

HAZARDOUS FATIGUE AND WORK-RELATED STRESS

1.0 Hazardous Fatigue

1.1 Causes of hazardous fatigue

Fatigue is caused by prolonged periods of physical and/or mental exertion without enough time to rest and recover. By the end of the day, some fatigue is normal. **Hazardous** levels of fatigue can be due to **one or more** of the following:

- Excessive workloads;
- Feeling stressed for extended periods
- Long shifts
- Working long hours in total over the week or longer periods
- Working nights
- Inadequate sleep, particularly over extended periods

Fatigue significantly affects a person's ability to function and the effects of fatigue include poor performance and productivity, and an increased risk of injuries and stress-related diseases.

1.2 Effects of fatigue and stress on work performance

High levels of fatigue and/or stress lead to reduced productivity, and increase the risk of accidents and injuries.

Research has shown that staying awake for 17 hours has the same effect on performance as having a blood alcohol content of 0.05%. Staying awake for 21 hours is equivalent to a blood alcohol content of 0.1%.

People working in a fatigued state present the greatest risk:

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

1.3 Effects of shift work and extended hours

Both shift work and extended working hours increase the risk impact on fatigue. Long hours and shift work patterns that disrupt the body's circadian rhythms often result in workers becoming fatigued.

1.4. Extended working hours

Extended working hours, particularly for shift workers, adversely affect the amount of time available for sleep and social activities. As work hours increase, the individual compensates by reducing the amount of time available for sleep and other activities. When a person works more than 48 hours within a week, the increased competition between sleep and other activities results in sleep of a limited quality and length. The individual begins to accumulate a sleep debt, which causes fatigue levels to rise, and affects health and safety.

1.5 Factors to consider when managing fatigue

The following factors should be considered when managing fatigue:

- Commuting;
- Roster design;
- Shift rotation;
- Sleep inertia;
- Breaks;
- Occupational exposure levels; and
- Manual tasks.

1.6 Roster design

When determining if roster design is contributing to fatigue, consider the following:

- Length of shifts – depends on physical and mental load of the work;
- Distribution of leisure time – allow for adequate rest and recovery;
- Regularity of shift system –allows workers to prepare for work;
- Length of shifts worked – this can contribute to fatigue;
- Previous hours and days worked – the effects of fatigue are cumulative, workers may have sleep debt due to the length of previous shifts;
- Type of work being performed – pay particular attention to the level of physical and/or mental effort required; and
- Time of the day when the work is being performed – remember that disrupting the body's circadian rhythms can cause fatigue and affect performance.

The key to managing fatigue successfully is ensuring that workers are given sufficient time between shifts. Adults require approximately seven to eight continuous hours of daily sleep. One way of doing this would be giving workers two successive full days off within a seven day period, so workers can catch up on their night sleep.

1.7 Shift rotation

If the starting times of shifts vary, the cycle should begin with an early start and move progressively later. Where a rotating three shift system is in operation the preferred rotation is day, afternoon, and night. This will allow workers the maximum opportunity for rest between shifts.

1.8 Sleep inertia

Sleep inertia can occur if a person is woken after sleeping for more than 40 minutes. They may be slow to respond, may feel drowsy and disoriented. It may take up to 30 minutes before complex tasks can be performed efficiently.

Sleep inertia has implications for safety when workers are on-call for emergencies. Suggested measures to control sleep inertia and the subsequent impairment in work performance include:

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

1.9 Breaks

Time spent away from the work environment allows workers to partially recover from fatigue, improving their subsequent performance and reducing their risk. For this reason breaks should be taken during work shifts, and should not be traded for an early finish time.

Consider the following when deciding on the length and frequency of breaks within a shift:

- Type of work being performed – the greater the physical and/or mental effort required, the longer the total break time required per shift; and
- Length of shifts worked– the longer the shift the longer the total break time required per shift.

1.10 Occupational exposure levels

Extended working hours increase the risk of exposure to hazards such as noise, heat and chemicals and should be carefully monitored. National and international exposure standards are usually based on five 8 hour days per week. Workplaces where extended hours are worked will need to monitor exposure levels.

It is recommended that expert advice is sought in adjusting exposure levels, because the increased exposure of workers over a 10 hour shift may not be simply 1.25 times the exposure for eight hours. Models need to be used, to take into account the reduced recovery time after exposure to hazards when extended shifts are worked. Workplaces should always aim for best practice, to keep all exposures significantly below the specified standards which will ensure workers are not over-exposed to a hazard.

1.11 Manual tasks

The prolonged performance of repetitive tasks without the adequate chance of rest and recovery may result in an **occupational overuse injury**. The risk of a musculoskeletal injury occurring may also be increased within extended shifts due to the cumulative effects of muscle fatigue, strains and sprains. Workers involved in repetitive manual tasks should have regular breaks.

2.0 Work - Related Stress

2.1 Definition of work-related stress

Work-related stress is a pattern of reactions that occurs when workers are presented with work or job demands and situations of various kinds, which threaten their ability to cope. When there is a perceived imbalance between demands and the resources (personal and environmental) available to cope with them, the worker's reactions may include:

- Physiological responses (for example increased heart rate, blood pressure, hyperventilation, as well as secretion of 'stress' hormones such as adrenaline and cortisol);
- Emotional responses (for example feeling nervous or irritated);
- Cognitive responses (for example, reduction or narrowing of attention and perception, forgetfulness); and
- Behavioural reactions (for example aggressive, impulsive behaviour, making mistakes).

When in a state of stress, people are often tense, concerned, less vigilant and less efficient in performing their work.

2.2 Persistent stressful working conditions

Persistent stressful working conditions are associated with:

- Increasing absenteeism
- Increasing tardiness
- Increasing personnel turnover
- Decreasing performance and productivity
- Decreasing growth rates and profit
- Decreasing quality of work and products
- Increasing unsafe working practices and accident rates
- Increasing complaints from clients/customers
- Increasing violent events
- Increasing occupational diseases
- Increasing costs through all of the above

2.3 Common causes of work-related stress

2.3.1 Work

- High work pace (time pressure)
- Lack of control (over work pace, but also over the management of physical risks)
- Low participation
- Little support from colleagues and supervisor
- Poor prospects for future career development
- Job insecurity
- Long working hours
- Shift work
- Low income
- Sexual and/or psychological harassment

2.3.2 Work-home interface

- Conflict of responsibilities and roles, particularly for women
- Home is the workplace
- Family exposed to work-related hazards
- Domestic violence, physical assault
- Difficulties in organising daily life activities to fit with work activities

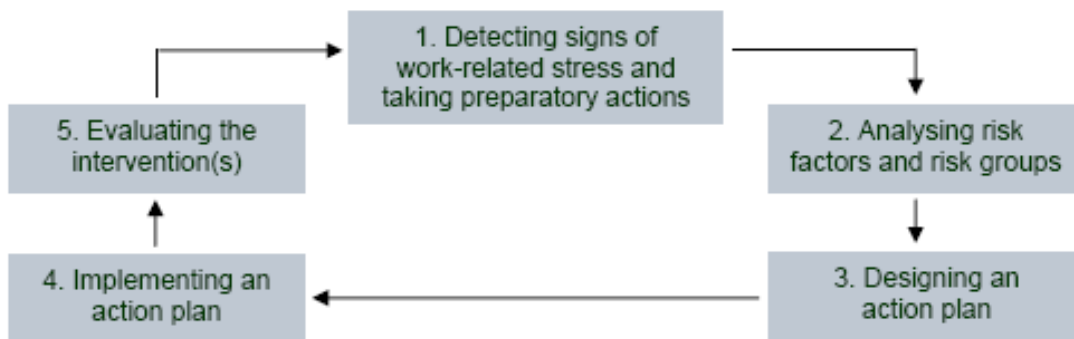
2.3.3 Personal characteristics

- Commuting;
- Competitive, hostile in attitudes towards other people
- Overcommitted – invest more effort in work than is healthy or safe
- Lack of self confidence

2.4 Managing work related stress: A step-wise approach

Although it is not possible to give one specific prescription for preventing work-related stress, it is possible to offer guidelines for the prevention of stress in organizations.

As the basic foundation of a healthily challenged workforce, workers have to be motivated, feel safe in their job, be satisfied, and perceive to have control over their work. Prevention of work-related stress is, therefore, an important undertaking and we propose that it involves a stepwise process.



Step 1: Preparatory Actions and Detecting Signs of Work-Related Stress

The first stage in the stress management process includes the following actions:

- Make sure that everyone is 'on board' and supportive of the aim – starting with the owner or senior manager and downwards from there. This is essential for success.
- Raise awareness of the causes, consequences, costs, solutions of work-related stress. This could be done by providing information in group meetings, supported by written information.

- Routinely check causes of work-related stress among workers. This can easily be done by getting people to complete the questionnaire below (anonymously). This will identify psychosocial hazards that should be eliminated or reduced.
- Worker input and involvement is essential in all phases of the stress management process. The worker knows his/her job best, including its problems. Make sure that people have a say in things affecting them – and listen to them seriously. Give them feedback about what is done as a result.
- Set goals with time limits in terms of one or more items listed at the beginning of this document.

Step 2: Identify Hazards, and Groups of People at Risk

In this phase a more detailed analysis of the situation takes place. New information enables insight into working conditions and individual characteristics of workers, thus sources of work-related stress and workers at risk can be identified. There are several methods that can be used to collect this information (for example using questionnaires, checklists, interviews, analysis of absence figures). A questionnaire such as the example in the box below can be used to gain insight into working conditions that may cause work-related stress. It may be completed with additional questions that are specific to the work, the workplace or the surrounding conditions.

Questionnaire to Identify Psychosocial Hazards

Job demands and working conditions:		
Do you have enough time to get your job done properly?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Are you exposed to unfavourable physical conditions in your work (for example unfavourable climate, noise, radiation, chemicals, sharp or moving objects, slippery surfaces, constant repetitive work, heavy lifting or strenuous work)?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Participation and control:		
Can you choose your own work methods, pace, and/or order?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Can you decide yourself when to take a break?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Are you involved in decision making?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Are there regular meetings to discuss work?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Can you improve any unfavourable physical loads in your work?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Interpersonal relationships:		
Do you receive support from your supervisor and/or colleagues?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Are you isolated from others during work?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Are you treated differently, for example, because of your race, gender, ethnic origin or disability?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Do you experience violence from customers, clients, patients or members of the public?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Career development and job security:		
Do you have good career prospects?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Are you able to develop your skills and intellect in your job?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Is your job security good?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Is it likely that during the next couple of years you will be in the present job with your current employer?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Working hours:		
Do you work long hours?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Do you work evenings, nights, and/or weekends (shift work)?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Do you have irregular working hours?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Role in the company and information:		
In general, are your work tasks clear to you?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Do you have conflicting tasks/roles?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Do you receive enough information to do your work properly?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Do you receive feedback on your performance?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Income:		
Is your income sufficient to support yourself and your family?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Work-home interface:		
Does your work interfere with your family responsibilities or leisure time activities?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Is your home also your workplace?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
If yes:		
Are your family members protected against unfavourable physical working conditions (see question 2)?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes
Do you consider your home as a proper place for you to work?	<input type="checkbox"/> Yes, regularly	<input type="checkbox"/> No or sometimes

Step 3: Designing an Action Plan

(1) For each of the psychosocial hazards identified during Step 2, review possible solutions. In doing this, look for ideas at the table below. Make a list of possible actions that it would be practicable to implement – either immediately or in future.

(2) Make a plan that prioritises the various actions agreed on in (1) above; identify who will be responsible for which action and decide on time limits (for example 3-6 months). Where necessary, update your goals as identified in Step 1.

Box 7: Examples of actions to prevent work-related stress	
Problems:	Possible actions:
High workload	<ul style="list-style-type: none"> • Redistribution of work among colleagues • Prioritize work/tasks • Offer a training course (e.g. on stress or time management)
Monotonous and routine work	<ul style="list-style-type: none"> • Make sure that where possible workers have some control over work pace • Make sure there are enough breaks • Job rotation (moving to a number of different tasks usually according to a rotation plan) • Job enlargement (add more tasks of same difficulty) • Job enrichment (add more difficult tasks) • Where necessary, offer additional training or education
Physical risks at the work place	<ul style="list-style-type: none"> • Replace the risk producing machines or devices by others that produce less risk • Shield the source of risk (noise or other) • Inform workers about the negative effects of exposure to these risks • Offer workers personal protection devices (ear plugs, hand cuffs to protect them from hot surfaces etc.)
Conflicting or unclear tasks or roles	<ul style="list-style-type: none"> • Make a clear job description with clear and appropriate demands
Insufficient work experience for the job	<ul style="list-style-type: none"> • Provide suitable training where necessary • Appoint a personal mentor at work • Offer help and encourage help from colleagues • Leave more difficult tasks to other more experienced colleagues
Lack of social support from manager and/or colleagues	<ul style="list-style-type: none"> • Offer managers training to learn how to treat their workers • Arrange regular team building activities (dinner after work, team excursions, or other social activities) • Have lunch and coffee breaks together • Stimulate and reward team work • Arrange regular meetings in which work problems can be discussed and solved (together)
Work-home interface	<ul style="list-style-type: none"> • Support or provide child care facilities • Flexible working times, such as temporary and/or part-time work • Teleworking/working from home • Address the needs of the family, children in addition to care for the worker • Provide worker transportation when needed

Consistent with good risk management principles, the normal 'hierarchy of control' should be applied. This means that actions and solutions should primarily focus on changes in the organizational culture and the organisation of work, rather than on individual behaviour.

Examples of the kind of solutions that are likely to work best include:

- Commuting;
- Redistributing work among colleagues,
- Introducing job rotation (moving to a number of different tasks usually according to a rotation plan),
- Introducing job enlargement (adding more tasks of the same difficulty),
- Introducing job enrichment (adding more difficult tasks),
- Improving managerial ability (for example by management skills training)
- Ergonomic improvements in the work place³
- Improving working schedules and working and resting times (for example, forward rotation of shifts in time is preferred from a health perspective as compared to backwards rotation of shifts),
- Implementing direct worker consultation at work,
- Improving communication between groups of workers, or between the client and the worker(s), and between workers and supervisors,
- Providing clear job descriptions or tasks, and
- Providing clear job promotion rules and paths.

Other solutions may include improving workers' individual abilities, skills and coping capacity through training and education, such as courses in:

- Time management,
- Dealing with aggressive customers,
- Lifting heavy goods,
- Using appropriate machines or equipment,
- Stress management and assertiveness training,
- Seeking support from family, community, and religion and spirituality.

Note: A focus on changing individual behaviour as a possible solution has two disadvantages when there are major problems in the workplace:

1. The beneficial effects on stress symptoms are often short lived;
2. Important causes of stress in the work environment are ignored and will continue to cause work stress.

As a general rule, organizational strategies to prevent work-related stress should be given top priority. However, even the most conscientious efforts to improve working conditions are unlikely to eliminate stress completely for all workers. For this reason, a combination of the organizational and individual approach is often the most useful way to prevent work-related stress while staying focused on organizational and work-organizational measures.

Step 4: Implementing a Plan for Action

Before starting the implementation phase, it is important to discuss how the action plan might be implemented and how different people, perhaps including some outside the organization, will be involved.

Participation of workers is crucial as they best understand their work and often have ideas on how to improve it. Only through participation will any existing resistance to change in organizations be reduced. Sometimes others outside of the organization can facilitate the change process.