THE NAVIGATOR
Inspiring professionalism in marine navigators

February 2026 | Issue no. 41 | A *Seaways* supplement

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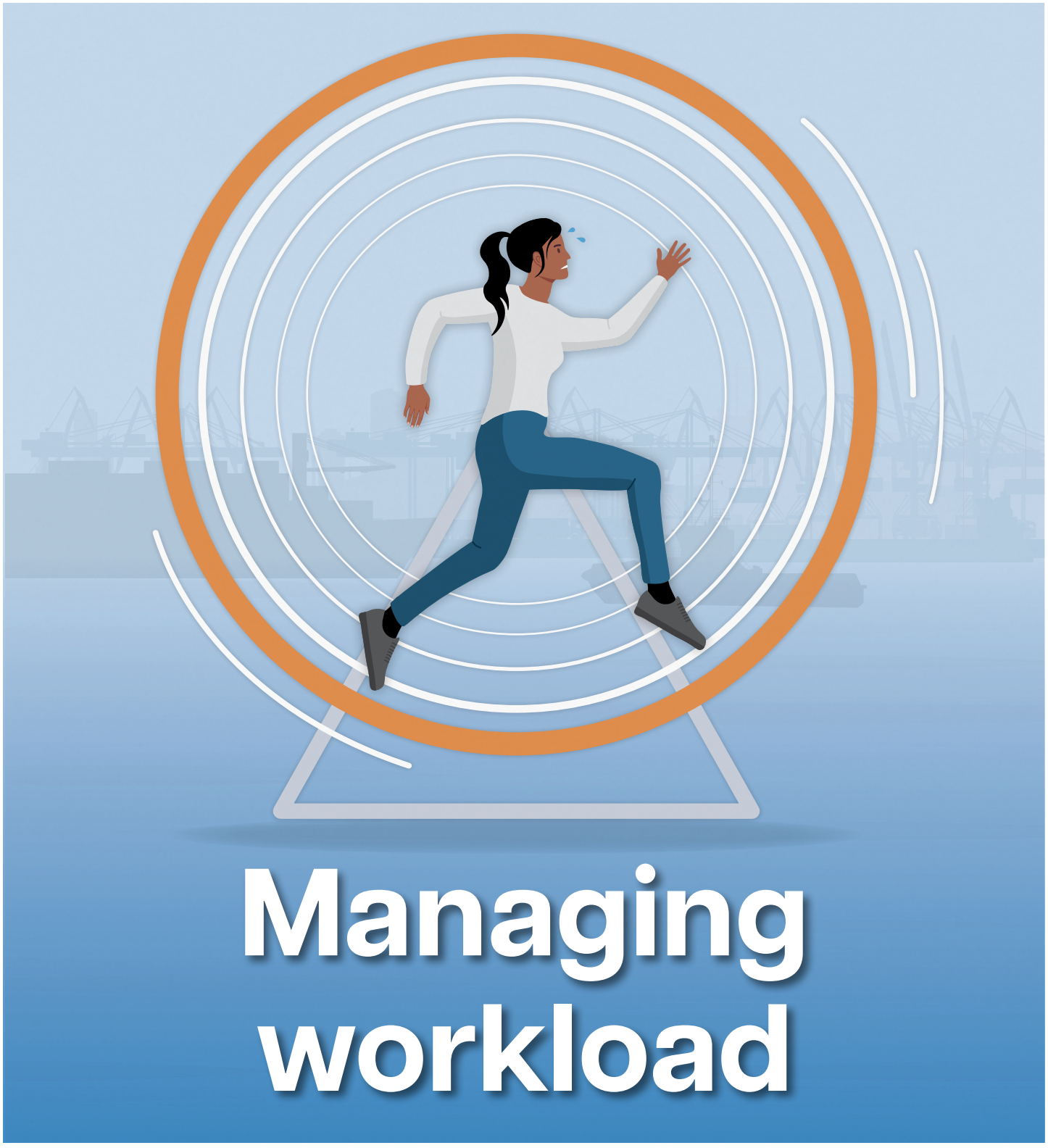

Managing workload

The Nautical Institute
Royal Institute of Navigation

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

Visit www.nautinst.org for The Nautical Institute's EU Authorised Representative.

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

Published by The Nautical Institute

The Navigator (Print) – ISSN 2058-6043
The Navigator (Online) – ISSN 2058-6051

Printed in the UK by
Stephens & George, Merthyr Tydfil, UK

We welcome your news, comments and opinions on the topics covered in *The Navigator*. We reserve the right to edit letters for space reasons if necessary. Views expressed by letter contributors do not necessarily reflect those held by The Nautical Institute

THIS ISSUE

FIND OUT MORE

***The Navigator*, issue 30, June 2022**
https://www.nautinst.org/technical-resources/navigator/the-navigator-issue-no-30-fatigue.html
Found this issue of *The Navigator* interesting? Check out this past issue for more information on how fatigue affects us physiologically and how to spot it

Human Performance and Limitations for Mariners
https://www.nautinst.org/shop/human-performance-and-limitation-for-mariners.html
This practical book from The Nautical Institute takes a very direct approach to explaining how understanding our limitations can improve performance, safety and job satisfaction

HORIZON final report summary
https://cordis.europa.eu/project/id/234000/reporting
A major research project looking at how different watchkeeping patterns affect performance by measuring neurological performance in real time

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NAV BRIEF

with **David Patraiko FNI**
Director of Projects,
The Nautical Institute

Work hard, rest hard

A professional navigator must be able to carry out their duties safely. That means not being fatigued or overworked. Don't risk dropping off – the safety of the ship depends on it!

Being a professional navigator ensures safety for the crew and environment, alongside commercial benefits to the company. It calls for extensive training and experience (with reflection), as well as continuous development and learning. However, even the most professional navigator with the best intentions can make mistakes if they are suffering from fatigue or allow themselves to become distracted.

Excessive workloads can have a devastating effect on performance and safety. In the 1990s, the aviation industry adopted a programme called 'Human Performance and Limitation' (HPL). This was designed to help aeroplane pilots understand how the limitations of the human body can affect decision-making. This comprehension is just as crucial to mariners. Ships are industrial machines and humans are flesh and blood. For these to work in harmony, everyone in the maritime industry must understand the limitations (and benefits) of humans – and how to manage them properly.

There are many reasons why a navigator's performance might be compromised, including fatigue, excessive workload, lack of sleep due to the environment, personal stresses, etc. The difference between 'work imagined' and reality is an important issue for shore managers and regulators. Asking the crew for 'just one more report' might not seem significant when sitting in a shore office; however, the cumulative impact on seafarers can be significant. We have spent decades reducing crew numbers due to the 'benefits of technology'. Yet, during the same period we have increased bureaucracy of compliance for reports, inspections, onboard training and commercial communications. Are we realistically readjusting crewing levels to take this into account? Perhaps not.

SHIPS ARE INDUSTRIAL MACHINES AND HUMANS ARE FLESH AND BLOOD. FOR THESE TO WORK IN HARMONY, EVERYONE IN THE MARITIME INDUSTRY MUST UNDERSTAND THE LIMITATIONS (AND BENEFITS) OF HUMANS

In this edition of *The Navigator*, we explore this issue from various points of view, listening particularly to seafarers. We hope that the regulators and operators who read this edition will also take note and rethink the demands upon the mariners. We encourage mariners to take fatigue seriously, know how to spot it in themselves, and others, report truthfully and have the courage to say NO when needed. Captain André LeGoubin offers excellent advice from his many years at sea on pages six and seven, while the Royal Institute of Navigation compares fatigue management at sea with that in the sky on page 10.

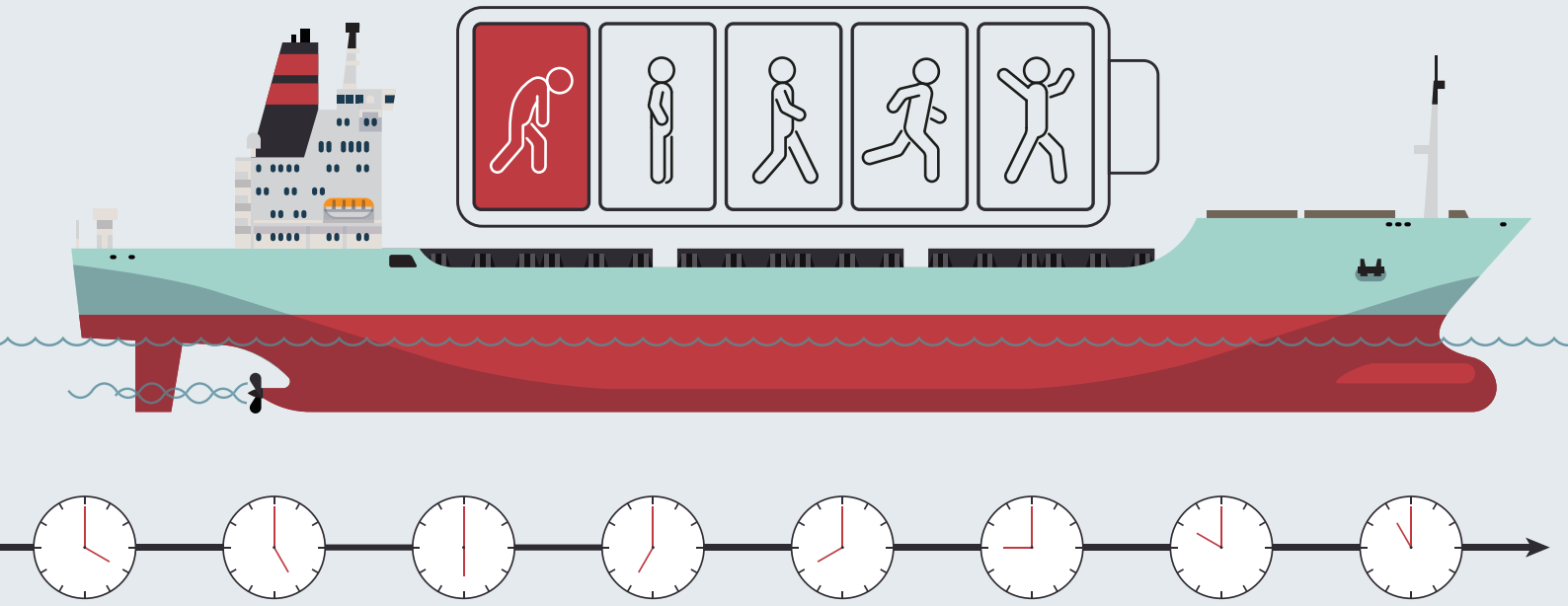
There are some good tips for managing fatigue on board, such as adjusting rotas where possible, employing good bridge resource management, paying attention to sleep hygiene and, perhaps most importantly, notifying the Master of issues and concerns where necessary. Short-term fatigue due to weather is one thing, but more prolonged fatigue affecting the whole crew as a result of continued or increasing high workloads must be brought to the attention of shore management. It is one thing to try to make a voyage with minimum people, but this is clearly counter-productive if a ship runs aground.

Navigators must look after themselves, and others on board. Owners and regulators must take stock of realistic crewing levels and whether the notion of 'work imagined' is what is happening in reality. Mariners must not be afraid to give realistic feedback.

As always, we encourage readers to share these ideas with your teams on board. It is your professionalism in recognising and managing workload that keeps your crews, ships and the environment safe.

Work, rest and port calls

A fundamental skill for any navigator is the ability to maintain situational awareness and make good decisions, both in planning and in carrying out the voyage. That requires good training, and good maintenance and development of knowledge. It also needs sufficient physical and mental rest



Seafarers rightly take pride in their resilience and ability to do the job that needs doing. Unfortunately, one of the symptoms of fatigue is that it prevents you from realising when you are unable to carry on safely.

Dr Michelle Grech explains further in The Nautical Institute's publication *Human Performance and Limitation for Mariners*: "Fatigue makes it harder to concentrate and pay attention, reaction time is slower and co-ordination is poorer. In most cases, fatigue leads to slower, more narrowed and muddled thinking, affecting decision-making and judgment.

"Crucially, fatigue reduces the ability to recognise when your performance is impaired. Individuals suffering from chronic fatigue are the worst judges of how well they are performing. As a result, a large number of seafarers may continue to work, even conducting safety-critical tasks, under the influence of fatigue, not realising that their performance and judgement is impaired."

It is precisely because you might not realise that there is a problem that it is so important to keep accurate records of your own work and rest hours – and comply with the onboard fatigue risk management system. A recent survey by the World Maritime University found that 64% of respondents reported adjusting their work/rest records to show they had worked fewer hours than was actually the case.

Concealing the problem may put you and your ship at risk – and in the long run, makes it harder to solve at source if those with the power to change the system believe the current situation is working.

Workload, compliance and safety

The maritime industry recognises the importance

of rest for good performance and health. Attempts have been made to manage the workload, including updating minimum requirements in the 2010 Manila Amendments to the STCW Code, which came into force in 2012. This mandates a minimum of 10 hours' rest in any 24-hour period and 77 hours in any seven-day period. Periods of rest may be divided into no more than two periods, one of which shall be at least six hours in length, with no more than 14 hours between periods of rest. These hours must be logged and can be checked by any Port State Control or flag surveyor.

Work 'as imagined' and 'as done'

This all looks great on paper. However, the work/rest requirements do not take into account current knowledge on sleep, fatigue and the science of safety. Part of the issue is that there is a huge difference between work 'as imagined' – the obvious things that have to be done – and work 'as done' – the invisible background work that goes into making the obvious work possible.

As Intermanager's Captain Garry Hallet explains, writing in *Seaways* about port calls: "The 'work as imagined', is that the ship arrives in port, loads or unloads its cargo and then sails on to the next port and repeats. On occasion, the charterer may wish to fuel the ship but that's about it.

"The 'work as done' is usually very different. Stores are loaded; garbage discharged; slops disposed of; lubricants and fresh water taken; service engineers arrive to upgrade systems or fix issues on board, crews change; port inspectors and flag and class surveyors come and go. On top of this additional workload, there are company inspections, reviews of the ship's safety management system – and so the list goes on." Then, of course, once you're back at sea, the watch system continues, even if your rest time was disturbed, or not possible at all.

WHILE ACCURATELY REPORTING AND MANAGING YOUR OWN FATIGUE LEVEL IS IMPORTANT, THE DISCONNECT BETWEEN REAL AND EXPECTED WORKLOAD IS AN ISSUE THAT MUST BE SOLVED AT A HIGHER LEVEL

What it looks like at sea

Port calls are just one example where the work needing to be done may exceed the time allotted to do it. The Nautical Institute asked members of its Seagoing Correspondence Group – who are all currently at sea – to share their experiences. They make it clear that being on watch, or even conducting operations during port calls, are far from the only responsibilities that seafarers face, and that the level of workload is causing fatigue – and putting safety at risk:

"Fatigue, excessive paperwork and complex SMS continue to be the key challenges [mariners] are facing at sea. The workload has increased many times, and manning is an issue which the ship owners are not addressing."

A Second Officer responsible for voyage planning goes into more detail: "To give just one example, at the commencement of a sea passage, the vessel is required to report all events and send detailed data to the owner, the charterer, the sub-charterer and a second sub-charterer. [...] All of this has to be completed immediately after completing discharge and sailing from port, after less than 24 hours alongside.

"Each recipient probably believes that their report is simple and takes only a few minutes to complete. In reality, for the crew it means additional hours of work, often distracting officers from their watchkeeping duties. However, the problem is mainly visible only on board the ship."

Solving the problem at source

While accurately reporting and managing your own fatigue level is important, the disconnect between real and expected workload is an issue that must be solved at a higher level. The Nautical Institute is working to make sure that the problem is visible beyond the ship, to shipowners, charterers and, above all, to the IMO flag state representatives who create the legislation.

We are working with flag states to ask the IMO to review the effectiveness of the current legislation, identify and confirm issues with the current system. We must then move to identifying solutions, which may involve changes to minimum crewing levels, for example.

Individual responsibility is important, but it is making sure that seafarers are heard and respected at the highest level that will make a difference long term.

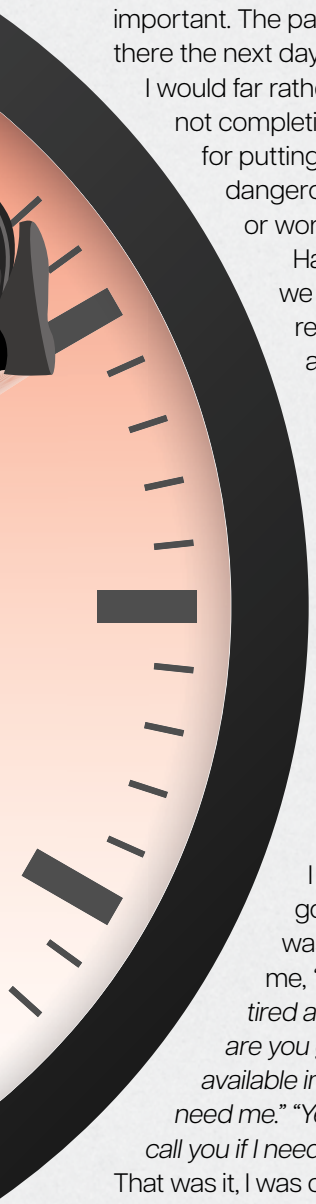
If you are a Member of The Nautical Institute and a current mariner, please consider joining our SeaGoing Correspondence Group to help us share your experience more widely.

www.nautinst.org/resources-page/join-our-seagoing-correspondence-group.html.

When tiredness takes over – what next?

We all get tired, but fatigue is a very different matter – and drinking coffee does not help! As a seafarer, I have experienced both. I describe fatigue as being so tired that you cannot think straight and often don't see the whole picture. It is a debilitating and, at times, dangerous situation. We must recognise the symptoms of fatigue in ourselves as well as in others. The consequences of failing to do so can literally be a matter of life and death. It can be hard to speak up, but you need to recognise when it is time to do so

by **Captain André LeGoubin**
MNM MA FNI



I can remember as a third mate walking backwards and forwards across the bridge to stay awake. I was so tired I didn't dare sit down as I knew I would fall asleep. That is the time you must prioritise your tasks. My priority was the safe navigation of the vessel, not catching up on paperwork or the myriad other tasks I had to do. I had to stay awake and keep everyone on board safe, and I achieved it. Nothing was more important. The paperwork was still there the next day, and I did it then.

I would far rather be criticised for not completing a form than for putting the vessel in a dangerous situation – or worse!

Having said that, we must accept our responsibilities. We are part of a small team, and everyone must play their part to the best of their professional ability. I remember as a very junior third mate going up the English Channel for the first time as a qualified officer. The Master was on the bridge and, to be honest, I hoped that he was going to stay up as it was quite busy. He told me, *"André, I am really tired and have to sleep, are you going to be OK? I'm available immediately if you need me."* "Yes Sir," I replied, *"I'll call you if I need you, sleep well."* That was it, I was on my own and did my job safely and as I had been trained. I learnt a lesson that night from that Captain about responsibility, trust and teamwork.

When I first went to sea (a long time ago) most Masters did not permit their OOW to sit down, in case they fell asleep during the watch. Although it was always an unwritten rule, you had better look out if they ever found you in the Pilot's chair. Those days are long gone and, in many ways I am pleased, but sometimes I think I'm lucky that I sailed with these old fashioned seafarers, although I didn't think so at the time!

IF YOU ARE SO TIRED THAT YOU CANNOT DO YOUR JOB SAFELY, YOU HAVE A RESPONSIBILITY TO TELL SOMEONE AND NOT WAIT AND HOPE THEY NOTICE

It is important to help your shipmates when you can. For example, if you are on the 8 to 12 watch and, due to the ship's schedule, the Second Officer is exhausted but you are OK, consider doing an extra two hours on watch until 0200. That way you will remain within the work-rest hours legislation by having six hours' rest and the Second Officer will only have to do two hours before returning to their bunk. Believe me, they will appreciate and remember it, and may even reciprocate when the opportunity arises. Don't expect that, though. Do it because you are a professional team member and someone who cares about their fellow seafarers.

One word of caution, tell the Second Officer you are going to do this, as they may set an alarm. Don't wake them up to tell them!

Senior Officers, Captains and Managers may be very good at their jobs, but they are not psychic. If you do not tell them that you are suffering from fatigue they will not know and will not be able to help you. This is something you must think about carefully as you don't want to get a reputation for using tiredness as an excuse not to work. However, if you are so tired that you cannot do your job safely, ***you*** have a responsibility to tell someone and not wait and hope they notice.

In my 13 years as an underway STS Mooring Master/Pilot, there were only two occasions when I was so tired that I could not do my job. Both times I told my line manager and she took it extremely seriously. She knew me well enough to know how concerned I was and how difficult it was for me to make that call. As a seafarer we just want to get the job done, but at times the only safe thing to do is say "no". Just not too often!

We were working off the East Coast of the USA in poor weather and trying to get the jobs done between weather fronts. I had reached the point where I was so tired that I did not think I could put the vessels together safely. I knew the only option was to tell my boss and delay the job, which I did. We agreed that I would be OK if I could get six hours off and at least four hours of unbroken sleep. As I had been proactive in this, she made operational arrangements to give me my rest, and later that night I put the vessels together safely. I could have gone ahead and may have been able to do the job, but can you imagine what would have happened if an accident had occurred. It would have been my fault because I did not have the courage to speak up.

Even if you are the most junior officer on board, you have a huge responsibility to your fellow seafarers, the environment and the vessel. You also have a responsibility to yourself. Only you really know if you are simply tired, or so fatigued that you cannot do your job safely. Your responsibility also lies in making sure that you take every opportunity to rest – and to work with your fellow team members to help them get their downtime too.

WATCH OUT

In this series, we take a look at maritime accident reports and the lessons that can be learned

Slipping into sleep; drifting into danger

How one Master's fatigue led directly to the grounding of a passenger vessel

What happened?

A small passenger vessel was running overnight trips for tourists from a home port. It had a small crew that worked a seven-day rotation before being relieved. On the evening of the sixth day, the vessel was being conned by the Master who was alone in the wheelhouse and sitting in the conning chair. He was feeling fatigued due to his heavy workload and was also taking prescribed medication. The Master initiated a turn to port, following his chosen route back to port. He then fell into a micro-sleep. As he was alone, no-one was there to rouse him and the vessel ran aground on some rocks.

The grounding caused a small hole below the waterline. This was not, however, judged to be a material threat to the vessel and incoming water was dealt with by a small bilge pump. Passengers were mustered, assessed for injuries and returned to the home port via fishing vessels. Investigations found that the incident was likely to have been caused by the Master's high levels of workload-induced fatigue.

Why did it happen?

- The Master was in sole charge of the vessel and, together with his crew, was in the sixth day of a seven-day rotation;
- His sleep may have been broken by a range of interruptions, such as vessel movements and changes in the weather;
- The Master fell into a micro-sleep while conning the vessel, caused by the effects of workload-induced fatigue. This was not mitigated against by his company's SMS;
- He was also taking prescribed medication that may or may not have caused side-effects, including drowsiness.

What lessons can be taken from this example?

- Beware the dangers of micro-sleeping. If you can fall asleep at the wheel of a car, you can also do so at the con of a ship;
- Standing and moving around while navigating makes it less likely that you will fall asleep, as compared to when you sit down;
- Take 'sleep hygiene' seriously and always ensure that you are adequately rested before taking on navigational duty;
- Be aware of the possible side-effects of prescribed medications.

THE MASTER FELL INTO A MICRO-SLEEP WHILE CONNING THE VESSEL, CAUSED BY THE EFFECTS OF WORKLOAD-INDUCED FATIGUE

The Nautical Institute's Mariners' Alerting and Reporting Scheme (MARS) – https://www.nautinst.org/resource-library/mars.html – comprises a fully searchable database of incident reports and lessons, updated every month. If you have witnessed an accident or seen a problem, email Captain Paul Drouin at mars@nautinst.org and help others learn from your experience. All reports are confidential – we will never identify you or your ship.

WHO'S NAVIGATING

Name: Otari Tvaradze
Current Position: Deck Cadet

Building resilience, leadership and confidence

Deck Cadet Otari Tvaradze discusses the value of continuous learning and maintaining high standards in the LNG sector

Q Why did you decide to pursue a career at sea?

A I grew up watching my father, who is also a seafarer. Through him, I learned what this profession truly means: discipline, responsibility and the pride of working in an industry that keeps the world moving. His stories, dedication and the respect he had for his job inspired me from an early age.

At the same time, I knew I wanted a career that would challenge me and help me grow. Life at sea offers something unique: every day is different, every operation demands focus and every voyage teaches you something new about yourself. It builds resilience, leadership and confidence – qualities that cannot be learned behind a desk. It is a career that allows me to grow as a person while building a stable and meaningful future.

Q Where do you see yourself in five years' time? Ten?

A Five years from now, I see myself sailing as a fully qualified and confident deck officer, ideally holding the rank of Second Officer on an LNG carrier or FSU. I hope to be trusted as a reliable bridge team member; someone who can take responsibility during critical moments and support the ship's Master and Chief Officer with professionalism.

In ten years, I aim to have gained extensive experience in navigation, cargo operations and ship management. My goal is to lead a vessel with professionalism, ensuring the safety of the crew, cargo and environment, while also mentoring the next generation of officers.

REWARDS COME FROM CONTRIBUTING TO A VITAL INDUSTRY THAT POWERS THE WORLD

Q What do you find challenging and rewarding about your workload in the LNG sector?

A One of the biggest challenges is the responsibility involved in handling LNG cargo. It demands extreme precision, constant monitoring and strict adherence to safety procedures. Even minor errors can have serious consequences, which is why every task – from watchkeeping and navigation to cargo and safety operations – requires full attention.

Seeing a safe voyage completed, cargo operations executed efficiently and the vessel operating smoothly as an FSU gives a deep sense of achievement. Learning from experienced officers and gradually taking on responsibilities has improved my technical skills and confidence. The challenges push me to grow, and the rewards come from contributing to a vital industry that powers the world.

Q How do you judge your own performance at sea? What criteria do you use?

A As a cadet, I focus on completing tasks accurately and efficiently, adhering to safety procedures and maintaining high standards. The training and mentorship I received from The Nautical Institute has also played a crucial role in developing my technical and leadership skills, helping me grow into a competent future LNG deck officer.

Ultimately, I judge myself by continuous learning, effective teamwork, safety compliance and the ability to contribute positively to every aspect of shipboard operations. I aim to not only complete my duties but also to develop the skills, knowledge and confidence necessary for a successful career at sea.

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

GNSS interference, workload and fatigue

Managing a new addition to the established workload – and what maritime regulation can learn from civil aviation

Responsibility for fatigue management of a ship's crew lies largely with the Master of the vessel. They must implement a fatigue management plan in accordance with their company's safety management systems. These should in turn adhere to the ISM Code. Problems related to fatigue are often exacerbated under stressful navigational conditions, particularly if lean manning systems mean there are fewer crew members available to offer support on the bridge.

A recent investigation undertaken on behalf of the Royal Institute of Navigation explored the impact of increased workload and stress resulting from GNSS interference.

Mariners were asked to estimate the impact of GNSS interference on their workload. Of 245 mariners who responded to the survey, just 25% reported little to no impact on their workload from GNSS interference. Contrastingly, 42% reported a moderate impact and nearly 33% reported a large impact on their workload.

Stressful situations need support

A further question asked respondents to describe the actions they took to counter any increase in workload. Over 60% of 241 answers supplied required calling on additional people. This included:

- Calling the Master to the bridge;
- Asking an AB to steer the ship during periods when the autopilot was not functioning normally;
- Seeking assistance to help silence alarms;
- Seeking assistance to adjust equipment settings to compensate for interference or revert to traditional navigation;
- Calling an engineer to the bridge to check equipment.

All of these would require additional people on the bridge, potentially disturbing someone else's rest hours.

One survey respondent wrote, "No actions possible, as extra crew cannot join the vessel in the middle of the ocean. All crew are already fixed into their watches and extra workload is inadvisable."

This suggests that their vessel is very lean-manned. While it is hoped that they close up extra personnel for a fog watch, this is a clear example of a situation where safety and lack of rest are at odds with one another.

More than half of those who replied said GNSS interference had a large impact on the safety of the vessel. Even more stated it had a moderate or large impact on their personal safety, physical or psychological well-being. In demanding situations like this, it is reasonable to conclude that mariner fatigue could present a critical risk to operational effectiveness and even safety.

Managing fatigue at sea and in the air

Let's compare mariner fatigue with fatigue management for civil aviation pilots. Civil aviation pilots and crews have stringent and uniformly enforced working-hour and rest regulations. The aviation sector places the onus of compliance on the airline rather than the pilot. By contrast, maritime responsibility for fatigue management lies primarily with the ship's Master.

Airlines apply working regulations rigorously, using a formal fatigue risk management system to manage pilots' hours. Work and rest periods are extensively monitored with limits on: actual flight hours per flight/month/year; total flight duty hours per duty period and per month; working hours per year and rest hours at base and away, per previous duty length and per week.

The maritime working environment is quite different, so no direct read-across is possible. However, this illustrates the extent to which operational and duty hours must be controlled to prevent safety being compromised.

Ivana Carrioni-Burnett FRIN is a marine pilot at the Port of London Authority and Chair of the Maritime Navigation Group at the RIN

TAKE 10

Ten ideas to help manage tiredness and fatigue at sea – and how to spot the difference before it's too late

1 Bad decisions

Even the most well-trained and experienced professional navigator can make bad decisions when impaired by fatigue.

2 Tiredness versus fatigue

All mariners get tired, it is a fact of life at sea. Fatigue is being so tired that you can't think straight – and even coffee doesn't help!

3 Watch and learn

Learn to recognise fatigue in yourself (not as easy as it sounds) and recognise it in others.

4 Take action against fatigue

If excessive workloads or fatigue is apparent, develop mitigation methods for yourself and for the crew.

5 You can say 'No'

Know when to say 'No' or alert others to the risks. Also, keep an eye out for opportunities to give others a break where needed.

6 Think ahead

Periods of excessive workloads, distractions or fatigue can often be anticipated, such as port calls, inspections, busy traffic areas, bad weather etc... plan ahead for mitigation.

7 Decision-making matters

The safety of the crew, vessel and environment depends on your ability to make good decisions each and every time. If you suspect degradation of decision-making, take action right away.

8 Be honest

Mariners often feel that they can somehow be super-human, but no-one can do that. Reduced human performance is a safety issue. Be honest when recording your hours of work and raise any issues with your DPA.

9 Change

Ship owners and regulators need to be encouraged to make changes if necessary; however, they must be aware of the situation and have evidence of risks. That means issues must be reported!

10 Look out for each other

Have honest discussions about managing workloads, distractions and fatigue on board. This is a key safety issue and can affect everyone on board from the highest to lowest ranks.

WIN AN iPAD

Just post a picture of you with your *Navigator* on Instagram, including the hashtag #NAVsnap, or send us a message on Facebook with your photo attached (www.facebook.com/thenauticalinstitute) and tell us the name of your ship or your college, if you have one. Let us know if you're a member of The Nautical Institute, too (everyone gets entered in the draw, whether you are a member or not!) Or send us the information in an email!

AND THE WINNER THIS ISSUE IS...

This month's Navsnap winner is John Carlo Espineda Escullar, sailing on the bulk carrier *San Nicolas*. John is pictured reading *The Navigator* while on deck in port – we hope it was a good read!

JOHN CARLO ESPINEDA ESCULLAR