.
- *Getting advice and information* on fatigue from relevant experts, research, guidance materials and data published by regulators, industry associations, unions or other sources.

- *Review workplace incident data*, including incidents travelling to and from the workplace, and ask the following questions:
  - What is the likelihood fatigue is contributing to the incidents?
  - What time of day do incidents occur?
  - When incidents have occurred, how long had the workers involved been working? For example time since start of shift, number of hours worked that week and in the preceding three months.
  - Do the incidents often happen when a worker's body clock is slowing the body down and concentration is poor?
- *Review human resource data*, for example rates of unplanned absenteeism, staff turnover and workers compensation claims. Those with an injury or illness may be at greater risk of becoming fatigued.

The checklist below can be used to assist in identifying factors in your workplace which increase the risk of fatigue.

### **Workers at high risk of fatigue**

Some workers are at a higher risk of fatigue because their work typically involves some or all of the factors which contribute to fatigue, for example:

- shift workers
- night workers
- fly-in, fly-out workers (FIFO)
- drive in, drive out (DIDO) and drivers.
- seasonal workers
- on-call and call-back workers
- emergency service workers
- medical professionals and other health workers.
- field and sales personal

### **Safety critical tasks**

It is particularly important to identify fatigue risks which might arise when safety critical tasks are being carried out. Safety critical tasks are those where the consequences of a mistake or error in judgment could cause serious injury, for example:

- driving a road vehicle, such as a taxi or courier van, or operating a crane or other high risk plant
- working at heights
- participating in medical or surgical procedures and settings
- working with flammable or explosive substances

- other types of work identified as hazardous, for example electrical work.

## 1.6 Assessing the risks

A risk assessment can assist in finding out:

- where, which and how many workers (including contractors and subcontractors) are likely to be at risk of becoming fatigued
- how often fatigue is likely to occur
- the degree of harm which may result from fatigue
- whether existing control measures are effective
- what action should be taken to control the risk of fatigue
- how urgently action to control the risk needs to be taken.

When assessing risks, contributors to fatigue should not be considered in isolation. For example, job demands, hours of work and environmental conditions may all increase the risk of fatigue in the workplace. The risks of injury from fatigue may increase if workers work long daily hours in a physically or mentally demanding job. This risk of fatigue may increase when new workers begin their job and are adjusting to work demands.

Risk assessment methods are similar to the methods used to identify factors contributing to fatigue in section 2.1 therefore these steps can be carried out at the same time.

It is not necessary to conduct a risk assessment in all circumstances.

## FATIGUE CHECKLIST

This checklist provides guidance to assist in identifying risks of fatigue but is not an exhaustive list of risk factors. If the answer is yes to any of the questions, fatigue risks may need to be further assessed and control measures implemented.

<b>Mental and physical work demands</b>	
Does anyone carry out work for long periods which is physically demanding? <small>(for example, tasks which are especially tiring and repetitive such as bricklaying, process work, moving bags of cement, felling trees)</small>	Yes/No
Does anyone carry out work for long periods which is mentally demanding? <small>(for example, work requiring vigilance, work requiring continuous concentration and minimal stimulation, work performed under pressure, work to tight deadlines, emergency call outs, interacting/dealing with the public)</small>	Yes/No
<b>Work scheduling and planning</b>	
Does anyone consistently work or travel between midnight and 6am?	Yes/No
Does the work schedule prevent workers having at least one full day off per week?	Yes/No
Does the roster make it difficult for workers to consistently have at least two	Yes/No

consecutive nights sleep per week?	
Do work practices include on-call work, call-backs or sleepovers?	Yes/No
Does the roster differ from the hours actually worked?	Yes/No
Does the work roster include rotating shifts?	Yes/No
Does anyone have to travel more than one hour to get to their job?	Yes/No
<b>Work Time</b>	
Does anyone work in excess of 12 hours regularly (including overtime)?	Yes/No
Does anyone have less than 10 hours break between each shift? (for example, split shifts, quick shift changeovers)	Yes/No
Is work performed at low body clock times (between 2 am and 6 am)?	Yes/No
<b>Environmental conditions</b>	
Is work carried out in harsh or uncomfortable conditions? (for example, hot, humid or cold temperatures)	Yes/No
Does anyone work with plant or machinery that vibrates?	Yes/No
Is anyone working with hazardous chemicals?	Yes/No
Is anyone consistently exposed to loud noise?	Yes/No
<b>Non-work factors</b>	
Are workers arriving at work fatigued?	Yes/No

## B. Motivations, Attitudes, Perceptions, and Skills: Pathways to Safe Work

The following have an impact securing workplace safety:

- (a) **Leadership** where managers value safety for its own sake;
- (b) **Responsive dialogue** where communication across levels of the organisation leads to identifying problems and fixing them;
- (c) **Participatory structures** where formal avenues are in place within an organisation to ensure that safety issues are not overlooked and workers' voices are heard;

(d) **Presence and fairness of work safety authorities** to ensure that government is seen to be doing its job and is respected and trusted; and finally

(e) **An Appreciation among individuals of safety issues and adoption of a personal priority for safety that is developed and nurtured within the work context.**

These factors are implicated both in the

(a) institutionalisation of safe work routines and in

(b) individuals developing the capacity to self-manage their safety and that of others.

They do so to different degrees, however. Having participatory structures is most important for Safe Work routines. Participatory structures regulate workplaces through saying *“these things must be done as a means to ensuring safety.”*

Having participatory structures and responsive dialogue makes safe practice happen in a consistent way.

Responsive dialogue, on the other hand, is the main driver of the capacity to self-manage safety issues. Talking over safety concerns, telling stories and joint problem solving help individuals internalise and understand safety issues, develop confidence in managing risks and ultimately embrace a safety consciousness.

Both routines and self-management are important to developing safe workplace culture. Institutionalised procedures allow workers to function safely under normal conditions when they can operate on automatic pilot. This does not help when routines change or disruption of unexpected kinds occurs, such as machinery breaking down. Capacity to self-manage is needed in such situations.

Yet capacity to self-manage safety is useful in an organisation only to the point where individual judgment is not swamped by habits and routines. In a workplace, habits and routines are at the heart of how work is done. For this reason, habits and routines will always tend to dominate the self-management capacities of individuals. It is therefore important to have habits and routines that progress safety. When such routines are in place and accepted as part of a safety program, individuals can reach their potential as ‘minders’ of their own well-being and that of their colleagues. Individuals who are able to self-manage on safety will not only be familiar with the logic behind the routines and practices, but also have knowledge and confidence to step in when habits and routines ‘go wrong.’

The findings point to the importance of safe work authorities, managers, industry bodies and unions cooperating to find ways of offering safe work options to working Australians, while at

the same time empowering workers to constructively engage with these options to make for a safer workplace and a healthier, more adaptive work culture.

*Specific steps like [institutionalising near-miss reporting and analysis](#), and nurturing a market in making work safer, easier and more efficient are examples of approaches that simultaneously are regulating and empowering, holding parties accountable, while trusting them to do better.*



The model guiding research is presented schematically above. The two behavioural outcomes

- (1) **Best Safety Practice standards** and
- (2) **Individual Capacity and Responsibility** for Safety, appear on the right hand side.

On the left are four sets of predictors:

- (a) **Leadership** by supervisors and managers that sets the standard of 'safety first';
- (b) **Opportunities to discuss** and learn through participatory structures that bring together a cross-section of interested actors and responsive dialogue that talks about real issues and safety solutions;
- (c) **Actions of Regulatory Authorities** (eg: WorkCover) who through their presence and integrity communicate whether individuals should trust and cooperate with them; and
- (d) **Priority of individual for Safety.**

## C. THE ASSOCIATED RISKS OF HANDLING DANGEROUS GOODS AND WHAT WE SHOULD BE PAYING ATTENTION TO:

### 1. Storage and Handling of Workplace Dangerous Goods - NATIONAL CODE OF PRACTICE (National Occupational Health and Safety Commission) NOHSC

In seeking to achieve Australian workplaces free from injury and disease, NOHSC works to lead and coordinate national efforts to prevent workplace death, injury and disease.

NOHSC has five strategic objectives:

- Improving information / data systems and analysis,
- Improving access to OHS information,
- Improving components of the OHS and related regulatory framework,
- Facilitating and coordinating OHS research efforts, and
- Monitoring progress against the National OHS Improvement /framework

### 2. Types of Goods Covered by the National Code of Practice (found in our inventory of stocks)

#### Class 2 Gases

- 2.1 Flammable gas
- 2.2 Non-flammable, non-toxic gas
- 2.3 Toxic gas Class

#### Class 3 Flammable liquid Class

#### Class 4 Flammable solids etc.

- 4.1 Flammable solids; self-reactive and related substances; and desensitized explosives
- 4.2 Substances liable to spontaneous combustion
- 4.3 Substances that in contact with water emit flammable gases Class

Class 5 Oxidizing substances, organic peroxides

5.1 Oxidizing substances

5.2 Organic peroxides

Class 6.1 Toxic substances

Class 8 Corrosive substances

Class 9 Miscellaneous dangerous goods and articles

COMBUSTIBLE LIQUID: “Any liquid other than a flammable liquid that has a flashpoint, and that has a fire point less than its boiling point”

## **Guidance on the Classification of Hazardous Chemicals under the WHS Regulations**

### **Implementation of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)**

#### **3. What is the GHS?**

The GHS is an internationally agreed system of classification and labelling of chemicals, which was developed under the auspices of the United Nations (UN). The GHS document, which is known as the “purple book”, describes the harmonised classification criteria and the hazard communication elements by the type of hazard. It provides decision logics for each hazard, examples of classification of chemicals and mixtures and illustrates how to apply the criteria. The GHS includes harmonised criteria for the classification of:

- physical hazards (e.g. flammable liquids);
- health hazards (e.g. carcinogens); and
- environmental hazards (e.g. aquatic toxicity).

The GHS is intended to cover all hazardous chemical substances, dilute solutions and mixtures, address how labels and SDS should be used to convey information about their hazards, and how to protect people from adverse effects.

The GHS document (3<sup>rd</sup> Revised Edition) can be accessed online at the following website:

[http://www.unece.org/trans/danger/publi/ghs/ghs\\_rev03/03files\\_e.html](http://www.unece.org/trans/danger/publi/ghs/ghs_rev03/03files_e.html)

**What are the duties in relation to classification?**

The WHS Regulations impose a duty upon manufacturers and importers of chemicals supplied to a workplace to determine if a chemical is hazardous, and to correctly classify the chemical. It is the classification of the chemical that determines what information is required on labels and safety data sheets under the WHS Regulations, for the safe handling of these substances.

Duty holder	Responsibilities
Manufacturer or importer	<ul style="list-style-type: none"> <li>determine whether a substance, mixture or article is a hazardous chemical</li> <li>ensure the hazardous chemical is correctly classified</li> <li>prepare and provide safety data sheets</li> <li>ensure the hazardous chemical is correctly labelled</li> <li>amend safety data sheets every 5 years and whenever necessary to ensure it contains correct, current information</li> </ul>
Supplier	<ul style="list-style-type: none"> <li>ensure the hazardous chemical is correctly labelled</li> </ul>
Person conducting a business or undertaking (eg: SIKA)	<ul style="list-style-type: none"> <li>ensure the hazardous chemical is correctly identified, labelled and understood.</li> </ul>

## 4. OUR DUTIES

### A. Hazard Identification

We must ensure that any hazard associated with the storage and handling of dangerous goods on the premises is identified, having regard to the state of knowledge of the hazard.

when identifying the hazards associated with those dangerous goods, we must ensure due consideration is given to:

- the chemical and physical **properties of the dangerous goods** including physical state, viscosity, vapour pressure, chemical energy, particle size, solubility, electrical conductivity, reactivity, combustion products and concentration; and
- the **chemical and physical reaction between dangerous goods** and other substances and **articles which could cause a hazard should they come into contact with one another**; and
- any manufacturing, transfer and transport processes involving the dangerous goods including the **temperatures and pressures to which the goods are subjected**, physical processes as separation, mixing, absorption and changes of state and processes involving chemical reaction; and
- the structures, plant (including the characteristics of the materials used in the plant), system of work and activities, used in the storage and handling of **dangerous goods which could cause a hazard**; and
- any activities, systems of work, structures, plant (including the characteristics of the materials used in the plant), substances or articles which are not used to store or handle the dangerous goods at the premises, but **could interact with the dangerous goods at the premises to cause a hazard** ;

(f) any information about the **inherent hazardous properties of the dangerous goods, including material safety data sheets for the dangerous goods, available to all;** and  
(g) the **type and characteristics of incidents known to be associated with the dangerous goods,** including incidents affecting the plant or structures used in the storage and handling of the dangerous goods at the premises.

## B. Risk Assessment

Where a hazard is identified, we must ensure that, an assessment is made of the risks associated with the hazard. In carrying out the risk assessment, we must have regard to:

- (a) the chemical and physical properties of the dangerous goods including physical state, viscosity, vapour pressure, chemical energy, particle size, solubility, electrical conductivity, reactivity, combustion products and concentration; and
- (b) the chemical and physical reaction between dangerous goods and other substances and articles which could cause a hazard should they come into contact with one another; and
- (c) any manufacturing, transfer and transport processes involving the dangerous goods including the temperatures and pressures to which the goods are subjected, physical processes as separation, mixing, absorption and changes of state and processes involving chemical reaction; and
- (d) the structures, plant (including the characteristics of the materials used in the plant), system of work and activities, used in the storage and handling of dangerous goods; and
- (e) any structures, plant (including the characteristics of the materials used in the plant), activities, systems of work, substances or articles which are not used to store or handle the dangerous goods at the premises, but could interact with the dangerous goods at the premises; and
- (f) the consequences, on and beyond the premises, of all reasonably foreseeable incidents that may occur as a result of the storage and handling of the dangerous goods.

## C. Record Keeping:

We must ensure that:

- (a) a record is made of:
  - (i) the assessment; and
  - (ii) each review of the assessment and sign off by all involved so that all know the associated risks and controls;
- (b) a copy of that record is kept while the assessment is current or being reviewed; and
- (c) that record is available, on request, to the relevant Authority.

## D. Review of Assessments:

We must ensure that the assessment is reviewed:

- (a) when there is a change in circumstances such that the previous assessment is no longer valid;
- (b) at intervals of **not more than five years** from the previous assessment or review of assessment.

## E. Control of Risk:

*We must ensure that any risk associated with the storage and handling of dangerous goods is controlled by eliminating the hazards associated with that risk or, where this is not practicable, by reducing that risk as far as practicable.*

We must ensure that as far as practicable the risks are controlled by progressive application of the following measures:

- (a) **elimination** of the use of dangerous goods;
- (b) **substitution** of the dangerous goods with other dangerous goods which are assessed to have a lower potential for adverse effects; and
- (c) the quantity of the dangerous goods stored and handled is **minimised**.
- (d) **control measures** and safe systems of work are implemented, supervised and maintained so as to ensure its continued control of all dangerous goods on the premises; and
- (e) where any **non-compliance** with this national standard is **identified or reported**, action is taken immediately to rectify the noncompliance. Where there are any risks arising from the noncompliance, the hazards associated with those risks are eliminated or, where this is not practicable, those risks are minimised. Design, Operation, Maintenance and Repair.
- (f) the plant and structures associated with the storage and handling of dangerous goods are **designed, manufactured, installed, commissioned, operated, tested, maintained, repaired and decommissioned so as to eliminate the hazards giving rise to a risk or, where this is not practicable, reduce the risk as far as practicable;**
- (g) any structures, plant (including the characteristics of the materials used in the plant), activities, systems of work, substances or articles which are not used to store or handle the dangerous goods at the premises, do not affect the dangerous goods or the manner in which the dangerous goods are stored and handled, which increases the risk.