Fatigue and shift work

Many individuals work shift systems, work at night, or work very extended hours. Such working patterns can lead to adverse effects upon health, particularly for night workers. Reduced levels of performance have been associated with night working which can also increase the likelihood of accidents and ill health.

Some people experience severe fatigue at work. This can lead to poorer performance on tasks which require attention, decision-making or high levels of skill. For safety-critical work the effects of fatigue can give rise to increased risks. However, all too often, fatigue is seen as a familiar and acceptable part of everyday life. Working long hours may even be accepted in the culture of a workplace as ‘the thing to do’.

Some organisations are starting to look carefully at three aspects of shift work:

- risks to health;
- possible impact on safety; and
- effects on shift workers’ social and family lives.

Health effects

Shift work, especially night work, can lead to the following health problems:

- Difficulty in falling asleep and staying asleep, difficulty in staying alert and awake at work, reduced quality and quantity of sleep, increased use of sleeping pills. There may be a gradual build-up of sleep loss into a ‘sleep debt’.
- Gastrointestinal disorders. These may be linked to an increased tendency to eat snack meals at work.
- Respiratory problems. Asthma attacks may be worse at night. Allergic reactions may become worse. Lung function declines at night especially for those with chronic respiratory conditions.
- Individuals taking regular medication may have problems with shift work. Dosages may need to be altered to take account of variations of drug effectiveness due to the time of day.
- A proportion of people find that they cannot cope with working shifts. They may experience health problems which become acute only weeks after starting shift work and they may need to move to other duties.

Possible effects on safety

Job performance may be poorer on shift work especially when working night shifts. Tasks tend to be completed more slowly at night, although this can be balanced by altering the workload. In general the early hours of the morning, eg between 02.00 and 05.00 present the highest risk for fatigue-related accidents.

Sleep loss can lead to lowered levels of alertness. Cumulative sleep loss over a number of days can result in a ‘sleep debt’ with much reduced levels of productivity and attention. Such sleep loss results not only from working night shifts but also on
morning shifts with very early start times and from 'on call' situations where it may be difficult to plan when to sleep.

**Social and family life**
Shift work, especially working rotating shifts, may have an impact on the social life of shift workers. However, this depends on the shift schedule as well as the age, sex, number of children and perhaps the personality of the shift worker. The quality of family life for the worker and the ability to take part in leisure activities may be affected by shift work.

**What causes these negative effects?**
There are a number of important influences including:

**Biological rhythms.** We have built-in body clocks to regulate all important body functions. These clocks tell us when to be active and when to rest. They also govern other physiological functions such as body temperature, hormones, digestion and blood pressure. The 24-hour biological rhythms from these clocks do not disappear even if there are changes to the environment (lighting, noise, temperature) and your routine (no sleep, changes of meal routine). Even if you are working nights your body clock will still reduce your body temperature in the early hours of the morning, reduce your blood pressure and stop digestion. This will make you more sleepy and less alert. A night worker trying to sleep during the daytime will find it harder to get to sleep because their body clock is telling them they should be awake. The reduced quality and quantity of sleep will lead to more fatigue as a 'sleep debt' builds up.

**Time at work.** Human performance tends to deteriorate significantly when people have been at work for more than 12 hours. Below 12 hours the evidence is less clear, and the extent to which fatigue occurs may depend on aspects such as the adequacy of rest breaks, the nature of the work, and the working environment. The effects of fatigue tend to be more marked if the task is monotonous or very repetitive.

**Amount of sleep.** The daily rest between shifts needs to be adequate to enable shift workers to return to work fully rested. An adult typically needs about seven to eight hours of sleep each night. Rest days are valuable in allowing people to 'recharge their batteries' and to maintain their work performance. The planning of rest days needs to take account of their frequency and the length of 'recovery' time available after blocks of shifts. Shift workers, especially night workers, benefit from regular recovery periods of at least 48 hours. This is because shortened or interrupted sleep over a period of time can result in their spending part of their rest days sleeping.

**Shift rotation.** A shift pattern which changes about once a week is likely to be more difficult to adjust to than either a more rapidly or a more slowly changing pattern. Current thinking suggests that starting a shift later than the previous one (forward rotation) may create less of a problem than starting a shift earlier than the last one (backward rotation). A typical forward rotation roster would be mornings, afternoons then night shifts. Some shift patterns can result in a short daily rest interval of perhaps only eight hours. This is particularly likely to lead to fatigue through reduced sleep.
Managing the impact of shift work
There is no one solution to the potential health and safety impact of fatigue and shift work. The ‘best practice’ management approach, which will go beyond what is required by health and safety legislation, is through a multi-component approach which includes:

- careful planning of shift rostering taking into account knowledge of the effects of biological rhythms;
- reviewing maximum hours of duty and time for recovery;
- education of shift workers on sleep routines, nutrition, effects on family and social life, exercise;
- environmental design changes, especially those aspects which can improve alertness such as temperature, lighting, and comfort levels;
- reducing the number of safety-critical tasks planned for the night shift;
- rotating jobs to reduce levels of boredom; and
- providing medical advice for shift workers, especially for those with existing medical conditions.


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