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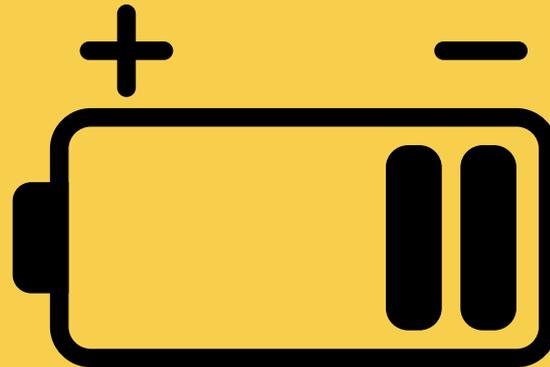
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## Fighting fatigue



### Dear Seafarer,

The UK government ran a road safety campaign under the banner "Think! Don't drive tired." Research has shown that drivers don't fall asleep without warning. Drivers who fall asleep at the wheel have often tried to fight off drowsiness by opening a window or by turning up the radio. This doesn't work for long. Does this sound familiar? Being aware of fatigue, recognising the symptoms and overcoming the effects, will prevent accidents on board ship. The road safety campaign research revealed that 20% of road accidents on major roads in the UK were sleep-related and sleep-related accidents are more likely than others to result in a fatality or serious injury.

Chronic fatigue among seafarers has been the cause of a number of accidents over the years. High profile accidents involving fatigue include EXXON VALDEZ, CITTA and PASHA BULKER and the issue of fatigue is also of critical importance given the shortage of experienced seafarers in the industry.

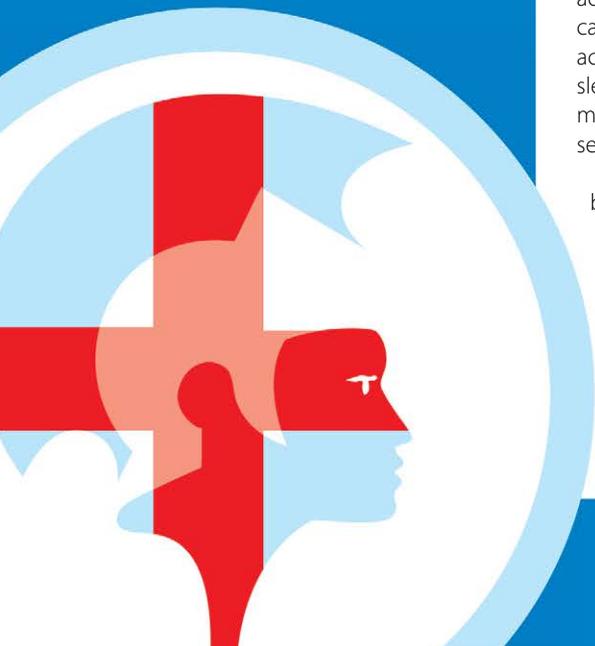
As shipping has become increasingly intensive, with smaller

crews and shorter time in port, seafarers can be working long and irregular hours. There are many reasons why they can be short of sleep, which could include the noise and vibration on the ship and the number of port calls and cargo handling operations. All of these can reduce the ability of the seafarer to gain quality sleep during rest periods.

P&I incident reports frequently make a causal connection between fatigue in the individual involved in the accident and the events leading up to the accident. Fatigue management needs to be high on the agenda of everyone involved in the adventure. For the seafarer, it means being able to identify the causes of fatigue and to work towards taking appropriate and early measures to prevent it.

We hope that this edition of Health Watch will raise awareness of the risks associated with fatigue and help all of us to reduce the number of accidents caused by fatigue.

If you have any questions or comments about any of the articles in this issue, please do not hesitate to contact us at the email address on the back cover.





## What is fatigue?

There is no comprehensive technical definition of fatigue, although it is generally understood to be a state of acute mental and/or physical tiredness in which there is a progressive decline in performance and alertness. The term is often used

interchangeably with 'sleepiness', 'tiredness' and 'drowsiness'.

The Director of the Ministry of Health in Pakistan, writing in the Nautical Institute's Seaways magazine has said: "Fatigue is counted as a contributor to many accidents

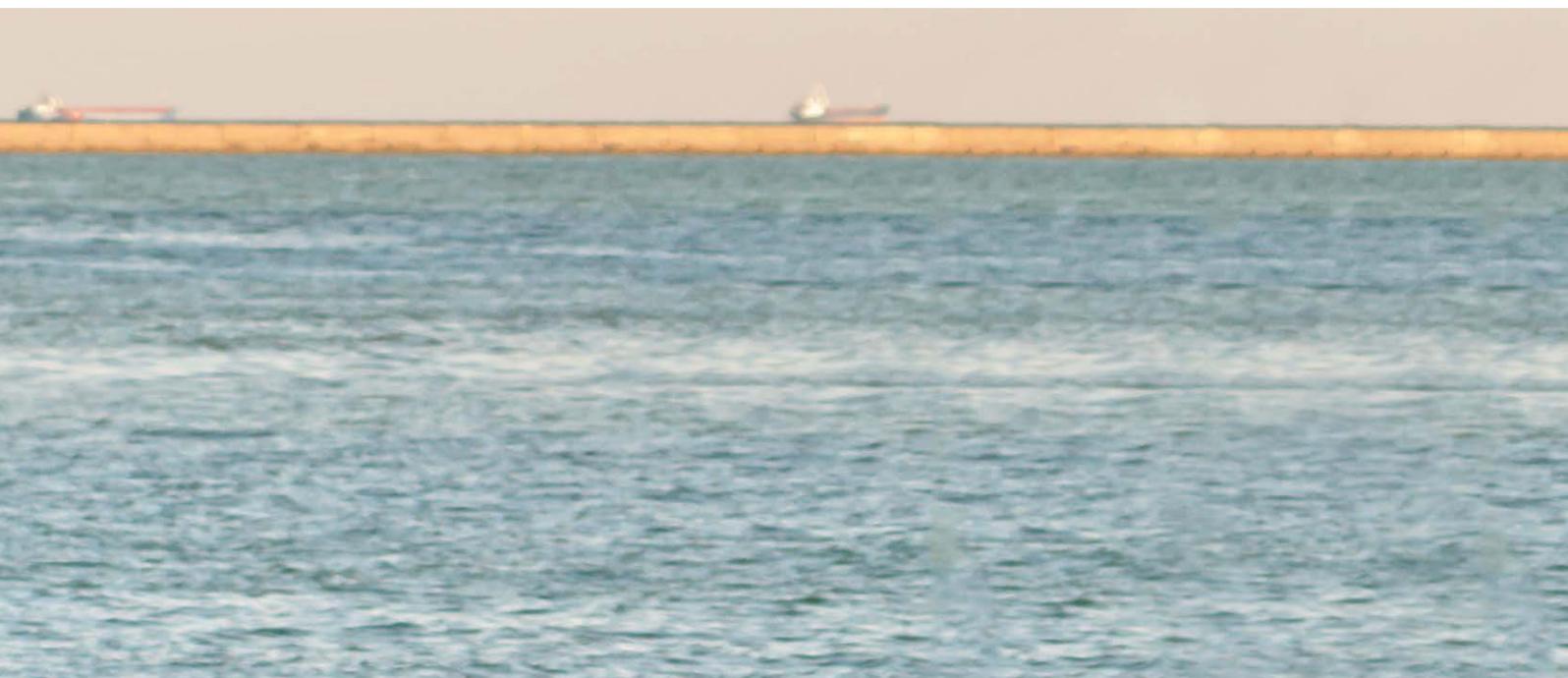
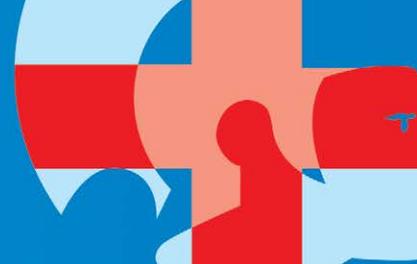
yet we fail to treat it with the seriousness it deserves. It is linked to the issues of personal safety and to accident prevention on board ship. The situation is worsened by the fact that symptoms of fatigue often cannot be detected in regular medical examination of seafarers."

### How to spot signs of fatigue

- + Inability to stay awake
- + Clumsiness
- + Headaches and giddiness
- + Loss of appetite
- + Insomnia
- + Moodiness and needless worrying
- + Poor judgment of distance, speed, time and risk
- + Slow responses and difficulty concentrating

### Risk factors for seafarers

- + Lack of sleep or poor quality sleep
- + Insufficient rest time between work periods
- + Excessive work load
- + Lack of social support
- + Boring or repetitive work
- + Noise or vibration motion
- + Dehydration Illnesses
- + Long distance travel to and from work (possible jet lag)



## Project Horizon

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In order to try and understand and measure the effects of fatigue, the EU-funded Project Horizon investigated the impact of different watchkeeping patterns on the effective performance of seafarers. The project brought together 11 academic institutions and shipping industry organisations and the aim was to scientifically measure fatigue in various realistic seagoing scenarios. At the centre of the project was the use of ship simulators in UK and Sweden which assessed officers' decision making capabilities in various real-time scenarios and with different stress levels. A total of 90 deck and engineer officers took part in the tests which were wide-ranging and included the use of monitors for brain

activity, eye movements and heart rates together with questionnaires, diaries, background information, video and also general observation of their duties.

Those taking part in the project came from across the world and were a representative cross-section from the industry. The study focused on two of the most common watch schedules used at sea: the 6-on/6-off and the 4-on/8-off.

Interrupted off-watch periods were also included in the study, during which time participants had to perform cargo operations and do paperwork.

## Conclusions

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- + Overall, more sleepiness was recorded during the first watch of the day, especially among deck teams
- + Sleepiness was found to increase with time on watch and peaked towards the end of night watches when slowest reaction times were also recorded
- + Incidents of sleep on watch mainly occurred during night and early morning watches
- + Off-watch disturbance instantly increased sleepiness
- + On the whole, sleepiness levels were higher in the 6-on/6-off system than in the 4-on/8-off system and those on the 6-on/6-off also got much less off duty sleep than those on the 4-on/8-off system
- + Sleepiness levels did not significantly differ between deck and engine room

- + Sleepiness levels consistently peaked between 0400 and 0800
- + Alertness levels consistently peaked between 1400 and 1800

As well as pointing out the various issues associated with the watchkeeping patterns, Project Horizon also provides some practical advice to reduce the risks, including alarm systems to alert crew before important waypoints, encouragement not to use chairs on the bridge during night watches, using additional crew at key times, training crew to recognise symptoms of fatigue and special protection of sleep periods for watchkeepers.

The full text of the report can be found at :  
<http://www.warsashacademy.co.uk/about/our-schools/maritime-research-centre/horizon-project/horizon-project.aspx>

## Fatigue – case studies

The Club is a sponsor of the Nautical Institute Mariners' Alerting and Reporting Scheme (MARS) - a confidential arrangement where crew can send in reports of accidents/near misses to the Institute and these are then published on a monthly basis without fear of reprisals. The purpose is to raise awareness and learn lessons to avoid similar incidents.

Here are just a few cases where fatigue has played a part, taken from MARS and also from the Australian Transport Safety Bureau.



## 'If you're tired, don't sit down'

After loading, a ship left port at 2300 and the master decided the AB assigned to the 0000-0400 watch would not be required for lookout duties. Close to midnight, the second officer arrived on the bridge to relieve the master and, after plotting the ship's midnight position on the chart, the master handed the watch to the second officer but stayed on the bridge to finish some paperwork and monitor the ship's transit through some restricted waters.

When the ship was in more open water, the second officer engaged the autopilot and the master left the bridge for some rest.

At 0256, the ship reached a waypoint and the second officer adjusted the course to 311 degrees and then went out to the starboard bridge wing to get some fresh air. When he returned to the wheelhouse, he secured the starboard bridge in the fully open position and sat in the port bridge chair. Shortly afterwards he fell asleep.

The ship passed the next planned wayward point and maintained her course for just over 2.5 miles, at about 10.5 knots until the Officer of the Watch (OOW) woke up and, sensing something was wrong, he immediately moved the engine control to neutral, and then full astern, but the ship grounded.

### Lessons learned

- ✦ The design of the bridge, despite being efficient, encouraged the OOW to sit down, which increased the potential for him to fall asleep.
- ✦ The OOW should have varied his watchkeeping duties in order to stimulate the senses, for example, by position fixing radio watch, effective use of the radar by regularly changing scales and altering the lookout position.
- ✦ The OOW should never work alone at night and an effective lookout should be posted at all times in darkness and in reduced visibility. The STCW Code chapter VIII 'Standards regarding watchkeeping' provides the requirements for day and night watches.
- ✦ The lack of a lookout removed a valuable control measure, as the interaction with the OOW might have prevented him from falling asleep. Also, if a lookout had been present on the bridge, he would have been in a position to immediately wake the OOW.
- ✦ The OOW was possibly fatigued when he arrived on the bridge for his watch and should have summoned help.



## Fatigue and safety issues end in fatality

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While underway, but not yet in open sea, the bosun was instructed to properly secure the port lifeboat for sea. He asked a seaman to help, but by the time he had arrived at the lifeboat station, the bosun had already started the task.

The bosun was sitting astride the forward davit cradle, close to the underneath of the lifeboat, trying to secure the forward trigger line to the trigger mechanism on the cradle. The seaman climbed the aft cradle ladder and attempted to do the same with the aft line but when he realised there was not enough slack in the line to allow this, he came down the ladder with the intention of lengthening the turnbuckle at the other end.

After reaching the deck he heard a noise and saw the lifeboat sliding down the cradle of the roller gravity davits. This noise alerted the ship's electrician, who was nearby, and both men rushed to the lifeboat davit winch and applied the brake – it stopped but not before

hitting the bosun, sending him backwards. He clung to the trigger line briefly but lost his grip and fell overboard into the water 15 metres below.

After 'man overboard' was communicated to the bridge, the pilot put the engine to dead slow ahead but the confined area of the channel prevented a turning or full astern manoeuvre. Despite releasing a smoke buoy and throwing in a life ring the crew lost sight of the bosun and five days later his body was recovered about 10 miles from the incident site.

Although the subsequent investigation found safety and maintenance issues concerning the davit cradle and lashing lines, it also found that the ship was operating with fewer than the minimum number of deck ratings and in the 24 hours before the incident, the bosun had only four hours off duty and his judgment, reaction time and alertness would have been affected by fatigue.

## Fatigue leads to environmental disaster

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Fatigue was also to blame for the grounding of the 230-metre long bulk coal carrier, *SHEN NENG 1* on the Douglas Shoal, Queensland, Australia in April 2010.

The ship had left the port of Gladstone bound for China carrying 68,000 tonnes of coal when she ran hard aground 38 nautical miles east of Great Keppel Island. The impact ruptured the ship's fuel tanks and released about four tonnes of fuel oil into surrounding waters of the Great Barrier Reef, causing an environmental disaster.

An investigation report from the Australian Transport Safety Bureau found that the ship had grounded about 20 minutes after a planned course alteration.

It also found the actions of the officer on watch, the chief mate, were affected by fatigue because he did not get sufficient rest while the ship was loading in Gladstone. There was no effective fatigue management system in place on board to ensure that the bridge

watchkeeper was fit to stand a navigational watch after the loading in Gladstone.

The report states: "The actions and inactions of the chief mate during the time leading up to the ship grounding indicate that his level of performance had deteriorated. This deterioration was probably the direct result of his lack of sleep."

The chief mate told the investigators he was tired when he went on watch at 1600 on the day of the grounding.

The report concludes: "Based on the actions of, and the mistakes made by the chief mate during his time on watch... it can be concluded that the chief mate's level of alertness and effectiveness was affected by fatigue. As a result he would not have been able to properly perform the duties of an officer in charge of a navigational watch after the ship departed Gladstone on 3rd April, 2010."



## Ways to combat fatigue

Fighting fatigue means having enough good quality sleep, eating a good diet, taking plenty of exercise and finding time for relaxation. Given the hours seafarers work, these things can be difficult to achieve.

A Cardiff University study in 2006 reported that almost half of seafarers taking part were working weeks of 85 hours or more and a similar amount said their hours had increased over the past 10 years despite new regulations intended to combat fatigue.

In its advice on steps to take to reduce fatigue, the International Transport Workers' Federation (ITF) says seafarers who become aware of the signs of fatigue should:

- + Use the maximum allowance of sleep, rest and leisure time
- + Inform their supervisor if they think fatigue may be impairing their performance
- + Where possible, rotate tasks to mix heavy and lighter duties
- + Exercise daily
- + Eat as healthily as possible and limit smoking, caffeine and alcohol consumption



## Eat often to beat tiredness

A good way to keep up your energy through the day is to eat regular meals and healthy snacks every three to four hours, rather than a large meal less often. Eating sensibly is also important, with the emphasis on foods which are high in fibre and trying to avoid fatty foods or too many snacks such as crisps and chocolate. It is also important to try and eat at least five portions of fruit and vegetables per day.

## Feel better with exercise

You might feel too tired to exercise but regular exercise will make you feel less tired in the long run and you will have more energy.

You can help to stay fit by doing push-ups or sit-ups in your cabin, using improvised weights made out of tin cans, exercising with a colleague and taking aerobic exercise like walking. Use the stairs wherever possible.



## Lose weight to gain energy

If your body is carrying excess weight, it can be exhausting. It also puts extra strain on your heart, which can make you tired. Lose weight and you will feel much more energetic. Apart from eating healthily, the best way to lose weight is to be more active and do more exercise.





## Sleep well

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Try to keep regular sleeping hours if possible – most adults need between six and nine hours of sleep every night.

Winding down can be critical in preparing for sleep and there are many ways of relaxing:

- + A warm shower before bed
- + Relaxation exercises such as light yoga stretches
- + Reading a book or listening to the radio – avoid watching television or using electronic gadgets

## Reduce stress

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Stress uses up a lot of energy. Try to introduce relaxing activities into your day. This could be taking exercise or a gentler option such as listening to music, reading or spending time with colleagues as well as communicating with friends and family at home. Whatever relaxes you will improve your energy.



## Cut out caffeine

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The Royal College of Psychiatrists in London recommends that anyone feeling tired should cut out caffeine. It says the best way to do this is to gradually stop having all caffeine drinks (this includes coffee, tea and cola drinks) over a three-week period. Try to stay off caffeine completely for a month to see if you feel less tired without it.

You may find that not consuming caffeine gives you headaches. If this happens, reduce more slowly on the amount of caffeine that you drink.



## Drink more water for better energy

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Sometimes you feel tired simply because you're mildly dehydrated. The recommended daily amount is around two litres per day, but this depends on other factors such as your work environment or how physically active you are. Water is thought to make up around 80% of the brain and so poor hydration can affect your mental as well as your physical performance.

## Workplace issues

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Demanding jobs, conflicts at work and burnout are common causes of fatigue. Take steps to address your work problems.





So, where can you get advice if you think you or a fellow crew member may be suffering from fatigue?



One obvious route is to tell the master, or the individual responsible for medical issues on board, that you or one of your colleagues are having difficulty getting enough rest or sleep.

## Seafarer Help

The International Seafarers' Welfare and Assistance Network (ISWAN) provides a seafarer helpline called Seafarer Help which gives free help and advice 24/7, 365 days a year. You can talk about anything, including welfare problems such as fatigue. To make communication easier the helpline advisors speak many languages and the helpline offers its service by telephone, email, SMS, live-chat and even by letter. Call **00 800 7323 2737**, text **076 24 818 405** or visit **[www.seafarerhelp.org](http://www.seafarerhelp.org)** to find out about more ways to get in touch.

## The International Port Welfare Partnership

A new project, launched by ISWAN, aims to ensure the provision of good services and facilities to seafarers at ports around the world. The project is funded by the International Transport Workers' Federation Seafarers' Trust and managed by the Merchant Navy Welfare Board.

The project aims to encourage and support the establishment of welfare boards worldwide, in accordance with the Maritime Labour Convention 2006. Welfare boards provide the forum for maritime organisations to regularly meet and support seafarers' port welfare services and facilities in order to improve their lives. Further information is available on their website:

**[www.portwelfare.org/home.html](http://www.portwelfare.org/home.html)**

## The Mission to Seafarers

They offer confidential support and advice on health issues and can be contacted on: **[www.missiontoseafarers.org](http://www.missiontoseafarers.org)**

## Apostleship of the Sea

They also offer confidential advice and support to seafarers through their website: **[www.apostleshipofthesea.org.uk](http://www.apostleshipofthesea.org.uk)**

## Videotel

Training organisations such as Videotel provide advice on dealing with fatigue through training, as well as encouraging crew members to socialise on board.

## The International Transport Workers' Federation

They have launched a campaign to combat fatigue at sea and they argue for:

- + Safe crewing levels on board ship
- + Enforcement of maritime regulations on minimum hours of rest and/or maximum hours of work
- + New regulations on seafarers' hours of work
- + Universal recognition of the right of all seafarers to shore leave
- + An on board safety culture
- + Fatigue to be treated as a serious health and safety issue

Visit the website at

**[www.itfseafarers.org/ITI-fatigue.cfm](http://www.itfseafarers.org/ITI-fatigue.cfm)** for more information.