

- Forward shift rotation, that is, mornings, then afternoons, then nights;
- Restricting the number of night shifts that VTSOs may work in a row;
- Contingency plans to avoid work overload;
- Ensuring that VTS personnel are medically and optically fit;
- Treating the lack of alertness as a hazard and encourage personnel to speak up and get assistance or rest when they judge their performance to be falling to unacceptable levels;
- Evaluating lighting, temperature, sound and other environmental modifications;
- Investigating incidents and/or accidents, where fatigue may be responsible;
- Managing potential disruption such as from maintenance or visitors, which may cause unnecessary stress.

## SUMMARY

A VTS Centre should have a sufficient number of VTS personnel to ensure that the VTS operations can be carried out efficiently and safely under all conditions, with due regard to the safety of navigation within the VTS area.

Every VTS Centre should be staffed by personnel appropriately qualified for the tasks required, and with a number corresponding to the size of the VTS Centre and VTS area to be managed.

When determining, approving or revising staffing levels, the VTS Authority should take into account applicable international and national regulations on staffing levels, as well as the need to avoid or minimize excessive hours of work to ensure sufficient rest and to limit fatigue.

Further details concerning labour regulations may be found in national/regional or international legislation.



**Even if you manage to stay awake, it does not mean the problem of fatigue and human reliability is solved!**

### Further Information

#### **"GUIDELINES ON FATIGUE"**

by the **International Maritime Organization**

The IMO guidelines on fatigue mitigation and management are comprehensive and provide practical advice to all the various stakeholders on how to combat it.

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#### **"GUIDELINE ON STAFFING LEVELS**

#### **AT VTS CENTRES"**

by **I A L A**

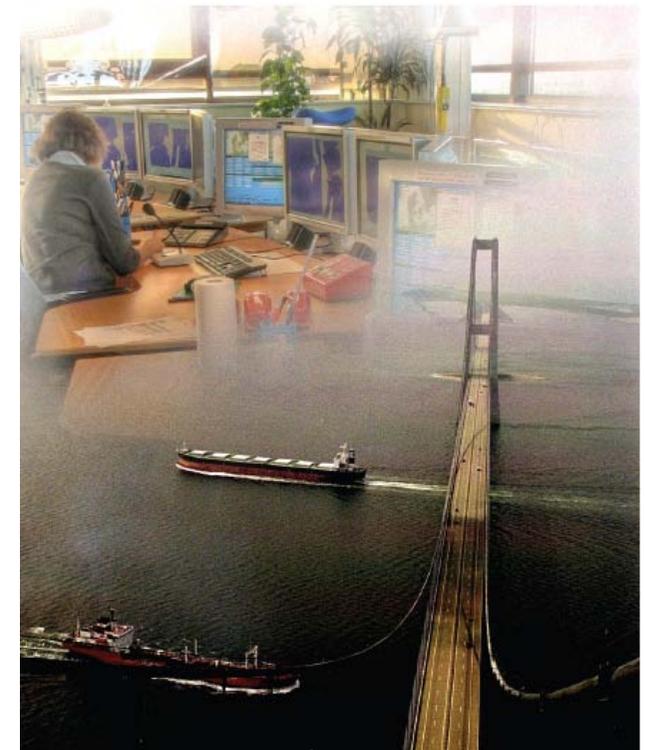
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VTS30/output/3

# Guide for VTS Authorities

*on Fatigue Awareness  
and Human Reliability*



## Overview

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Fatigue is one of the most significant causes of accidents both at sea and ashore and can have a serious impact on the safety of navigation.

The work of VTS personnel involves unsociable duty hours, shift work, intensive concentration, time spent travelling to and from work as well as handling critical and/or emergency situations.

The objective of this Guide is to promote a safety culture by assisting VTS Authorities in recognizing and mitigating the effects of fatigue in VTS Centres. It provides an overview of the factors affecting alertness and outlines some of the strategies that can be used to counter fatigue.

## What is Fatigue

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There is no universally accepted technical definition for fatigue. However, common to all the definitions is degradation of human performance and diminished alertness or human reliability.

Alertness is the optimum state of the brain that enables us to make conscious decisions. Fatigue has a proven detrimental effect on alertness – this can be readily seen when a person is required to maintain a period of concentrated and sustained attention, such as looking out for the unexpected.

IMO defines fatigue as a reduction in physical and/or mental capability as the result of physical, mental or emotional exertion which may impair nearly all physical abilities including: strength, speed, reaction time, coordination, decision making or balance and to which all individuals are susceptible, regardless of skill, knowledge or training.

Fatigue on the part of VTS personnel can present a disastrous risk to the safety of human life or damage to the environment and property. Because the role of

VTS is technical and highly specialised, these negative effects could be exponentially increased where VTS personnel must be constantly alert and able to concentrate fully on the job at hand. Fatigue can result in a loss of situational awareness.

## Biological Clock and Circadian Rhythm

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Each individual has a biological clock, and this clock regulates the body's circadian rhythm.

The biological clock can make a person sleepy or alert on a regular schedule. In normal conditions, the sleep/wake cycle follows a 24-hour rhythm. However, the cycle isn't the same for everyone. Although individual rhythms vary, each person's cycle has two distinctive peaks and dips.

Independent of factors that cause sleepiness, there are two times of low alertness (low-points or dips) in each 24-hour period. These commonly occur between 3–5am and 3–5pm.

Our bodies move through various physical processes and states within a 24-hour period, such as sleeping, waking, and cyclical changes in body temperature. This cycle represents the circadian rhythm. The biological clock, which regulates the circadian rhythm, is normally synchronised to the traditional pattern of daytime wakefulness and night-time sleep.

All sleep does not have the same quality and does not provide the same recuperative benefits. In order to satisfy the needs of the human body, sleep must have the following three characteristics to be most effective: duration, continuity and quality.

Sleepiness is also affected by working environment, personal health and how the body reacts to being active at night and sleeping during the day.

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## Stress

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One of the most common causes of fatigue is stress. Stress occurs when a person is confronted with a situation that poses a threat or demand, and the individual becomes aware of his/her inability or difficulty to cope. This can result in reduced job performance and even health problems.

Stress can also be caused by a number of other things, including the internal and external (to operational centre) environment, personal problems, broken rest, nutrition, long working hours and interpersonal relationships.

## Fatigue Management

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A major difficulty with fatigue management is that people who are experiencing fatigue have a difficult time recognizing the signs of fatigue themselves. Managing sleep and alertness effectively can help to reduce fatigue and lead to improved well-being.

To avoid and reduce fatigue VTS Authorities should consider;

- Introducing a fatigue management programme;
- Offering fatigue information for VTS personnel;
- Re-evaluating policies, practices and procedures that may no longer be valid;
- Being proactive in identifying hazards and reducing exposure;
- Optimization of staffing levels
- Keeping the schedule of duties under review to ensure that the hours of work continue to be realistic and workable;
- Sufficient rest between shifts;
- Ensuring that overtime worked and/or substitution do not cause excessive fatigue;
- Personal preferences;
- Allowing sufficient time off after night shifts;