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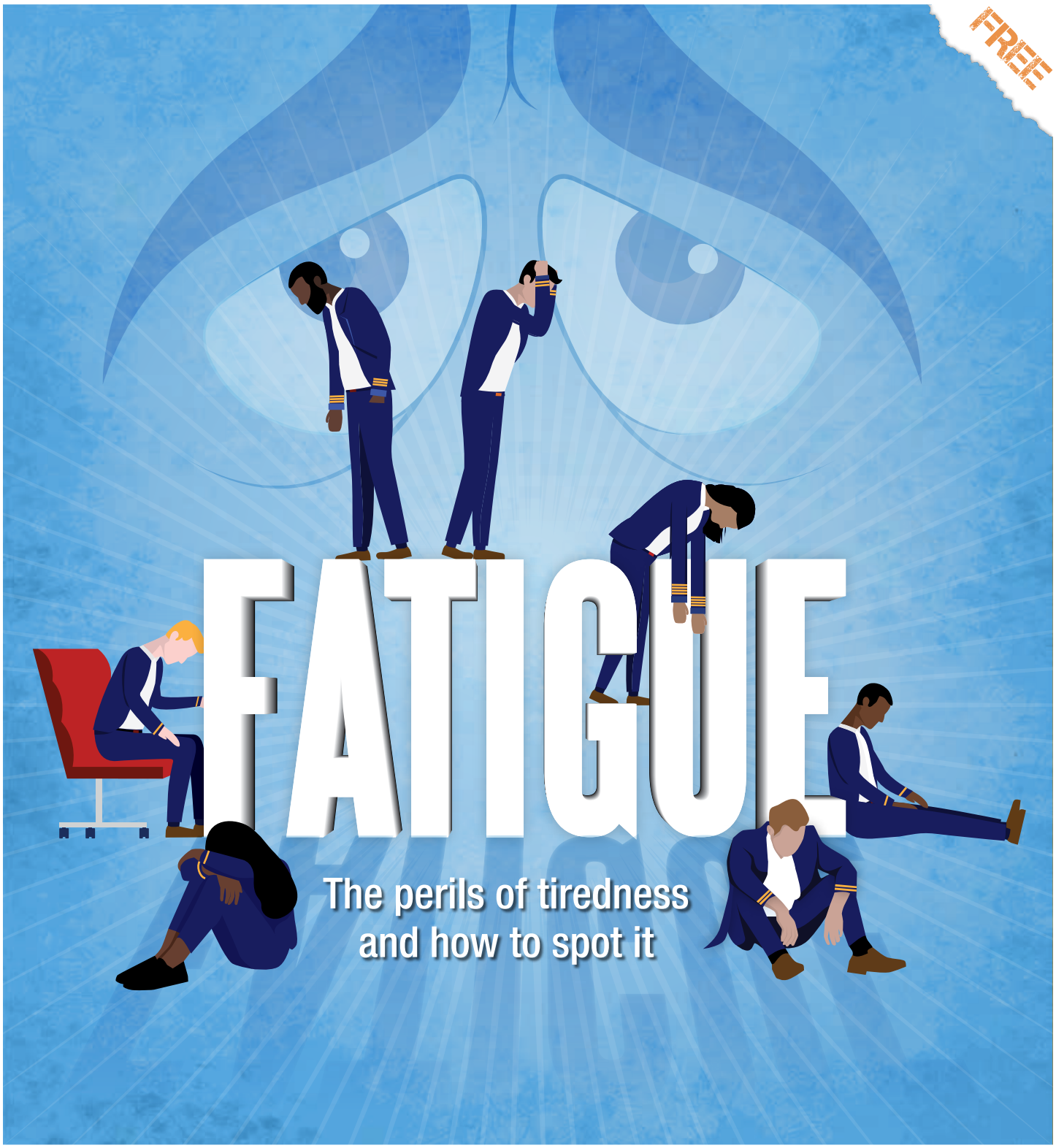

FATIGUE

The perils of tiredness and how to spot it

A free publication by **The Nautical Institute** in association with the **Royal Institute of Navigation**

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NAV BRIEF

David Patraiko FNI
Director of Projects, The Nautical Institute

The perils of ignoring fatigue

Tiredness and fatigue onboard ships can become a problem if they are not managed properly. A ship is an industrial platform that operates 24/7. There are vibrations and noises to contend with and it is often too hot or too cold. Demanding watch patterns mean that you don't always get enough continuous sleep, so your body's natural cycle is disrupted. Then, there's the sea itself…

So, what's the big deal? As explained in Dr Grech's article on page four, tiredness and fatigue can lead to poor decisions and mistakes. Long-term fatigue can also cause poor physical and mental health.

To be clear, the management of fatigue starts and remains in the head office. Yes, mariners onboard have a critical part to play, as described by Captain Foong, FNI on page six, but if the environment isn't right, crewing levels not sufficient, workload unmanageable and the safety management system not working there may be little that mariners can do. That is why inspectors have the vital job of looking closely for signs and causes of fatigue among the ship's crew.

Adherence to mandatory work hours is a start, but only a start – and it is only useful if mariners keep accurate logs and report incidents of violation (very unnatural to do for mariners). Shipowners need to ensure that issues of light, heat, and vibration are as optimum as possible. Crewing levels need to be equal to workload. This might mean sending support personnel to certain ports or even adding an additional full-time officer. Decent food and access to exercise must be provided and crews trained in both risks and mitigation techniques.

From a crew's point of view, you need to be alert to spotting tiredness in yourself and others. There may be times when extra personnel need to be called out or a watch schedule adjusted. If persistent fatigue is a common issue the Designated Person Ashore (DPA) must be notified. Lifestyle choices also need to be considered: diet, consumption of caffeine and the benefits of certain types (and amounts) of exercise. Leisure time needs to be carefully managed. It's one thing to wind down with a good book or movie, but quite another to binge watch an exciting TV series when you actually need to get some sleep. Addictive online activities have also been known to be harmful (for those lucky enough to have online access onboard). Worrying about family issues can also cause people to lose sleep and should be watched out for in yourself and others.

Some tiredness can't be helped, but with careful management the risks of poor decisions and performance can be reduced. Don't let fatigue be the norm; lives depend on good decisions so talk about fatigue, seek help if you need it and work out strategies to manage it effectively.

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The Nautical Institute
200B Lambeth Road, London SE1 7JY, UK
Tel:+44 (0)20 7928 1351 Fax:+44 (0)20 7401 2817
navigator@nautinst.org www.nautinst.org

The Royal Institute of Navigation
With support from: 1 Kensington Gore, London, SW7 2AT, UK
Tel: +44 (0)20 7591 3134 Fax: +44 (0)20 7591 3131
www.rin.org.uk

Editorial committee:
Editor Emma Ward
Design Phil McAllister
For The Nautical Institute
Vivien Antwi, Lucy Budd, Aly Elsayed AFNI, David Patraiko FNI,
For the RIN George Shaw FRIN

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ALL AT SEA

Emma Ward

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International Day for Women in Maritime

To mark the first year for this important event, female members of The Nautical Institute's Younger Members' Council have described aspects of their life at sea. To read their whole contributions, check out May's edition of *Seaways*

Joining my first vessel as an officer, I couldn't help but think to myself, will my peers accept me? Even in these progressive times you may join a vessel and be the sole female onboard. More often than not, you may even be the first female seafarer your colleagues have worked with. It's human to feel out of place and even isolated when you start sailing. It will take a lot of strength to hold your own space on a team of men. As you gain more knowledge and experience, you will overcome this.

Don't be consumed by the need to prove you are equal to your counterparts. Never doubt your competency and continue to fulfil your duties; they will recognise your efforts.

Sabeena Poonwassie MNI

Nothing says, 'Welcome aboard! You belong here!' quite like walking up the gangway of a new ship and being issued PPE and safety equipment that fits you. As shipping companies work to become more inclusive and create a more diverse work force on board, this element is left out of the discussion. Often times, if you fall outside of the normal 6ft, 200lbs size range of American mariners, you are not supplied with gear to fit you. You come aboard and must 'make it work'.

One size fits all, fits no one, and yet this is the safety equipment standard throughout the industry. Give all workers the tools they need for success – and diversity is the result. True acceptance is achievable for our industry, but it begins with being issued the proper gear from the start.

Lt. Emily Bull MNI

Gender inequality in the maritime sector has received increasing attention since 1989, when IMO first introduced a strategy to increase opportunities for women in the maritime sector. Beginning in 2003, associations took concrete steps to actively promote the participation of women in the maritime and port sector, and efforts to address the issue were actually launched. These efforts included the creation of several key entities, such as Women in Maritime Caribbean (WiMAC). The Women in Shipping and Trading Association, (WISTA) founded as far back as 1974, has also played a leading role.

Despite many years of change, efforts are still required to address the factors that deter women from finding employment in greater numbers in the maritime and port security sector, both offshore and on land.

Nitzeira Watson AMNI

Sabeena Poonwassie, MNI

Nitzeira Watson AMNI

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What does fatigue look like?

Fatigue at sea has gained increasing attention over the last few years – and generated research to match. Current regulatory requirements mainly focus on hours of work and rest. However, other factors come into play, such as irregular work hours and having to stay at your workplace to sleep. **Dr Michelle Grech** from the Australian Seafarers Welfare Council looks at why sleep matters, and how you can tell when you or your colleague might be affected

Sleep quantity and quality are critical factors in determining how fatigued you are likely to be at any given time. Generally, we require between seven and nine hours of continuous sleep per day to perform adequately. Repair, restoration and maintenance of physical and mental functions are all undertaken during sleep, which is why it is so important.

Sleep debt

When we do not get enough sleep during the night, or over a series of consecutive nights, we build up what is called sleep debt. This results in high levels of fatigue. It's common in seafaring to get some sleep but not enough, night after night, possibly for weeks or months. Studies point to a 45% increase in errors by the fourth consecutive night shift and a 90% increase in errors by the seventh night on duty. Sleep debt can also lead to 'micro-sleeps' which is when you 'nod' off or even fall asleep completely while working.

Important studies showed that people who went without sleep for 17 hours recorded similar cognitive impairment levels to people with a blood-alcohol concentration of 0.05% – enough to affect your performance when driving, for example. This increased to 0.1% when subjects were awake for 23 hours or more. Over the longer term, sleep debt also impacts on physical and mental health.

Sleep debt is made more intense when you are required to work at night and sleep during the day. Due to our circadian rhythms, daytime sleep is often shorter and of lower quality. We are biologically programmed to be active during the day and to sleep at night. For many people, shift working patterns often conflict with their biological clock – and contribute to reducing sleep quantity.

Working conditions

Working too long without sleep at any time of day contributes significantly to tiredness and fatigue. In general, the longer you remain awake, the stronger your drive for sleep becomes, and the higher your levels of fatigue grow. The risk of an accident in the twelfth hour of work is more than double the risk of an accident in the eighth hour of work, according to one study. Additionally, the longer you have continuously been on a single task without a break the more likely you will be fatigued. Many people work more than 12 hours per day, sometimes with limited breaks. A seafarer's working week usually exceeds 70 hours.

One concern is that, over the past few years, evidence points to an excessive increase in working hours on ships. Worst still is that 'pressure' on seafarers to 'toe the line' by some shipping companies and under-report actual hours worked (basically hiding breaches in the hours of work and rest requirements) is becoming the 'norm' for many.

SHORT-TERM RISKS OF FATIGUE ARE MAINLY RELATED TO AN IMMEDIATE IMPACT ON SAFETY. FOR EXAMPLE, YOUR DECISION-MAKING MIGHT BE IMPAIRED IN A COLLISION SITUATION, OR YOU MIGHT FALL ASLEEP AND MISS A COURSE CHANGE

Working onboard a vessel also introduces conditions that are seldom present in other workplaces. These include noise, lighting, vibration, ship motion, temperature and other factors known to disturb sleep. Any sleep that people do manage to get is often disturbed. This leads to poor quantity and quality of sleep. Consequently, the continuous presence of fatigue remains highly likely.

How can you tell someone is fatigued?

Short-term risks of fatigue are mainly related to an immediate impact on safety. For example, your decision-making might be impaired in a collision situation, or you might fall asleep and miss a course change, resulting in a grounding. As a rule, elevated levels of fatigue are associated with the following physical symptoms and behavioural indicators:

> decreased alertness
> lessened ability to sustain attention
> slower reaction time
> poor hand-eye coordination
> difficulties with communication
> reduced vigilance
> impaired decision-making
> micro-sleeps
> mood swings
> compromised short-term memory
> impaired judgement
> lethargy and an increase in error rates.

What effect does fatigue have on a person's health?

There are many physical health outcomes that result from continuous exposure to long working hours (i.e. 60 hours or more per week), sleep debt and fatigue. Incomplete recovery from work has been shown to increase overall risk of death from cardiovascular diseases. Other physical health risks include gastrointestinal problems such as peptic ulcer and irritable bowel syndrome; a higher risk of coronary heart disease, increased blood pressure and weight gain.

In addition, you are at a higher risk of displaying negative behaviours such as smoking or poor diet. Psychosocial effects include needing longer to recover and regain energy after work.

Another more insidious impact that fatigue has is that on mental health. We are currently seeing a rise in mental health concerns in shipping. Problems with mental health appear as reduced performance, impaired alertness and / or a sense of weariness, burnout and exhaustion. Even before COVID-19 hit, it was widely acknowledged that people working at sea were at a higher risk of mental health issues due to their work hours, watch schedules and high workload. There is now strong evidence to suggest that increased levels of depression and anxiety in the maritime industry have been further exacerbated due to the pandemic.

Given the inevitable and ongoing risks associated with the onset and impact of fatigue, the maritime industry needs to ensure that people working at sea are properly supported, and that their work demands do not require them to continuously extend themselves to the limit of their capabilities. Only then can the risk of fatigue be properly managed.

Fighting fatigue one sleep at a time

Seafarers work in a heavily regulated industry. Like many other dedicated professionals out there, they face a workload that is physically and mentally challenging. Prolonged stress, working long hours in an isolated place and not finding enough time to sleep can all lead to immense fatigue. The good news is that there is plenty that can be done to help combat stress and promote healthy, restorative sleep. **Captain James Foong FNI** explains further

Fatigue can be described as a drowsy state of deprived sleep and extreme tiredness. Seafarers who are fatigued may experience diminishing cognitive ability, and a loss of interest in their work, which could endanger themselves, their colleagues, the ship they are operating, and the wider marine environment. Here are a few reasons why a seafarer might be prone to fatigue:

Overwork

In the past, a ship's captain had pretty much one job to do – to manoeuvre the vessel from port A to B. However, things have changed, thanks in no small part to the increase in telecommunication devices available. Nowadays, captains and their bridge teams must answer emails, sort out essential documentation and attend to overwhelming administrative work, regardless of time zones or passage scheduling. Meanwhile, the technical side of actually operating the ship still requires their full attention. Often, an officer can only take on the extra administrative work required of them during their 'rest' time.

According to a survey carried out by Cardiff University, officers tend to underreport their working time on timesheets to comply with audits and inspections (Seafarer fatigue: The Cardiff Research Programme). Almost 50% of seafarers reported that their working hours are at least 85 hours or more. When short-staffed, seafarers can legally work up to 91 to 98 hours per week, which is double the maximum number of working hours regulated by the International Labour Organization (ILO) for shore workers.

Watch systems

Deck officers can traditionally work a maximum of 12 hours on watch a day to comply with STCW. This schedule means officers get multiple intervals of break throughout a day. However, in many cases, navigating officers work overtime when there are no extra crew members to act as back-up. Officers in this situation may only manage three or four hours of sleep after factoring in overtime and the need to eat and take a shower before getting ready for their next shift.

Studies have shown disruptive sleep-wake cycles like this are unlikely to be sustainable for an extended period. The added stress they produce can lead to reduced reaction times, severe mental health concerns, and increased risk of illness.

Environmental factors

Working at sea is remote by nature. The isolated working environment onboard ship can impose additional mental stress on seafarers who find it hard to deal with such remoteness. Additionally, issues such as severe ship motions during heavy weather; incessant chatter over the walkie-talkie and vibrations from the vessel being loaded or unloaded can add extra levels of physical discomfort that also affect a seafarer's mood and levels of fatigue.

So, what can be managed onboard to ensure seafarers are physically and mentally fit and protected as much as possible from the negative consequences of fatigue?

Suitable surroundings

Soundproof insulation is a highly effective way to reduce unwanted sound traveling into the cabins and disrupting sleep. Standard fiberglass composite and dampening acoustic sealant both offer good soundproofing properties to muffle airborne and impact noise. Comfortable, ergonomic furniture can also help people relax during rest times and ease any aches and pains in the body. When a ship is first designed, companies should be encouraged to work with sleep experts to ensure crew accommodation can be as relaxing and effective in minimising noise as possible.

Reduce sleep debt

It's normal for seafarers to build up some form of 'sleep debt' with irregular work hours, night shifts and/or difficulty getting at least six hours of sleep consistently. Therefore, proper planning of sleeping hours around other demands on time (e.g. eating and showering) is key. The sleeping environment should be dark, quiet, and well-ventilated with a decent mattress to allow easier transition into the deep sleep phase. In addition, scheduling strategic nap times can help seafarers maintain their mental and physical health. For example, this could be achieved during breaks or between changes in activities.

Competent crewing

On top of that, sufficient crewing of the ship is mandatory to ensure each officer has enough time to rest properly after each watch-keeping cycle. It is helpful for higher-ranking officers to clarify their job scope before spending too long on administrative work and documentation that could be carried out by someone else with space in their schedule. Administration can often be better managed by a well-trained executive officer who could also take on safety inspections and audits.

Diet, exercise and lifestyle

Seafarers must establish and maintain healthy habits if they want to enjoy a better lifestyle. Choose food that offers a good balance of macronutrients to help keep fatigue at bay. Regular exercise can help prevent work-related illnesses and improve overall health and wellbeing.

Another way to keep spirits high and protect people's wellbeing onboard ship is to develop a good range of social activities to encourage team cohesiveness, boost morale and improve cooperation. Setting up a job rotation scheme is helpful too, as changing jobs can dispel feelings of monotony and prevent seafarers from growing bored of repetitive tasks.

Crew retention

It can be extremely tiring for experienced crew members to have to frequently train new seafarers if there is a high turnover of staff onboard ship. Finding ways to retain quality people can therefore greatly assist in reducing overall fatigue levels within the team. Establishing an open working culture where people can feel confident about raising concerns can help with this, along with excellent career opportunities, fair remuneration packages, and support with mental health and personal development.

Connecting with the 'outside world'

Ultimately, onboard telecommunication facilities must be up-to-date to keep seafarers in touch with the outside world. People working in an isolated environment are usually extremely keen to connect to others and have their voices heard. Tiredness and fatigue is not just about not getting enough sleep. It can be exacerbated by a lack of contact with home, pressures around shore leave and inadequate attention to people's psychological needs.

We must acknowledge the serious threats posed by fatigue and find workable solutions for mitigating against these risks. The physical and mental wellbeing of seafarers needs to be prioritised. To those active seafarers out there who are reading this article, I wish you all the best in your career and sincerely thank you for your contribution to the maritime industry. Safe seas and clear horizons always.

TIREDNESS AND FATIGUE IS NOT JUST ABOUT A LACK OF SLEEP. IT CAN BE EXACERBATED BY A LACK OF CONTACT WITH HOME, PRESSURES AROUND SHORE LEAVE AND INADEQUATE ATTENTION TO PEOPLE'S PSYCHOLOGICAL NEEDS

Tired of talking about fatigue?

There are many – far too many – accidents where fatigue is cited as a contributing cause. So what lessons should the industry be learning as a whole to tackle ongoing issues of crew fatigue?

If the industry wishes to retain experienced workers in safe conditions, then the time for action from ship owners and operators is now, writes Seafarers Hospital Society CEO **Sandra Welch**

In an occupation that can be stressful and dangerous, fatigue onboard ship amplifies the chances of a range of health issues occurring, from depression to obesity. We need a culture of care among all companies involved to help alleviate fatigue and boost wellbeing among seafarers.

As part of our landmark study on seafarer health initiatives, conducted with Yale University, SHS hosted a series of roundtable discussions with ship owners, operators and other shipping stakeholders to assess achievable solutions to holistically address seafarer welfare.

Low hanging fruit

Based on research conducted for the metastudy, report author Dr Martin Slade offered several recommendations on how crew can reduce fatigue and how companies can assist in this, including adopting a holistic approach to the plight of seafarers and ensuring working routines are fixed so crew can settle into a schedule.

Gruelling watch schedules need to be addressed, such as the exhausting watch-keeping routine of 'six on, six off', which often prevents crew from ever getting an effective seven hours of sleep.

Increasing bureaucracy must be resolved as ship management systems become more complex and unmanageable, contributing to cognitive overload. Automation or removal of tasks to colleagues onshore could also help. Masters must be allowed to 'stop work' when they deem it necessary for the safety and wellbeing of the crew.

Creating the right conditions for quality rest is also important. Care should be taken to avoid influences that interfere with sleep. Accommodation areas should be cool, with the option of shielded daylight, and insulated from noise and vibration. The same applies to recreational and catering facilities, to create an environment where seafarers can unwind calmly. Comfortable mattresses should be prioritised.

Contract length

Our industry should consider a cap on contract lengths – the report suggests six months – for time spent at work and on leave. As Frances Coultas, a working seafarer, points out, "There needs to be an acknowledgement that contract length has a significant impact on seafarers' health – both mental and physical. While some of the people I have worked with appreciate contracts of nine months or more, due to the opportunity to make more money, the feedback I more commonly receive is that more than six months is not ideal, as people complain of mounting fatigue, stress and an apathy for work. This is when mistakes happen, which puts their health at risk, not to mention also risking the health of crew members around them."

Coultas points out that while nine months is an industry standard, this does not mean that it is the best option for seafarers in the long term. On the one hand it may appeal to crew looking to secure nine months' wages, but on the other, working such long contracts can have long-lasting negative health impacts and ultimately lead to a shortened career and source of financial stability.

GRUELLING WATCH SCHEDULES NEED TO BE ADDRESSED, SUCH AS THE EXHAUSTING WATCH-KEEPING ROUTINE OF 'SIX ON, SIX OFF', WHICH OFTEN PREVENTS CREW FROM EVER GETTING AN EFFECTIVE SEVEN HOURS OF SLEEP

Varying approaches

It is unlikely that a single set of solutions will succeed for all seafarers, so it is important that we offer a range of potential solutions and institute as many as possible to maximise our chances of tackling fatigue. The causes and remedies are clear. Seafarers are justifiably tired of talking about fatigue; the time has come for real commitments to make lives better for the people that keep the world's supply chains moving.

Cruise ships, Covid-19 and coffee

Third officer **Iryna Bates** talks about life onboard cruise ships, her early days as a yacht stewardess and how she copes with tiredness and fatigue at sea

Name: Iryna Bates

Current Position: Third Officer, MSC Cruises

What do you like best about a career at sea?

It's a fast-paced environment where no two days are the same. It gives you the chance to meet many people from different cultures and backgrounds, and teaches you valuable lessons not only professionally but also socially. Every single day you get to apply yourself so you can work to the best of your ability and learn something new.

What career path has led you to your current role?

My career at sea started at a later age than the majority of cadets nowadays – not as a cadet, but as a stewardess on a yacht between finishing A Levels and going to University. Naïvely, I thought I would have the life of luxury working on a yacht. However, the stewardess position turned out not to be for me, and I found myself feeling jealous of the deckhands and officers who got to do the exciting jobs, such as sailing the ship that we called our home.

So, I started my cadetship in 2016 and spent the next three years eager to get my OOW ticket. I qualified in 2019 and was already planning how to get enough sea time to get my Chief Mates qualification. I was fortunate enough to complete a contract as a Third Officer before COVID-19 hit and the world stopped – including all the cruise ships. I couldn't stop, though, and applied for anything that would give me sea time. I returned to working in superyachts for a while, this time as an officer. I then moved back to cruise ships once they came back into service.

Where do you see yourself in five years? Ten?

I'm currently studying for my Chief Mates SQA's and Orals after completing the required sea time. In five years, I would like to be doing my Masters, maybe have even completed it. I want to have visited places that are rarely seen, and encountered events that only a few people get to experience. I want to continue learning and growing as a person and hopefully become someone others can look up to, as I myself look up to so many people in this industry.

I WOULD SAY THAT ANYTHING CAN BE CURED WITH A COFFEE! ON A SERIOUS NOTE, HOWEVER, IT IS VERY IMPORTANT TO GET THE REST THAT YOU NEED; NOT ONLY PHYSICALLY SLEEPING BUT ALSO MENTALLY

What do you find most interesting or challenging about working on cruise ships?

I think the sheer number of people on a cruise ship is the most interesting and simultaneously the most challenging thing. The amount of work that is required by all teams for the ship to function is phenomenal. Being one of the people who communicates with every department, as everything goes through the bridge, becomes a blessing and a curse at the same time.

How do you protect yourself against tiredness and fatigue affecting your work while you are on duty?

I would say that anything can be cured with a coffee! On a serious note, however, it is very important to get the rest that you need; not only physically sleeping but also mentally. I make sure that I comply with my rest hours and am comfortable enough to speak out if I'm not meeting those hours or if I feel fatigued. I work in an environment where I know that I can ask for help with tasks if I ever feel overloaded with work.

How does your bridge team help you stay alert and focussed while at sea?

I think with the introduction of BRM (Bridge Resource Management), the bridge team as a whole becomes more efficient and aware of their roles and responsibilities. Maintaining a good relationship with all members of the team also helps; I have worked with all members of the bridge team and they have become more like family members to me than colleagues. We all have each other's best interests at heart.

Royal Institute of Navigation
Science Technology Practice

WAYPOINT

George Shaw FRIN

Fighting fatigue with technology

George Shaw from the Royal Institute of Navigation looks at how how technology might be able to help address concerns about fatigue at sea

Even between shifts, seafarers remain 'at work', ready to respond to an emergency or crewing requirement. There is constant pressure to get to the next port. "Why did it take you so long?" asks the accusing voice from ashore. Lack of shared information and understanding of factors such as weather, tide, currents and fuel efficiency demands add even more stress. Short transits between ports compound fatigue, with little chance for a routine of rest.

These issues must be addressed at a regulatory level – but we should also look at the way technology helps counter the impact of fatigue. Issues must be detected and alleviated reliably for different depths of fatigue, such as reduced attention span, impaired decision-making, distorted judgement (distance, speed etc.), spatial disorientation, loss of situational awareness – and simply falling asleep. Supporting technology must respond appropriately to the seafarer's cognitive state and the circumstances in which the vessel is operating.

Planes, trains and safer navigation

The technology problem is challenging. Systems detecting fatigue (or its effects) must miss very few critical incidences while ensuring a very low rate of false alarms. They must intervene as little as possible to maintain safety without affecting efficiency. Systems that annoy a navigator or threaten the ETA at port will simply be ignored or switched off.

For example, navigators may disable the bridge navigational watch alarm system if regular resets or alarms are deemed a nuisance. This is far too easily achieved on a vessel, compared with the alert system in a train driver's cab, for example. Commercial aviation has a regulatory focus for fatigue prevention, with a Flight Time Limitations (FTL) scheme that may also be supported by an aircraft's Fatigue Risk Management System (FRMS) using sensor and data technology to monitor flight deck activity. Aviation recognises that the best safety device is a rested human navigator; a lesson for maritime to mull when considering bridge staffing levels and technology.

THE BEST SAFETY DEVICE IS A RESTED HUMAN NAVIGATOR

Advanced developments in communications, such as S-100 standardisation of data, VHF Data Exchange System and rapid growth in satellites, should increase the availability of information to promote shared understanding between ship and shore and provide an invaluable opportunity to alleviate stress and reduce fatigue. The explosion in data, however, raises issues of personal privacy and timeliness of information extraction.

Monitoring techniques

Integrating resilient, trustworthy back-up positioning systems would address the vulnerabilities of GNSS and alleviate the navigator's workload. Innovative developments in autonomous vessel systems could potentially monitor operational performance to counter fatigue on crewed vessels. Intelligent systems could be adapted as decision aids for mariners and to capture human errors. For example, they might monitor the ship's position, track and speed against the voyage plan, deviation from approaches and transits for TSS, as well as adhering to collision avoidance rules during encounters with other vessels.

However, in increasingly complex and restricted sea spaces, technology may struggle to embrace the experienced mariner's valid actions and risk the annoyance (and consequent disabling) of too many false alarms.

Technical wizardry on the bridge is no substitute for regulatory intervention and adequate bridge staffing with work schedules that adequately accommodate rest periods. Appropriate technology and integration with bridge systems should help, but only if centred on human factors. Badly chosen or poorly integrated 'solutions' could exacerbate the problem, with a cacophony of bridge alarms adding to the mariner's workload and fatigue.

The onus is on the partnership of seafarers, equipment manufacturers, standard setting bodies, regulators and vessel operators to balance technical and human interventions appropriately to address fatigue. After all, the best safety device is a rested human navigator.

Contact RIN at: www.rin.org.uk | 1 Kensington Gore, London, SW7 2AT | Tel: +44 (0)20 7591 3134

TAKE 10

Fatigue is one of the most dangerous threats to a navigator onboard ship. Here are ten points to help you manage your levels of tiredness and fatigue

1
Understanding fatigue
Fatigue is a state of physical and/or mental impairment that can reduce the ability to operate a ship safely.

2
Fatigue by design
By their very nature, ships and ship operations have a high risk of inducing tiredness and fatigue, with causes including ship design, onboard tasks and the motion of the seas.

3
An ongoing concern
Long-term fatigue can lead to physical and mental health problems; left unchecked, it is not just a short-lived problem.

4
Risk management
Tiredness and fatigue can be managed. The risks cannot always be removed, but there will be ways to mitigate them.

5
Counting hours
Hours of work and rest are important, but tiredness and fatigue management go beyond just recording hours.

6
Fighting fatigue from shore
Ship owners and managers must 'own' fatigue and tiredness management. This can be done through ship design, crewing levels, workload, food provision, exercise facilities, sleeping arrangements and training the crew about dangers and mitigation.

7
Know the signs
Mariners must be aware of how to recognise fatigue in themselves and others. Manage time as best as possible, adjust watches when necessary, get support if needed, keep accurate accounts of work and rest and notify the DPA if required.

8
Monitor mental health
Not only can fatigue lead to physical health issues, but also mental stress. Issues such as relationship problems, either onboard or with family/friends, can also lead to mental fatigue. Be sensitive to this in yourself and others.

9
Knowledge is power
The IMO has published guidelines on fatigue that relate to ships and seafarers. There is also a wealth of information on the internet from both maritime and non-maritime sources.

10
Share and share alike
No-one is immune to tiredness and fatigue, so discuss these issues with the whole crew and watch out for each other. A poor decision made by one person can affect everyone!

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