

HSE Human Factors Briefing Note No. 10

Fatigue

Briefing Note 1 – ‘Introducing Human Factors’ explains the background to these Briefing Notes.

Fatigue does not have a clear scientific definition but is generally a feeling of tiredness and being unable to perform work effectively. Specifically, a fatigued person will be less alert, less able to process information, will have slower reaction times and less interest in working compared to a person who is not fatigued.

Case studies

Research into accidents on day, afternoon and night shifts at two paint plants showed that there was a significant increase in accidents, particularly in the last 3 hours of the shift.

The frequency of injuries in an engineering company increased from the morning to the afternoon shift and again from the afternoon to the night shift. Also, there were more accidents during the last two compared to the first two shifts of a weekly rotating shift system. This suggests that operators do not adjust to shifts over successive nights and that more rapidly rotating shifts would be better.

Frequent overtime can increase accident risks and so can long hours at work. For the first 8 or 9 hours in a shift, the accident risk is constant, but after 12 hours, the risk approximately doubles and after 16 hours, it trebles.

Source: Ref. 1

Shift-workers, particularly those on rotating shifts, have a higher incidence of sick leave, a higher rate of visits to clinics at the work site, and poorer scores on a variety of measures of health. In one study, 62% of shift-workers complained of sleep problems, compared with 20% of day-workers. Shift-workers, and particularly night-workers, have a higher incidence of digestive disorders than day-workers, and a number of studies have indicated that they also have a slightly higher incidence of cardiovascular disease. Shift-work may also be a risk factor in such pregnancy outcomes as low birth weight and pre-term births.

Source: Occupational Safety and Health Service New Zealand (1998). ISBN 0-477-03604-X

HSE Concerns



- Fatigue can ultimately lead to operator errors or violations at work. It is often a root cause of major accidents.
- Sites should focus on the system for controlling excessive working hours, especially for staff involved in major hazard work. Fatigue should be managed like any other hazard.
- The legal duty is on employers to manage risks from fatigue, irrespective of any individual's willingness to work extra hours or preference for certain shift patterns for social reasons.
- Changes to working hours need to be risk assessed.

Our company manages fatigue as much as possible by making sure that:

- Working hours are not too long
- Employees get enough rest between shifts
- Employees don't work too many night shifts in a row
- Managers negotiate with staff about overtime or double shift working
- Managers fit in with individuals' preferences – some people prefer nights
- Employees avoid critical jobs at the ends of shifts or at 'low points' in the day or night e.g. 3a.m.
- Shifts rotate 'forwards' that is, mornings, then afternoons, then nights
- Employees take quality rest breaks in their work
- Anyone can report fatigue problems to management and the company will make improvements
- The environment doesn't cause drowsiness (it's light with visual interest, not too hot and there is always variation in the level of sound)
- There are contingency plans to avoid overloading one person with overtime or double shifts
- Incidents or accidents where fatigue may be responsible are thoroughly investigated

Learning more about fatigue

A great deal of research has been done into the causes and management of fatigue and yet it is still poorly understood. For this reason, the suggestions below should be considered as guidelines based on the most useful material available. If fatigue is a problem in your workplace, considering the information below should help you identify this and suggest some possible solutions.

What can cause fatigue?

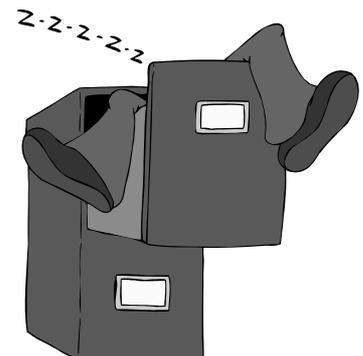
The main factors are:

- Loss of sleep – 'acute', for example, having 5 hours sleep instead of the usual 8; or 'cumulative' having 7 hours sleep instead of the usual 8 over each of several days
- Poor quality sleep – lots of interruptions
- Having to work at a 'low point' in the day e.g. early hours of the morning; mid to late afternoon and after a meal
- Long working hours, particularly if these are as long as 14 to 16 hours
- Poorly-designed shift work
- Inadequate breaks during the working day

What are the main effects of fatigue?

Compared with their normal state, a fatigued person will:

- Find it hard to: concentrate, make clear decisions or take in and act on information
- Have more frequent lapses of attention or memory
- React more slowly (for example, to hazards arising in the workplace)
- Make more errors
- Occasionally fall asleep at work – momentarily or for several minutes



- Have little motivation or interest in their work
- Be irritable

How can we avoid or reduce fatigue?

- Make sure employees have the opportunity to sleep for at least 8 hours between shifts
- Encourage employees to develop good sleeping habits
- Restrict night shifts to 4 in a row or to 2 in a row if they are 12 hour shifts
- Allow at least 2 days off after nights
- Make sure shifts 'rotate forwards' - mornings, followed by afternoons followed by nights
- Avoid long shifts and too much overtime: aim for less than 50 hours work per week (i.e. comply with the EU Working Hours Directive)
- Arrange for quality breaks during the working day
- Consider personal preferences – some people are 'morning people' some are 'night people' (larks/owls)
- Consider allowing some 'napping' at work to restore performance but beware of a person working immediately after a nap – they will be less effective for between 30 minutes and an hour
- Arrange for more interesting and varied work to be done at night and at other low points but make sure these are not too demanding or too monotonous/repetitive

Additional points to note

- Individuals are not good at assessing how fatigued they are
- They can be skilled at coping with fatigue, but this can increase stress or the risk of gastric disorders or other health problems
- Shorter and more shifts may not solve the problem – errors rise early on, diminish, then peak later

References

1. HSE (1999). 'Validation and Development of a Method for Assessing the Risks Arising from Mental Fatigue'. Contract Research Report 254/1999. ISBN 0 7176 1728 9
2. HSE (2004 pending) 'Managing Shiftwork: Health and Safety Guidance for Employers'