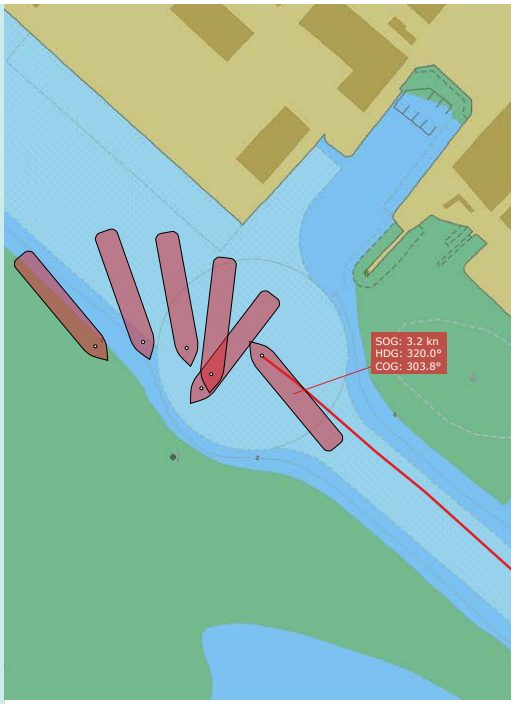
MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY DIGEST

Lessons from Marine Accident Reports

1/2023



Featuring introductions by Ashley Nicholson MBE | Hazel Bennett | Andrew Flanagan

MARINE ACCIDENT INVESTIGATION BRANCH

The Marine Accident Investigation Branch (MAIB) examines and investigates all types of marine accidents to or on board UK vessels worldwide, and other vessels in UK territorial waters.

Located in offices in Southampton, the MAIB is an independent branch within the Department for Transport (DfT). The head of the MAIB, the Chief Inspector of Marine Accidents, reports directly to the Secretary of State for Transport.

This Safety Digest draws the attention of the marine community to some of the lessons arising from investigations into recent accidents and incidents. It contains information that has been determined up to the time of issue.

This information is published to inform the merchant and fishing industries, the recreational craft community and the public of the general circumstances of marine accidents and to draw out the lessons to be learned. The sole purpose of the Safety Digest is to prevent similar accidents happening again. The content must necessarily be regarded as tentative and subject to alteration or correction if additional evidence becomes available. The articles do not assign fault or blame nor do they determine liability. The lessons often extend beyond the events of the incidents themselves to ensure the maximum value can be achieved.

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The editor, Clare Hughes, welcomes any comments or suggestions regarding this issue.

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GLOSSARY OF TERMS AND ABBREVIATIONS

AB	able seaman
AIS	automatic identification system
CCTV	closed-circuit television
CO2	carbon dioxide
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea, 1972
COSWP	Code of Safe Working Practices for Merchant Seafarers
DSC	digital selective calling
GMDSS	Global Maritime Distress and Safety System
IMO	International Maritime Organization
kg	kilogram
kts	knots
Li-ion	lithium-ion
m	metre
“Mayday”	the international distress signal
MCA	Maritime and Coastguard Agency
MOB	man overboard
MSC	Maritime Safety Committee
MSN	Merchant Shipping Notice
nm	nautical mile
OOW	officer of the watch
PMS	planned maintenance system
PPE	personal protective equipment
RIB	rigid inflatable boat
RNLI	Royal National Lifeboat Institution
ro-ro	roll-on/roll-off
RYA	Royal Yachting Association
SAR	search and rescue
UKHMA	UK Harbour Masters’ Association
VHF	very high frequency
VSP	Voith Schneider Propeller
VTS	vessel traffic services

CHIEF INSPECTOR’S INTRODUCTION

Welcome to MAIB’s first Safety Digest of 2023. In my opinion, this is the more important of the MAIB’s biannual Safety Digests because it is published as the northern hemisphere emerges from winter. This is not simply an observation that the leisure boating season is about to start, though the digest does give us the opportunity to re-emphasise some good safety tips before going afloat. More to the point, anyone can be caught out as the air warms and layers of clothing are shed. Strong sea breezes that develop as the sun heats the land can add significant wind-chill that turns a pleasant day into a cold one, and anyone entering the water, deliberately or otherwise, will find the sea temperature is still very cold.

As usual, I will start by thanking Ashley Nicholson MBE, Hazel Bennett and Andrew Flanagan for their respective introductions to the merchant, fishing and recreational sections of this edition. Each is an expert in their own field, and their industry insights help bring contemporary context to the cautionary tales and safety messages in the following pages. I hope you will find time to read the whole edition but please do read the section introductions.

This digest has a good balance of stories but perhaps with an increased number of incidents and accidents that were controlled early on by a well-trained crew and so did not escalate into a disaster or tragedy. I am in complete agreement with Ashley’s words, *It is how you deal with an incident rather than what happens that matters*; look at cases 5, 12 and 16 for some examples of where good system knowledge and well-practised safety drills helped save the day.

Case 12 interested me because it involves the failure of a component that was not the subject of routine maintenance or periodic replacement. Safety critical systems are full of such components; in this case it is a fuel actuator valve, but it could be a limit switch (see case 6), a pressure relief valve or any number of other items. Ships can be in service for 25 to 30 years and while many components are inspected, maintained and routinely replaced, others soldier on until they fail. When you have done all the easy jobs, start thinking about the onboard systems you take for granted, and what might happen if they were to fail suddenly. If you do find out the hard way, please let us know and we will include your story in these digests so others can learn from your experience.

Finally, the *Reul A Chuain* safety flyer, reproduced at the back of this digest, helps me make the point that it is too late to start thinking about man overboard procedures when you have someone in the water. One of MAIB’s key safety messages for 2023 is not just to think about how you would recover an unconscious man overboard, but to actually practice it as realistically as possible. Put simply, if your risk assessment identifies a risk of falling or being knocked overboard, especially if one of the mitigations is wearing a personal flotation device, then should that occur the next task will be man overboard recovery.

Putting a lifejacket on is easy; recovering a man overboard is not – please practice it.

I hope you enjoy reading this edition and, when you have finished, please pass the digest on so others can benefit too.

Be safe.

Andrew Moll OBE
Chief Inspector of Marine Accidents

MERCHANT VESSELS

From my very early years in the maritime industry I was told to ensure I read the latest MAIB publications when they landed. As a new and inexperienced team member this proved worthwhile advice and I found it both interesting and thought-provoking. I have ensured that the teams I have worked with over the years have done and continue to do the same; continuous improvement through collaboration is key to growing as individuals and together as an industry. For this reason I was truly honoured to be asked to write the introduction for the Merchant Vessels section of this Safety Digest.

I joined the port industry nearly 15 years ago, having spent a very short period of time at sea. I relied heavily on the procedures and processes to help me through my cadetship, and my transition into a shore-based role in vessel traffic services. Over the years my career has been entirely focused on the maintenance of navigational safety within ports and harbours, and in doing so the creation and implementation of appropriate processes and procedures to facilitate the safe movement of the large variations of traffic we see in our UK waters. This remains my key priority in my roles as both president of the UKHMA and marine director at the Port of Tyne.

Ports, harbours and ships across the UK and the wider world are run and operated by people who all wish to stay safe in their workplace. Few, if any, incident investigations find that the root cause was a wilful act. We therefore ask ourselves this: *Why do our procedures continue to fail and why do we continue to fail to follow procedures?*

The reality when reading cases like those featured in this issue is that it is not always the individual act that causes the incident but more so a series of other influencing factors. An overreliance on electronic safety systems and, all too often, the failure to use our basic skills culminate in the creation of an act or omission that creates an unsafe condition.

We must treat the source not the symptom

It is important when we investigate incidents that we ascertain the root cause so as to ensure we can truly address the issue rather than implement another procedure to mask one that is failing. We must treat the source not the symptom.

The root cause analysis technique developed by Sakichi Toyoda[1] of asking *Why?* five times to determine the true origin of an incident should assist in making certain that we do not fail to identify the reason the individual may have chosen to override the system or not follow the procedure. Where human error is attributed as the cause, we do not stop there but continue to ask *Why?* to safeguard the removal of systemic or underlying issues and allow meaningful learning and improvements.

I have spent many hours liaising with captains, tug masters, pilots and operators undertaking detailed incident investigations and, whether it be poorly-managed isolation processes causing a mechanical or electrical fault during manoeuvres, as in case 2, or the more complex waters of commercial pressures overriding safety decisions, it is apparent that not all procedures are regularly followed. With this in mind we must ensure that our port personnel, pilots, tug boat crews and ships' crews alike are appropriately trained in responding to emergency situations.

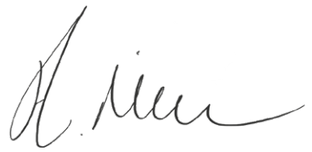
It is how you deal with an incident rather than what happens that matters; you cannot always prevent bad things happening, but handling them effectively can help prevent a mistake from becoming a crisis. The firefighting responses in case 5 and case 12 provide good examples of when drills and training before the event significantly improved the crew's ability to deal with an emergency and minimised the severity of the outcomes.

A well-trained and competent individual will provide greater value to the overall safety and performance than that of an automated system and it is important that we do not become overreliant on the mechanics. In a world of ever-evolving technological developments, increased use of artificial intelligence, autonomous vessels and alternative fuels we must never underestimate the value of human involvement in the decision-making process. It is important that we see people less as a source of error and more as the creators of safety.

It is how you deal with an incident rather than what happens

In reality there will always be gaps in any system because creators cannot foresee all situations. It is therefore important that our people, our crew and our teams are trained and supported with the tools they require to identify and manage the risks that arise and continually improve their procedures in the process.

The MAIB reports provide a vital element in highlighting lessons, good and bad, from accidents and incidents across the industry. However, similar to having a robust safe operating system in place and failing to follow it, improvements to safety will only come if its recommendations and advice result in review and reflection and, where appropriate, changes to practice, equipment or process, that reduce the risk of similar incidents in the future. Too often the MAIB's conclusions are that incidents could have been avoided and yet the same or similar tragedies continue to appear on the pages of its reports and digests. While improvements to safety management are important, the need to learn from mistakes and experience will endure; that being said, we must base our growth and development of good safety practice on good solid foundations and not the shoogly pegs.



ASHLEY NICHOLSON MBE | Marine Director, Port of Tyne and President of the UK Harbour Masters' Association

Ashley joined the Port of Tyne in 2021 as its marine director and a member of the executive team. She is responsible for the port's marine operations, including pilotage and conservancy, and leads on the decarbonisation of its vessels and responding to global trends as deep-sea shipping switches to sustainable fuels. Ashley joined the Port of Tyne following over a decade at Forth Ports, where she held a variety of roles from VTS operator through to senior harbour master.

Ashley is the first female president of the United Kingdom Harbour Masters' Association (UKHMA), which represents over 500 UK harbour masters and marine professionals and acts as an industry expert consultee to UK government and regulatory agencies on UK maritime policy regarding safe marine operations. She is also an industry advocate for encouraging more women into the maritime workforce and was recognised for this in Her Majesty The Queen's New Year Honours List 2021.

[1] https://www.mindtools.com/a3mi00v/5-whys

Too hot to handle

passenger vessel | accident to person

The propulsion engine of a small coastal passenger vessel began to overheat while on passage to its next port. One of the vessel's engineers stopped the engine and cleaned the sea water strainer, which had become clogged with debris and was restricting the flow of cooling water to the engine. The engineer also noticed that the engine's cooling system expansion cap (Figure 1) looked loose; he protected his hand with a rag and attempted to tighten the cap, which suddenly blew off. The engineer responded by instinctively turning his back to the unit but was sprayed with scalding hot water from the engine's pressurised cooling system.

The engineer sought assistance on board and was placed in a shower to cool the extensive burns to his back while the emergency services were called. He was evacuated ashore by a Royal National Lifeboat Institution (RNLI) lifeboat, from which he was transported to a local hospital and treated for superficial burns.

It was later found that the securing lugs for the engine cooling system expansion cap were bent (Figure 2), which had possibly prevented the cap from sealing correctly.

Figure 1: Expansion cap in the fully closed position

Figure 2: The bent securing lug

The Lessons

1. **Observe →** Always allow an engine to cool down before attempting to conduct maintenance on a pressurised cooling system.

2. **Risk →** Ensure you refer to the risk assessments. These exist to alert operators to potential hazards and the mitigation measures that should be implemented before the task is undertaken. The risk assessment method statement is a clear explanation of how you are going to manage the identified risks.

3. **Procedure →** The company issued a safety flash that highlighted the dangers identified in this case. Familiarise yourself with manufacturers' manuals and ensure that you know how to complete a task correctly and safely.

It has to go somewhere!

oil tanker | risk assessment

An oil tanker was anchored off the south coast of the UK when an auxiliary room fire alarm activated. The ship's firefighting team went to the engine room to investigate and discovered smoke emanating from an overheating sea water pump (see figure); they stopped the pump, allowed it to cool down and found that there was little damage.

The pump supplied cooling water to several items of machinery. Three days before the incident, one of the ship's engineers had closed the valves to one piece of the machinery in preparation for planned maintenance but did not know that all of the other pieces of equipment were also isolated.

The cooling water had nowhere to go when the valves were closed and there was no flow through the cooling pump, which caused its mechanical seal to gradually overheat and generate smoke.

Figure: The sea water pump

The Lessons

1. **Communicate →** Maintenance should be effectively planned and communicated. It is vital to consider the effects of isolation on running equipment that may not be directly related to the job in hand. The use of isolation logs and lock-out/tag-out notices can help engineers monitor the status of their systems and prevent mishaps.

2. **Aware →** All of the human senses play a part in the detection of issues that electronic or mechanical sensors may fail to pick up. The application of touch, smell, sight and sound while moving through a space are powerful tools in the armoury of a watchkeeping engineer and provide early warning of a developing problem.

A nerve-racking accident

cargo vessel | accident to person

A stevedore suffered nerve damage, sickness and disorientation after handling cans of fumigant while unloading sweet potato pellets from a general cargo vessel. The fumigant was later identified as aluminium phosphide. It had been placed among the bags of cargo by the vessel's crew during loading to control insect infestation. The fumigant had not been deployed by specialist fumigators due to COVID-19 access restrictions that were in force at the loading port.

The untrained crew incorrectly deployed the fumigant, which did not fully volatilise or disperse during the 5-month voyage to the cargo's discharge port and so presented both a fire hazard and poisoning risk. The crew did not record the use of fumigant on board and the discharge port was unaware of its presence among the cargo. The ship's cargo holds were tested for oxygen levels, carbon dioxide, carbon monoxide, hydrogen sulphide and lower explosive limit before the stevedores discharged the cargo. When the stevedores started working in the holds they soon began to find the cans of fumigant among the bags of sweet potato pellets (see figure). The cans were marked with hazard symbols and the stevedores showed them to their supervisor; however, the cargo work was not suspended for several hours, by which time some of the stevedores had been in contact with the aluminium phosphide. The next morning one of the stevedores became unwell and required hospital treatment for sickness, disorientation and nerve damage to his hand.

Several hundred cans of fumigant were later removed from the cargo vessel's holds by a specialist contractor. It took several months for the injured stevedore to recover and be fit enough to return to work.

Figure: Stevedores unloading the bags of sweet potato pellets and (inset) a can of fumigant

The Lessons

1. **Qualified →** Fumigation of a ship's cargo is a specialised operation that should not be undertaken by untrained crew or stevedores.
2. **Risk →** Before unloading operations start, fumigated cargo holds must be tested by qualified fumigators and any residual fumigant removed. Port operators are reminded to be vigilant for potentially risky cargoes and to check with ship operators whether fumigants have been used on board.
3. **Hazard →** Cargo holds can be a hazardous environment; stop work if you find something unusual and check if it is safe to proceed.
4. **Equipment →** Appropriate personal protective equipment (PPE), including coveralls, gloves, face masks and respirators, must be worn when handling fumigants.
5. **Procedure →** Masters, owners and charterers are reminded of the contents of IMO Circular MSC.1/Circular.1264 – *Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds*, which details the safe use of fumigants, measurement of fumigant levels on board ships and the responsibility to notify port authorities of the potential presence of fumigants on board.

A dizzying loss of control

tug | capsize

In the early hours of the morning, the master of a twin azimuth stern drive port tug ordered the main engines to be started and for the crew to "*Let go*" the mooring lines in preparation for meeting an inbound vessel. The tug had been laid alongside another tug at a floating pontoon.

After accepting propulsion control from the engineer in the engine room, the master struggled to break clear due to the strong tidal stream. To prevent a collision with the other tug, full astern was being used on both engines when the port propulsion unit alarm sounded and the tug began to spin clockwise to starboard, narrowly missing both the moored tug and the floating pontoon (Figure 1).

The tug continued its spin to starboard while the master tried to respond to the problem. The darkened bridge meant that it was difficult to see the azimuth direction indicators (Figure 2) as he attempted to arrest the spin. The port shaft revolutions indicator was not working and the master had to rely on the starboard shaft indicator for his information. He sounded the general alarm to warn the other two crew that he had a problem. Having let go as instructed, the mate returned to the wheelhouse and, to try and assist the master, operated the wheelhouse buttons to ensure they had correctly engaged when propulsion control was taken from the engine room.

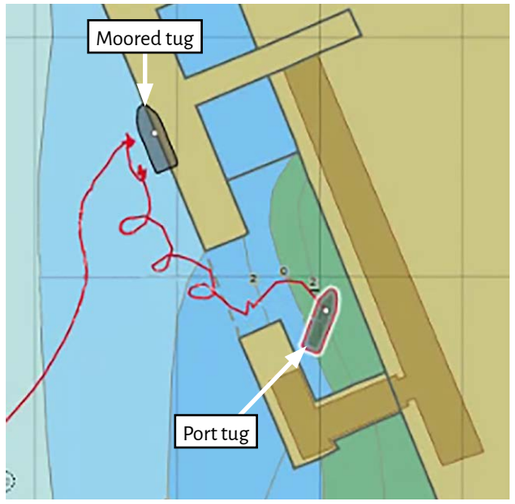


Figure 1: Uncontrolled track and final position of the port tug

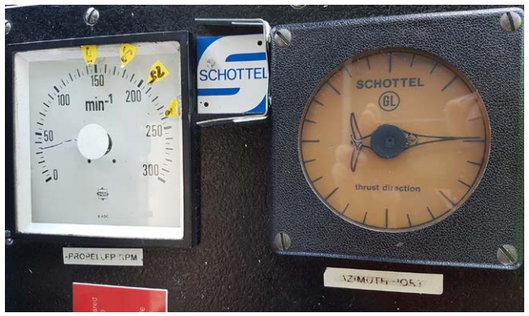


Figure 2: The azimuth direction indicators

The tug's bow made hard contact with an adjacent floating pontoon's handrails and pontoon air tank. Its port quarter then made heavy contact with a moored rigid inflatable boat (RIB), the impact of which caused the RIB to capsize and its landing stage to sink (Figure 3). The tug's stern and starboard side then rotated close to the shore before full propulsion control was regained and the master manoeuvred the tug out into the river.

The master informed the port's vessel traffic services (VTS) of the incident and advised the pilot on board the inbound vessel of the tug's propulsion fault. He then returned the tug to its berth for a closer inspection of the damage.

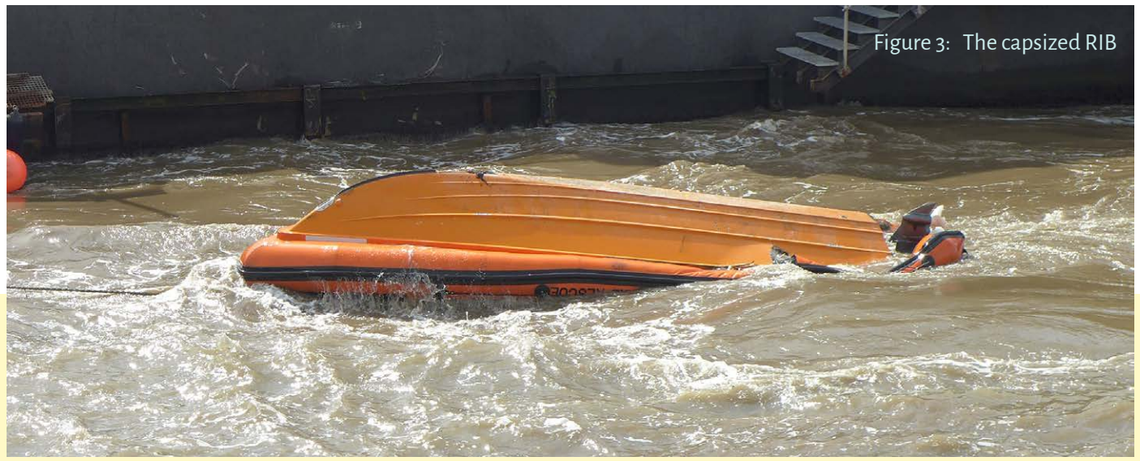


Figure 3: The capsized RIB

The Lessons

1. **Check →** The qualified and experienced master, mate and engineer joined the tug 6 days before the incident and had completed nine jobs over 5 days, three of which occurred at night. Their regular tug was undergoing a refit and they had operated this tug infrequently over several years. However, the tug spun four times over a 4-minute period before being brought under control, demonstrating incomplete propulsion system operational knowledge and insufficient emergency response skills. The clockwise spin to starboard after the master went full astern on both propulsion units indicates that the master only had control of the starboard unit. Proper pre-departure checks of the propulsion system would likely have identified that control of the port propulsion unit had not been successfully transferred to the wheelhouse.

2. **Aware →** The vessel familiarisation forms for the master and chief engineer required detailed knowledge of the tug's propulsion systems and what actions to take in an emergency situation such as a blackout and loss of propulsion. The wheelhouse reflected the vessel's age and comprised several different types of controls, various means of portraying information and a range of different alarm and indicator methods. Each control function was fitted with a dimmer to adjust the brightness of the indicators at night. Familiarity with such an inefficient layout requires time and experience, particularly when working with dimmed indicators at night, and the master must maintain a good lookout. Familiarisation forms should be recognised for their training and safety benefits rather than considered an unnecessary hurdle before letting go the mooring lines.

3. **Risk →** The azimuth directional indicators were hard to read due to the glass covers becoming less transparent with age. The port shaft indicator had failed a day earlier after an attempt to replace the internal lamps resulted in a broken indicator needle. A temporary needle repair was unsuccessful and the master, unable to adjust the brightness of the new lamps, resorted to covering the indicator with a piece of paper. A defect report submitted on the same day stated: *(Still) able to operate equipment* and *requires repair asap*. As a result, the master relied on the starboard shaft indicator for both shafts. Risk assessments are essential to identify the potential hazards arising from inoperative or ineffective propulsion controls and indicators and when to keep the vessel in operation or withdraw it from service for repairs.

4. **Communicate →** Many of the wheelhouse and engine room controls were labelled in Dutch and only a few had been relabelled in English. This, coupled with the crew's lack of familiarity with the vessel, exacerbated the potential for errors and misunderstandings. Incorrect assumptions about the meaning of a switch label can have expensive consequences.

An unfortunate fitting start to a new vessel

cargo vessel | fire

A recently built specialist cargo vessel was on passage when a temperature probe in the main propulsion system gearbox became detached from its fitting. Operating at 25 bar, the gearbox oil ejected the probe from the orifice followed by an oil jet that impacted engine room air supply trunking and sprayed a major part of the engine room (Figure 1), including one of the running main engines.

The gearbox low oil pressure alarm sounded on the bridge and within a few minutes the vessel's engineers had attended the engine room and declutched and stopped the engines. The master was informed of the extent of the oil spray and the vessel went to emergency stations; the designated firefighting crew got dressed and donned their breathing apparatus.

The oil had saturated the main engine exhaust lagging, which had started to smoke. Proactively, the engineers had prepared for ignition and brought wheeled foam fire extinguishers to the scene. A few minutes later, the oil-soaked lagging ignited but was quickly smothered in foam; subsequent small fires were similarly dealt with.

The vessel was able to make its way to port, where an investigation was started that involved the shipbuilder and gearbox manufacturer. Before the vessel could leave port, the contaminated lagging was replaced, electrical cable trays and affected electrical connections were cleaned and checked, various electrical motors were overhauled and the engine room was washed down.

The investigation identified that the temperature probe was held in place by a pipe compression fitting (Figure 2) that had not been fully tightened during the vessel build. Once the fitting slackened further, there was nothing to stop the oil pressure forcing the probe out of the gearbox.

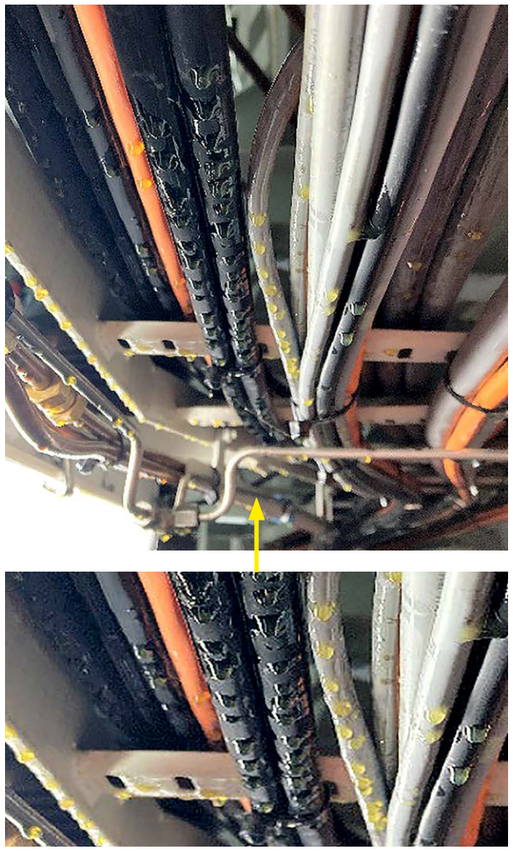


Figure 1: Oil dripping from engine room cables

Figure 2: The original temperature probe fitting

Figure 3: The new temperature probe fitting

The Lessons

1. **Action →** The crew responded well to an unexpected event that could easily have resulted in a major fire. Not only did they quickly go to emergency stations but they placed foam extinguishers near the oil-soaked engine so that lagging fires could be quickly dealt with. Knowing your emergency procedures and equipment pays dividends when a real situation occurs.

2. **Monitor →** New vessels always have snags, some of which only make themselves known once the vessel is underway. A heightened level of equipment monitoring during the first few months of a new vessel's life can catch some but not all; a good understanding of the different systems on board will therefore be vital in mitigating the consequences when the unexpected happens.

3. **Equipment →** Although it was a marine gearbox, the design of the probe fitting was insubstantial in terms of the operating environment and the consequences of it coming loose. Poorly designed equipment increases the risk of injury to the crew and can force them into undesirable workarounds. In this case, the manufacturer produced a redesigned fitting and probe housing that would prevent reoccurrence and allow the probe to be changed while the propulsion system was working (Figure 3).

6

Cylinder liners and metatarsals: a painful combination

cruise ship | accident to person

A cruise ship's engineering team were working with the engine manufacturer's technicians to overhaul a large diesel generator, using the engine room's overhead gantry crane to lift the heavy engine components. One of the 1200kg cylinder liners was being lifted into position above the engine, a process that required the electric winch motor to raise the crane hook to its maximum lift height, when the crane's hoisting wire suddenly snapped (Figure 1). The suspended cylinder liner fell onto the engine (Figure 2), causing damage to both pieces of equipment, and struck the left foot of an engine room fitter who was standing nearby. The crew member was treated in hospital for a broken toe and subsequently repatriated.

The failed hoisting wire had been renewed shortly before the engine maintenance work started but was 7m shorter than the wire length specified by the crane manufacturer in its technical manual. The shorter length wire affected the operation of the crane's hoist limit switch and prevented it from cutting power to the winch electric motor when the hook was raised to the maximum lift height; the winch motor was therefore able to overload the wire and cause it to fail.

Tests of the three remaining engine room cranes established that all of the limit switches failed to stop power to the winch motors and thus failed to meet manufacturer requirements. The wire length recorded in the ship's planned maintenance system (PMS) computer was found to be incorrect when compared with the manufacturer's specification. The cranes were taken out of service for repair and the ship's engineering team were instructed to conduct a full inspection of engine room hoisting devices and take necessary steps to ensure that all equipment met manufacturer specifications; they were also reminded to test the hoist limit switches before operating the cranes.

Figure 1: Failed crane hoisting wire

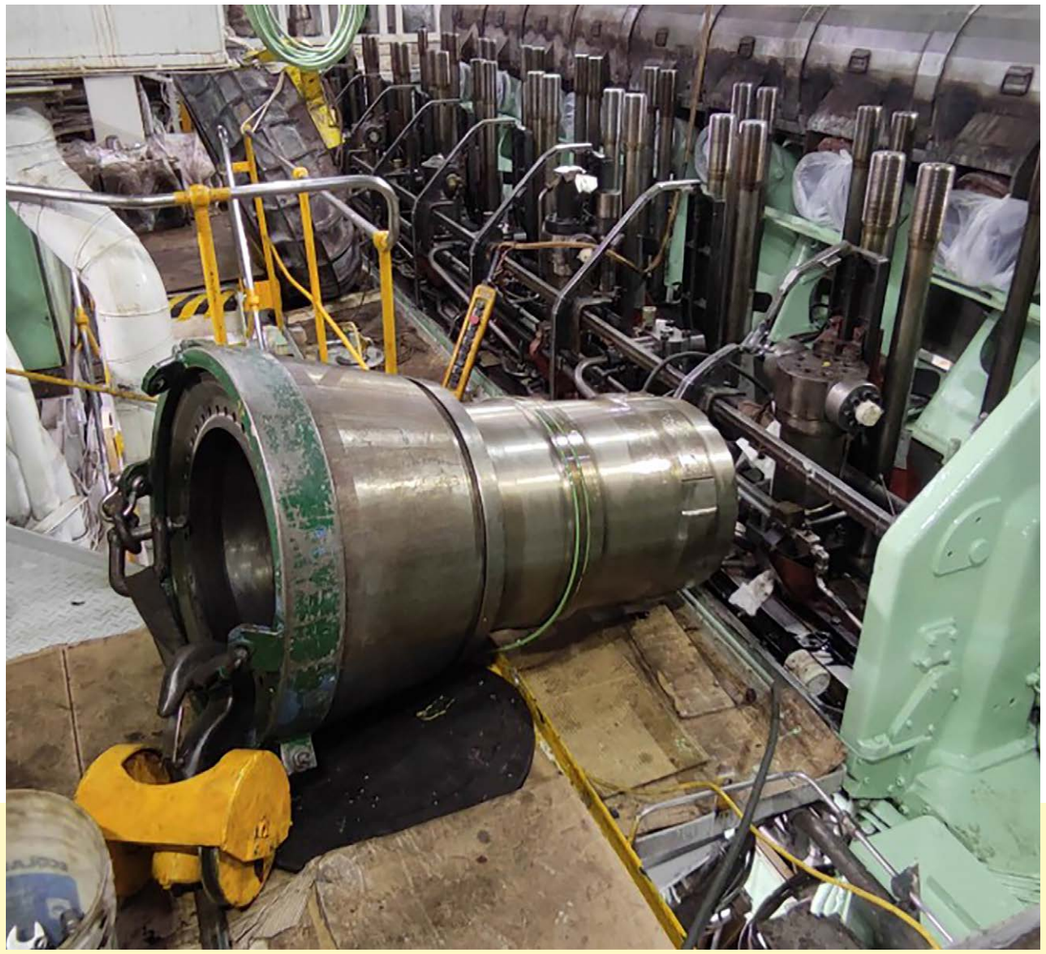


Figure 2: Position of cylinder liner after wire failure

The Lessons

1. **Hazard →** The crew member was lucky on this occasion but the first lesson here is to not stand under or near to suspended loads, regardless of whether the lifting equipment is new or has been recently overhauled. This incident is a reminder that equipment failure can occur at any time, potentially with severe consequences.

2. **Margin of safety →** It is unclear why the wire length documented in the PMS was incorrect. However, overreliance on hoist limit switches to cut power to the winch electric motor is risky, whether on cranes or lifeboat davits. A high torque electric winch motor has the potential to over-stress the hoist wire, causing it to fail. It is always safer to stop the lifting operation before overhead capacity is reached, even if the system is correctly set up and the limit switch has been tested.

3. **Risk →** Lifting operations are hazardous and require careful risk assessment to prevent accidents. Chapter 19 of the Code of Safe Working Practices for Merchant Seafarers (COSWP) provides invaluable guidance on what control measures to take before and during such tasks.

A sting in the tail

passenger ferry | accident to person

It was a dark autumn morning and a domestic roll-on/roll-off (ro-ro) passenger ferry was preparing to shift across from the lay-by berth onto the linkspan, ready for its first load of the day. Before letting go the last of the forward mooring ropes, the able seaman (AB) working the forward mooring deck noticed that the heaving line was caught around the middle section of the mooring rope and the loose end had been tied off on the handrail. The AB released the heaving line and mooring rope and payed them out together until the linesman ashore had enough slack to let the mooring rope go, whereupon he started to manually heave the mooring rope and heaving line back inboard.

Figure 1: Reconstruction of the approximate position of the able seaman when he was struck by the mooring rope

When the mooring rope was released the heaving line, which was weighted with a sandbag, sank and was drawn into the forward propulsion unit. The mooring rope was still caught up in the heaving line and ripped free of the AB's hands and started to pay out at speed from the pallet that it was stowed on (Figure 1), at which point he tried to jump out of the way to a safe area.

The loose end of the mooring rope whipped round some of the bitts and through the fairlead, catching the AB's lower leg before it disappeared into the water. The AB had the presence of mind to use his radio to shout up to the bridge to stop the propulsion unit, after which he collapsed onto the deck in agony.

The AB suffered severe bruising and abrasions to his leg (Figure 2), but the injuries could have been much worse.

Figure 2: Leg injuries sustained by the able seaman

The Lessons

1. **Risk →** Space on the mooring deck was limited due to the design constraints of the vessel and there was a real risk of getting caught by a snapback or, as in this case, a rope that had run away, with devastating consequences. Next time you are on the mooring deck, take time to think where you would go if a rope started to run away.

2. **Communicate →** The heaving line had twisted around the mooring rope the previous evening, during the process of tying the vessel up. The night team had intended to inform the day team as part of their handover but this did not happen. Without full knowledge of the state of the moorings, neither the resources nor time needed to clear the twisted rope were allocated.

8

Oops!... I did it again

bulk carrier | grounding

It was a fine mid-summer's day with light airs when a bulk carrier picked up its pilot to negotiate the lock gates and berth at a tidally constrained harbour. The ship was running behind schedule and the pilot and the master discussed the pilotage plan before settling on a direct course towards the lock entrance. Having just missed high water, the ebb stream was already flowing across the approaches to the lock, pushing the ship to starboard of its approach track. The bulk carrier grounded on a shoal near the port entrance (Figure 1).

The pilot and master took rapid action to apply lots of stern power and managed to free the bulk carrier from the shoal after 20 minutes. The ship had turned back into the main channel and, with the tide falling quickly and the ebb stream strengthening, the pilot and master decided to make a second approach. However, having made a very tight turn off the harbour entrance the bulk carrier again missed the approach and grounded for a second time on the same shoal (Figure 2). The ship had to wait until the next high tide to float off and eventually berthed 12.5 hours later than originally planned. The bulk carrier was undamaged but received a detention notice after a port state inspection, which delayed its departure.

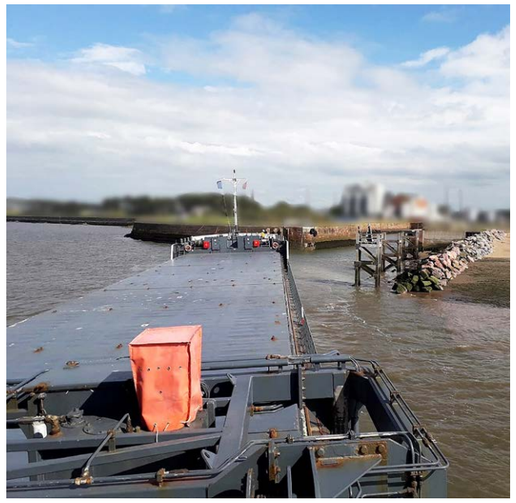


Figure 1: View from the starboard bridge wing towards the habour entrance during the first grounding

Figure 2: Bulk carrier aground on the shoal in the approaches to the lock entrance

The Lessons

1. **Plan →** Tides do not bend to the will of mariners and accommodate their schedules. Given that the pilot and master had missed the predicted high water time by 16 minutes, the first attempt into the harbour already posed a challenge while the second attempt, some 40 minutes later, was optimistic. It is often best to wait for the right conditions, regardless of operational pressures.

2. **Communicate →** After the accident it emerged that neither the master nor the pilot was happy with the attempted port entry. However, they did not broach the subject with one another or question the plan. The International Chamber of Shipping Bridge Procedures Guide, Sixth Edition, provides advice on leadership, *challenge and response* and *thinking aloud* to best practice operations on board. Talking about the tides and environmental conditions as part of a thinking aloud exercise can enable good decisions to be made and ensure that all are aware of the risks.

3. **Hazard →**The shoal at the harbour entrance was charted and recognised as a hazard on the ship's pilotage plan. However, it appears that everyone had become accustomed to the risk it presented. Dredging is not always the right answer and so for each act of pilotage it is vital to ensure that there is positive acknowledgement of the conditions, which will differ each time. In this case, the winds were light and did not counter the effect of the strong ebb stream.

Li-ion +H_2O = explosion

deep-sea vessel | explosion

A specialist deep-sea vessel was using equipment capable of operating at extreme depths to conduct deepwater experiments, the on board power supply for which was provided by lithium-ion (Li-ion) batteries that were encased in several metal tubes attached to its framework.

An inspection of the equipment after a successful deployment identified a potential leak from one of the metal tubes. However, other work priorities meant that the technician in charge of the equipment decided to leave it in its storage area and delay the removal and further examination of the battery.

Seven hours later, the vessel's bridge team heard a loud bang followed by a fire detection system warning for the deepwater equipment storage area. The attending crew members discovered a scorched and damaged metal battery tube lying on the deck (Figure 1).

Figure 1: Damaged battery tube

Examination of the battery tube indicated that sea water had leaked into the battery compartment (Figure 2) and contaminated the Li-ion battery, which caused pressurised gasses to build up and self-combust and resulted in a brief explosion. The remaining battery tubes were removed to a secure storage area for further checks.

Figure 2: Water ingress and damage

The Lessons

1. **Risk →** Li-ion batteries are both commonplace and a popular choice; a 1kg Li-ion battery can store the same amount of energy as a 6kg nickel metal hydride or lead acid battery. However, Li-ion battery failures do occur and have often resulted in fires that are difficult to extinguish.

2. **Hazard →** Lithium reacts intensely with water, which can corrode or damage the internal battery safety devices and cause it to overheat, ignite, rupture or leak. Salt water is far more conductive than fresh water, which means that the battery can discharge more quickly, and the electrical current will break down the salt by electrolysis, producing hydrogen and chlorine gas. Put simply, a Li-ion battery should not be exposed to water or moisture.

3. **Maintain →** A Li-ion battery that is found to be damaged or affected by water should not be used or charged. Remove the battery to a secure place where it can be monitored and potential spontaneous combustion can occur safely. In the event of a fire, use an ABC[1] or BC[2] powder fire extinguisher to put it out. Other methods include misting the fire with chemically exfoliated vermiculite or dousing it with large quantities of fresh water.

[1] Suitable for use with class A, B and C fires involving combustibles, flammable liquids and energised electrical equipment.

[2] Suitable for use with class B and C fires involving flammable liquids and energised electrical equipment.

To me... to you. To me... to you!

passenger ferry | loss of control

An early morning sailing of a domestic ro-ro passenger ferry nearly came to an awkward end when it lost control and headed for the beach. Fortunately, the crew were able to regain control before the ferry grounded and the voyage continued safely.

The vessel was fitted with a Voith Schneider Propeller (VSP) system that provided it with the ability to drive in any direction without the need for a rudder. The VSP could be controlled from joysticks on one of three consoles on the port, starboard or centre of the bridge. Control was exchanged by pressing a *command* button at one of the consoles and confirmed by pressing the button a second time. An audible tone would indicate when there was misalignment between the joysticks of the two consoles and the transfer would not take place. The angle of the control display panels made it difficult to see which console was in control.

The master was using the starboard console (see figure) to manoeuvre the ferry out of port on the morning of the incident. The helmsman pressed the *command* button on the centre console to request control as normal and the audible tone sounded. The master, believing control had been passed, set the starboard console's joystick to the *zero* position. However, the VSP audible tone continued.

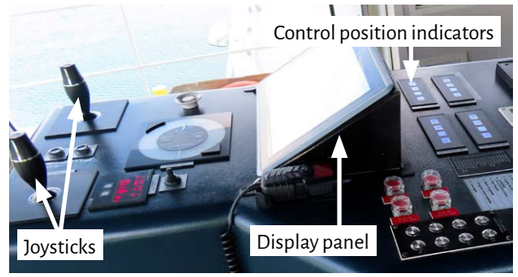


Figure: Voith Schneider Propeller control console

This was confusing. Neither the master nor helmsman knew who was in control. The ferry slowed and swung to port, lining itself up with a man who was enjoying an early morning cup of coffee on the beach, much to his consternation. The bridge team attempted to take control at each console station and in doing so the control passed backwards and forwards many times.

The audible tone stopped shortly afterwards, indicating that the transfer process had timed out. The bridge team then zeroed all the joysticks and successfully transferred control to the centre console after pressing the *command* button at that station twice. The ferry was able to pull back from the beach and resume its passage.

The Lessons

1. **Equipment →** The system for identifying which console had control at any time was unclear; at the time of transfer no one knew who had control. Modifications to the position of the VSP display panels had inadvertently made it harder to see the control indication when the crew were manoeuvring the ship. Control indications should be unambiguous and any modifications need to be carefully considered so that the fixing of one problem does not create another.

2. **Qualified →** The bridge team were familiar with the routine transfer of control between stations with the joysticks in the full ahead position, but when the VSP did not operate as expected it took time for them to regain control. The zeroing of the controls to affect a transfer was described in the ferry's safety management system and training in this procedure may have quickened the bridge team's response to the loss of control.

11

Bowling a leg break

dredger | accident to person

In the early hours of the morning a dredger was heading into port to discharge cargo and some equipment and the crew were woken to prepare the vessel for berthing. The bosun and the deckhand discussed the plan to use the deck crane to offload equipment once the vessel was tied up.

The bosun thought he had lots of time in hand so decided to prepare a 0.5t sheave, which was due to be lifted ashore from a void space. He removed the lashings that were securing the sheave vertically against some pipework and started to roll it toward the port side hatch in readiness for offload. The bosun was manoeuvring the sheave past some oil drums when he lost control and the sheave toppled over, struck his thigh and then trapped him under its weight (Figure 1).

In considerable pain, the bosun managed to raise the alarm using his handheld radio. The crew mustered quickly, lifted the sheave off his leg and administered first aid. The dredger arrived at its berth and the bosun was transferred by ambulance to hospital, where he received treatment for multiple fractures to his leg (Figure 2). He was unable to return to work for several months.

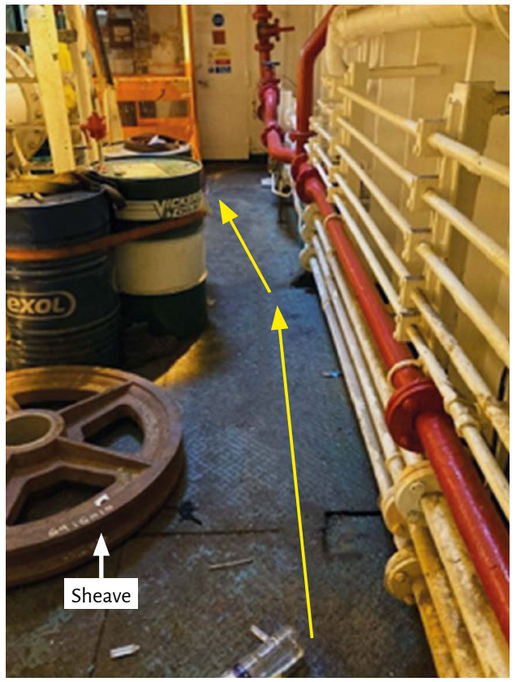


Figure 1: Planned route to move the sheave across the void space

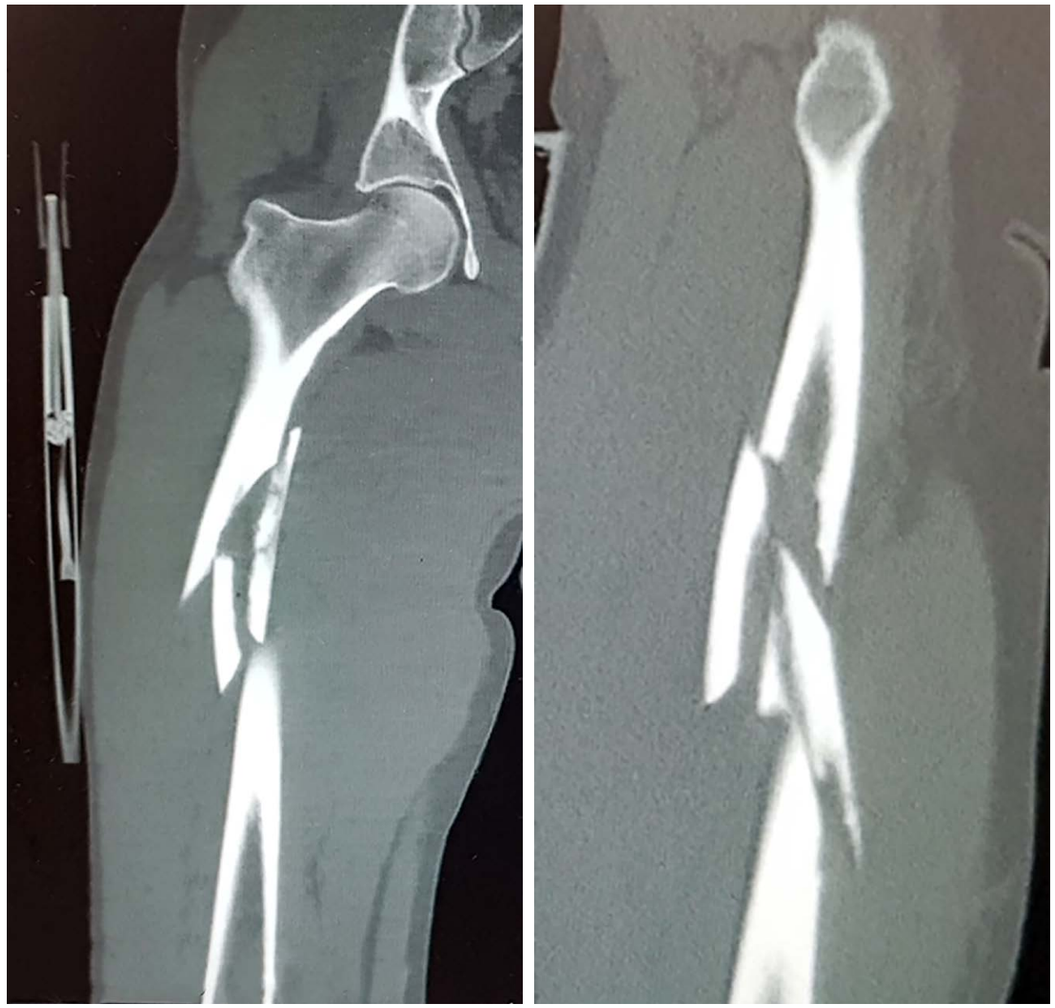


Figure 2: X-ray images of the bosun's broken leg

The Lessons

1. **Plan →** The sheave was heavy and over 1m in diameter. It was not stowed in an authorised location and the crew had no lifting plan in place to move it across the space. The sheave was unwieldy and required careful thought to move it safely despite it being easy to roll. The bosun was unaware of the weight of the sheave and had underestimated the risks and hazards involved in both its removal and relocation.

2. **Teamwork →** It can be very tempting to just crack on with a task rather than bother other people. Aside from mutual support and help should something go wrong, a second person can ask questions, highlight risks and challenge the plan. A thorough job done well may feel less efficient at times but can help minimise risks and reduce the likelihood of serious injuries, the effects of which may last a lifetime.

12

Even screws need some tender loving care

car carrier | fire

A large car carrier suffered a fire inside the fuel purifier room while on passage. The crew evacuated the engine room, stopped the ventilation and closed the fuel supply to the engines before deploying the carbon dioxide (CO_2) fixed firefighting system. The bulkhead temperatures were monitored and the fire was declared successfully extinguished when these had reduced to a safe level. The vessel was left without power as a result of the fire and had to be towed into port for repair.

Subsequent inspection identified that this short but intense fire had caused severe damage to the fuel purifier room, including the purifiers, fuel booster modules, heaters, associated electrical plant and cabinets (Figure 1). The adjacent space deckhead wiring and electrical cabinets in the engine room had also been impaired, albeit to a lesser extent.

Examination of the equipment indicated that the fire had likely broken out due to gas oil spray emitted from a gas oil purifier system three-way inlet fuel valve actuator (Figure 2). The actuator had become detached from the valve body and the whole assembly was severely damaged by fire and heat (Figure 3). Separation of the actuator and valve actuator spindle from the valve body allowed the fuel, operating at 2 bar pressure, to escape and spray over nearby heating and electrical equipment. On closer examination, the screws that secured the two parts of the actuator to the valve body were found to be slack.

Figure 2: Example of a fuel valve actuator

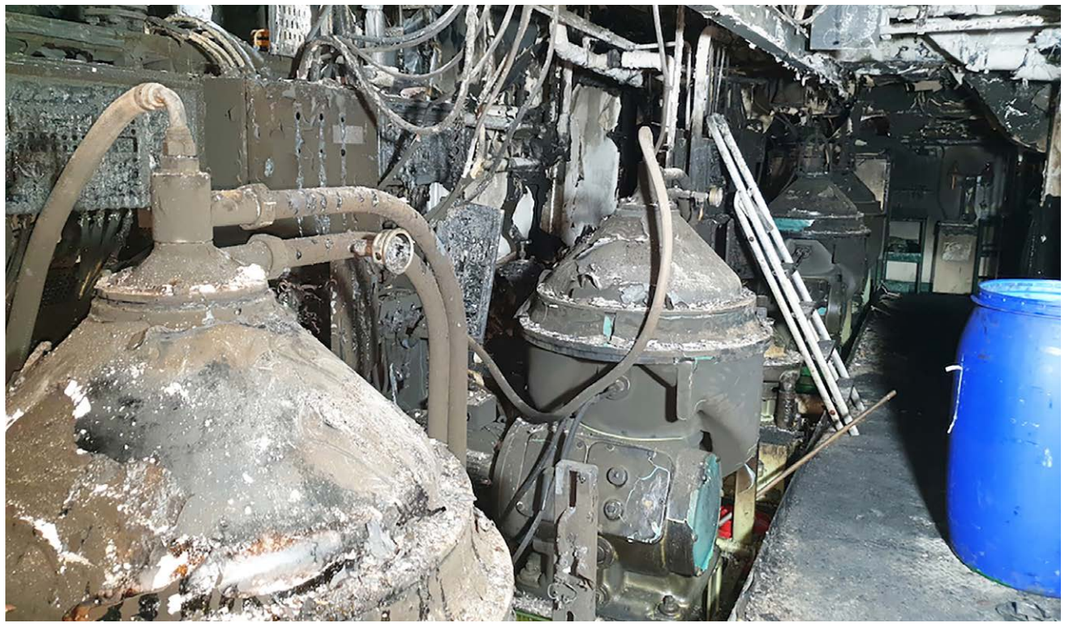


Figure 1: Fire-damaged fuel purifier room

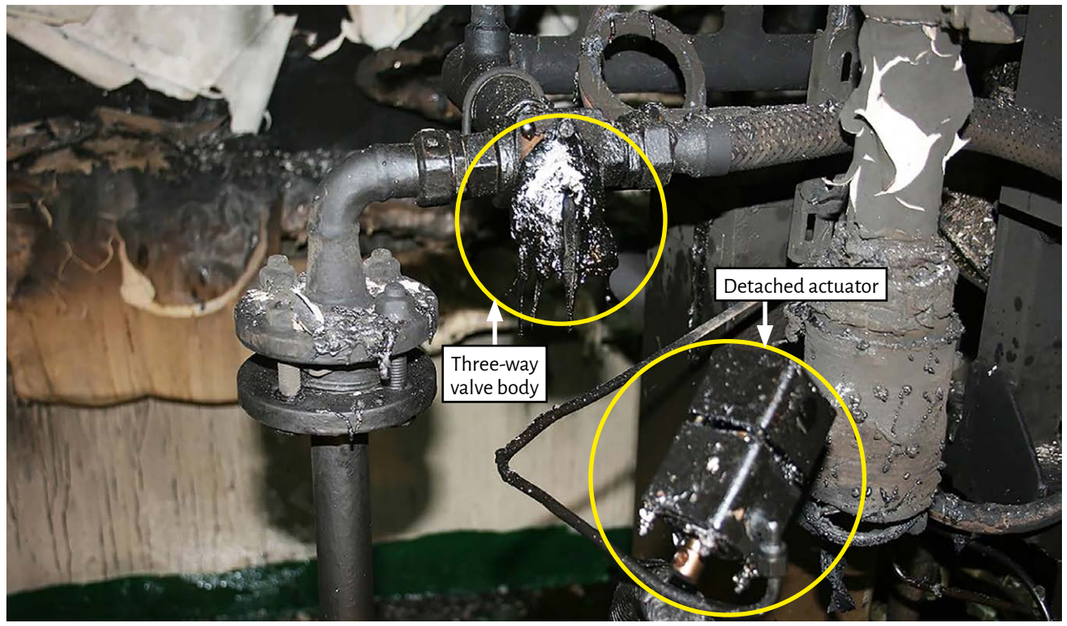


Figure 3: Fire-damaged fuel valve actuator

The Lessons

1. **Action →** The crew's response to the rapid escalation of the fire prevented further widespread damage and risk to life and, despite being left without power, the vessel was able to be towed to port and eventually repaired. Knowing how to respond effectively to the outbreak of a fire is imperative to avoid potential devastation.

2. **Observe →** Vigilance during engine room rounds mitigates the risk of unwanted breakdowns. However, spotting loose screws on an actuator in a hot purifier space would test many of us. Seemingly insignificant components can have a considerable impact on crew and vessel safety; it is well worth applying a little tender loving care to check that even small parts such as these are correctly fitted and maintained.

13

Wind beneath my (bridge) wings

cargo ferry | grounding

A cargo ferry was making its way into port with gale-force winds blowing from the east. Due to the unfavourable conditions the master was conning, supported by a co-navigator and helmsman. The manoeuvre required a 180° swing to port before moving astern and docking port side alongside.

The master began the turn once the vessel was inside the swinging circle (see figure). With the bow thruster to port and the rudder hard to port the turn rate started to build and the vessel's stern drove through the wind, which was now gusting at over 50 knots (kts). The ferry started to drift bodily downwind as the wind came onto the port side; this initially went unnoticed by the bridge team (see figure).

The master struggled to lift the bow against the wind and the co-navigator, growing uneasy, highlighted that the wind was now gusting at up to 60kts. The vessel was no longer within its operational limits and began drifting sideways at 1.5kts toward unsafe water. The master became slightly flustered and several unclear messages were relayed to the anchor party, which needed clarification before the port anchor was eventually dropped. However, this did not stop the ferry from running aground on the western limit of the channel (see figure).

The master regained composure and manoeuvred the vessel off the mud and alongside the berth by paying out the anchor cable to help hold the bow against the wind. As a precaution, the intention was to have someone standing by the anchor's bitter end in case it needed to be let go; however, the crew could not find it and so this idea was dismissed. No damage was found when the vessel finally made it safely alongside and the anchor was recovered by tug later that day, without incident.

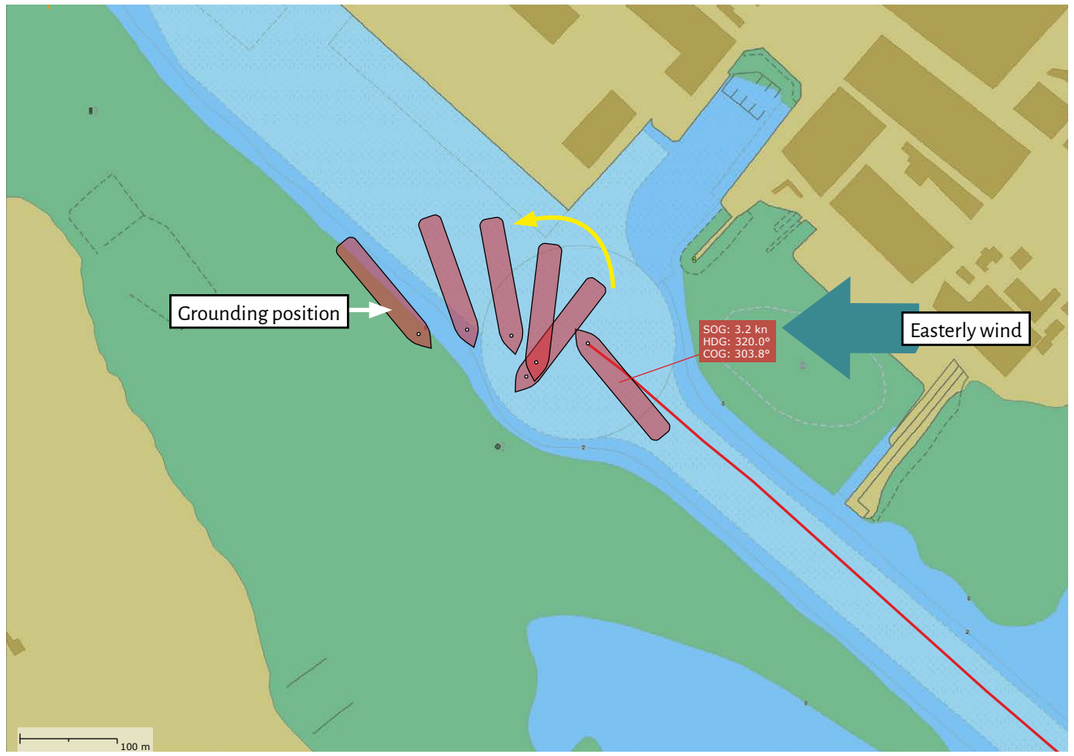


Figure: Cargo ferry's swing to port and subsequent grounding position

The Lessons

1. **Plan →** Abort positions should be included in the passage plan and visually shown on the chart to prompt a bridge team discussion. The team can then determine whether the vessel can complete the manoeuvre within operational limits and review its contingency plans.

2. **Communicate →** Bridge Resource Management principles can be applied to other vessel operations such as those on the mooring deck. For example, closed-loop communications can be helpful between the bridge team and mooring deck leaders, especially in an emergency situation such as when the anchor needs to be let go unexpectedly.

3. **Teamwork →** A shared mental model leads to more significant input and vested interest from all involved. Team members can monitor the execution of the plan more effectively if they know what is happening. The concept of *thinking aloud* supports this and can empower other team members to challenge and make recommendations when they develop concerns.

4. **Equipment →** The bitter end frees the ship from the anchor. The deck team must know its location and how to release the anchor chain in an emergency. Including the bitter end in both crew familiarisation and refresher sessions for those working on mooring decks helps to remind crew of its location should it ever be needed.

MOB recovery is time critical

transfer vessel | man overboard

A crew transfer vessel in a northern European port had come alongside a cargo ship (Figure 1) to transfer two passengers and their luggage. The first passenger successfully climbed the pilot ladder (Figure 2) and boarded the cargo ship. The second passenger had started to ascend the ladder while the transfer vessel moved clear of it; as he continued to climb, first one foot and then the other slipped from the rung. Unable to either regain his footing or support himself, he fell from a height of 2m into the water between the two vessels.

The crew transfer vessel was immediately moved astern and its skipper continued to back it away from the cargo ship until the casualty could be seen in the water, drifting down the side of the ship's hull. His lifejacket had inflated correctly and he was floating, with his head supported clear of the water. The skipper of the transfer vessel called "Mayday" on very high frequency (VHF) channel 16. Meanwhile, the ship's crew threw a life ring and a separate line, which the casualty was able to grab hold of. They used the line to pull the casualty back along the hull towards a point close to where the pilot ladder would be lowered, ready to recover him onto it. However, the casualty was unable to climb the ladder after it was prepared and lowered and, despite a crew member descending the ladder to assist him, he lost his grip on both the ladder and the lines and once again drifted away along the ship's hull.

The skipper of the transfer vessel decided to attempt a recovery and manoeuvred into a position from which his crew were able to securely catch hold of the casualty with a boat hook. The skipper then left the helm and assisted his crew to follow the vessel's man overboard (MOB) procedure and recover the casualty using a boarding ladder and davit. Despite being in the water for about 10 minutes, the casualty was able to walk to the waiting medical care when he was recovered ashore.

Figure 1: The transfer vessel alongside the cargo ship

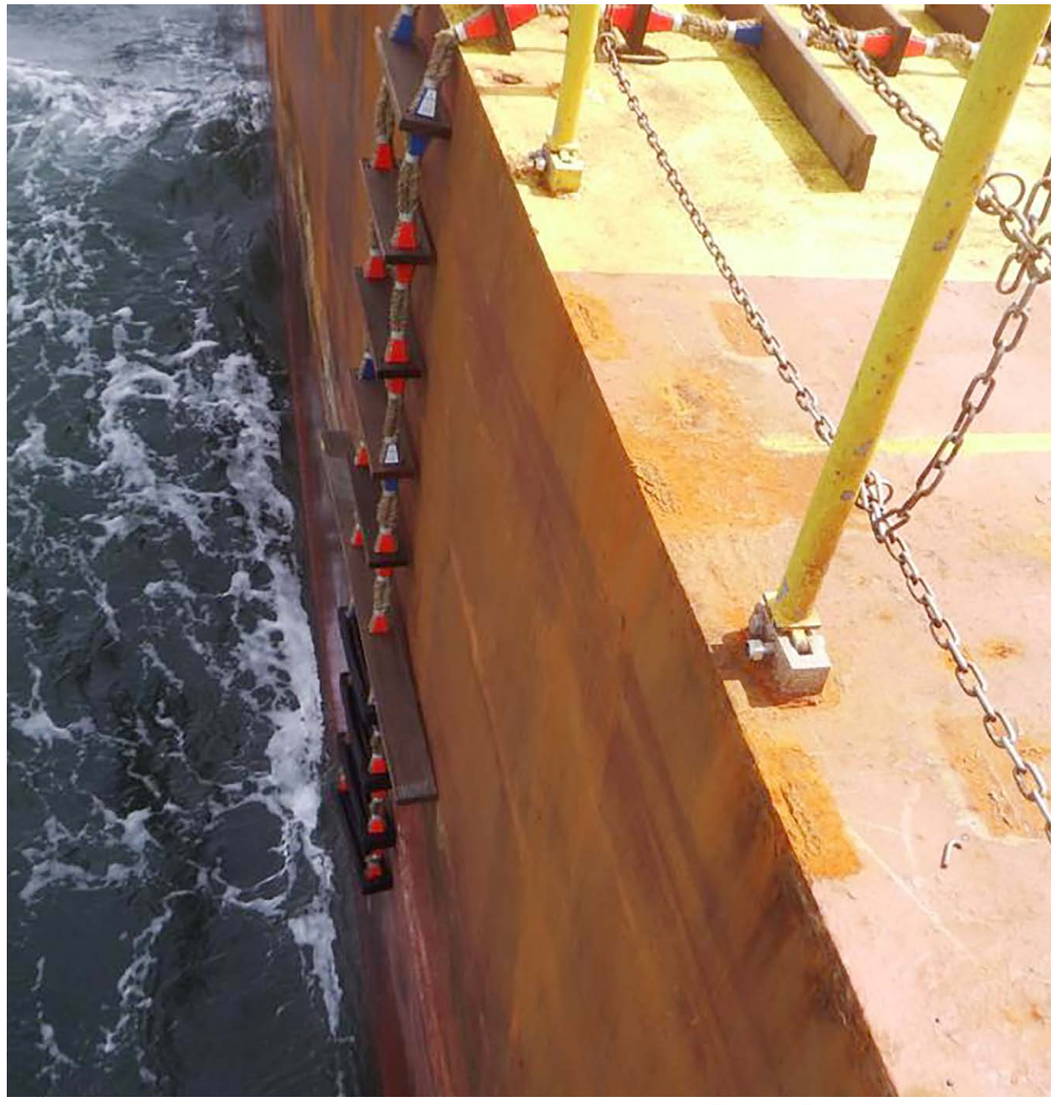


Figure 2: The cargo ship pilot ladder

The Lessons

1. **Hazard →** On this occasion the casualty was successfully recovered; however, dependent on environmental conditions and the individual's health, 10 minutes is often the upper time limit to complete an MOB recovery before the victim becomes incapacitated by cold water. Even with the assistance of a crewman, the casualty quickly lost the ability to self-recover once the pilot ladder was lowered and had to rely on others to rescue him from the water.

2. **Risk →** The hazard of an MOB during crew/passenger transfers via pilot ladder requires risk mitigation such as the preparation of a detailed emergency response, conducting regular practical drills and discussing which vessel will take the lead in recovering the casualty. It may be too late to start thinking about MOB procedures when you or a colleague are in the water.

3. **Equipment →** It almost goes without saying that the use and automatic inflation of the casualty's lifejacket was instrumental in keeping him afloat, minimising the expenditure of valuable energy and helping to manage the inevitable stress of suddenly being submerged in cold water. Without the lifejacket an increased level of medical intervention would have been likely. It is imperative that lifejackets are well maintained and correctly worn to increase the chances of a successful MOB recovery.

A head for heights

cargo vessel | risk assessment

A contractor prepared to remove two cylinder heads from a cargo ship after carrying out engine maintenance. The heads were made of cast iron, weighed 280kg each and were strapped to a wooden pallet ready to be lifted ashore using the ship's deck crane.

Two slings were passed through the pallet and the four ends were attached to a lower hook, which was joined to two upper slings by a shackle; these upper slings were suspended from the deck crane hook. The four sling ends rested one on top of the other in the throat of the lower hook and so it was impossible to close the safety gate (Figure 1).

The initial lift of the wooden pallet was successful but when it was about 10m above the jetty the uppermost sling end slipped from the lower hook and flipped the pallet over, causing the cylinder heads to fall. Thankfully, the lifting operation plan ensured nobody was standing below the suspended load and damage was minimal; the falling cylinder heads caused a dent in both the jetty (Figure 2) and the operator's wallet.

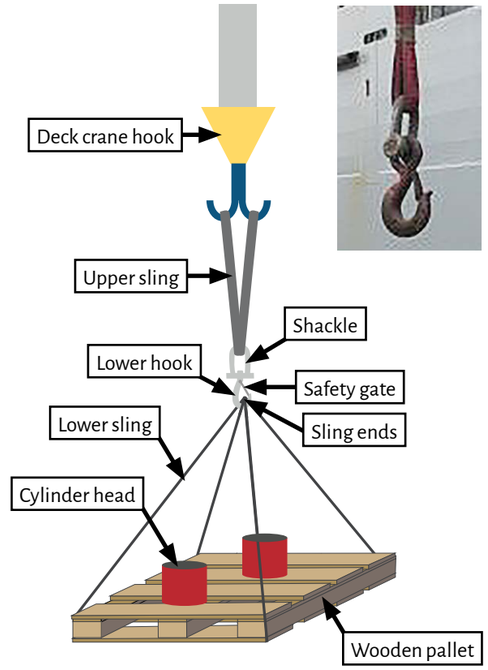


Figure 1: Slinging arrangement and (inset) close-up of lower hook

Figure 2: Wooden pallet and damaged cylinder head

Figure 3: Wooden pallet fork-lift hook

The Lessons

1. **Procedure →** Adherence to COSWP is essential during lifting operations, particularly its instruction that loads should be lifted using *certified lifting equipment that should be appropriate for the task*. The cargo ship was equipped with a purposely designed set of forks with which to lift loaded pallets, but it was not used (Figure 3).

2. **Risk →** Any lifting operation requires careful consideration, adequate risk assessment and supervision by a responsible crew member. There was an opportunity when the sling ends prevented the safety gate from closing to pause and reassess the lifting arrangement to make it safe.

3. **Margin of safety →** Clearing people away from the immediate area before the lifting operation ensured that the consequences of this accident were purely mechanical and financial. The outcome would have been much worse had anyone been standing below the suspended load when it fell.

A cracking lesson

supply vessel | risk assessment

A supply vessel was in port and loading six containers of cargo in preparation for its next trip out to an offshore rig. Each container held about 7500 litres of liquid nitrogen.

The ship's crew suspended cargo operations for the night and were awoken early the next morning by a loud bang. The crew mustered on the bridge and saw that ice was forming on the deck beneath one of the nitrogen tanks, indicating a leak from the container (Figure 1).

The crew recognised that they were faced with a hazardous situation and stopped anyone going near the leaking nitrogen or into the spaces in the decks below it. A specialist was called in to conduct tests of the atmosphere to make sure it was safe.

The cargo deck was constructed from low carbon steel and, although suitable for shipbuilding, was not designed to withstand the very low temperature of -196°C that the evaporating nitrogen generated.

Steel becomes brittle as its temperature drops and when the deck cargo was removed the crew found that a 4m² area of deck plating and the supporting steelwork had cracked due to their exposure to the low temperature (Figure 2).

A post-incident inspection found that both the main outlet valve and the bleed valve on the nitrogen container, which was not locked, were slightly open and had allowed the nitrogen to leak out through the open bleed valve (Figure 3).

Figure 1: Icing of deck beneath nitrogen tank container

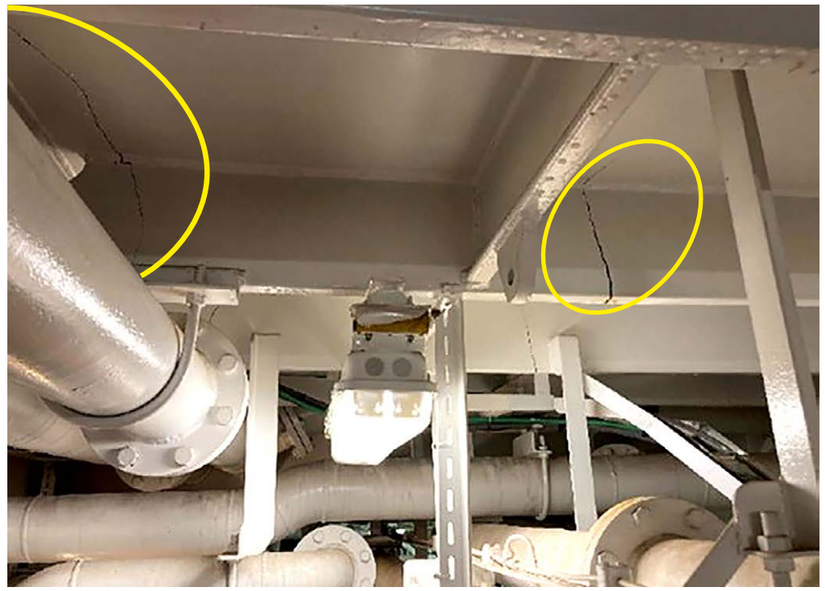


Figure 2: Cracks in the supporting steelwork

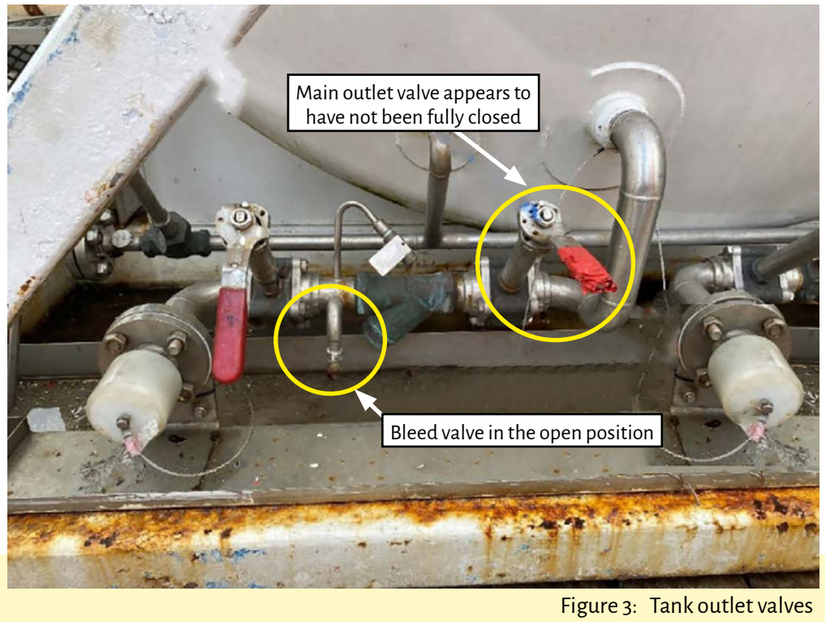


Figure 3: Tank outlet valves

The Lessons

1. **Risk →** The carriage of cryogenic gases requires careful consideration of the risks they pose to materials. In this case the simplest hazard control, which was that of keeping the nitrogen in the tank designed to contain it, failed because the valves were unsecured and vulnerable to being knocked open.

2. **Action →** Once the crew had spotted the leak they made the right decision not to go dashing into areas where the atmosphere could be unsafe. Instead, they properly considered the risks before taking action.

3. **Monitor →** It is likely that the main outlet valve was knocked open when the nitrogen was loaded, and a long time passed before the leak was noticed. An inspection of the cargo once it was on board and an effective deck watch overnight could have identified the leak much sooner and prevented damage to the ship.

FISHING VESSELS

I come from a long line of stevedores and dock workers but was unaware, as many of the population are, of the commercial fishing industry.

That changed when, having just moved to the South West of England and in need of a job, I applied for the post of training advisor for the newly created Western Sea Fish Industry Training Association. This was the first time Cornwall and Devon fishing organisations had worked together to organise training.

32 years later, I am still here.

Starting with organising the basic safety courses all around the coast, I met fishermen working on all sizes of boats in small coves and at larger ports. I soon realised that this was a very different challenge to what I had been used to when organising land-based training.

Work soon developed into writing projects to develop the range of safety training courses available. It was obvious that small student numbers for fishing courses meant that local colleges were not interested and so we set about organising and planning the training licences for the maritime courses that fishermen needed. In 1992, we set up the 12-week Class 2 Deck Officer commercial fishing skipper's ticket course as this was only available in Scotland at the time; we still run this course when there are enough students.

We then set up the GMDSS radio courses, which we now run using touch-screens with desktop simulators. As training regulations continue to change we have had to adapt and change and now operate a full bridge simulator to allow fishermen in the region to attain the qualifications that they need to progress their careers.

All our courses have to be licensed by either government or industry bodies, which means we also come under the MCA survey regime and those of five other national organisations. We are now a full Scottish Qualifications Authority centre so are able to offer courses to fishermen at all levels.

Could these accidents have been prevented had the people involved been better trained?

Fishing safety training and education is a niche market with very small student numbers, which has always been an issue. The number of fishermen who need or indeed want to attend certain courses varies from year to year as the industry changes. Planning courses is complicated but, however much effort you put in, this can still result in an empty classroom if the weather and fishing conditions are good. I also quickly realised that I was in a job where a student who failed to turn up for their course might have died at sea since booking their place on it.

I remember hearing a first-hand account of the rescue of a local fisherman after his boat had sunk. A helicopter rescue crew member recounted that the fisherman was gripping the side of his small wooden boat and refused to let go; he did not want to be rescued and his rescuer had to get into the water to try to physically drag the fisherman away from his sinking boat and to safety.

We have managed many safety projects over the years. The introduction to our first 25-minute safety training film stated that *a fisherman dies at sea every 10 days*, which was the statistic at the time. A lot of things have changed since then, when the wearing of lifejackets was not commonplace, few safety drills were carried out and a different set of safety regulations existed. Attitudes are changing and we have trained hundreds of fishermen all over the South West, many of whom come back to refresh their skills in the same subjects.

But the accidents continue.

The basic core of safety training is often what to do after a potentially life-threatening accident has happened. However, if the accident rate remains too high even after all these years, perhaps a different approach would be more effective in reducing both this and the death rate.

The accidents in this issue of the Safety Digest all involve human error, which in slightly different circumstances might possibly have meant no accident at all.

Tiredness, inexperience and distraction are highlighted in many, many cases as the main factors contributing to accidents. Could these accidents have been prevented had the people involved been better trained?

Regardless of the training and experience of a fishing boat crew, it does not remove the risk of their boat being run down by a large coaster with no one on watch in the middle of the Channel during the winter.

Additional regulations and training procedures are often introduced in response to an accident investigation to stop the incident happening again. The fact that the things affecting accidents are often down to individual attitudes begs the question of whether assessing the need for the creation of more safety regulations or training courses is the only solution. It would be interesting to establish whether the implementation of both the extra training and regulation actually influenced the number of similar incidents in the future.

You can teach students the knowledge and the skills but it is difficult to both teach people the right attitude and ensure that they apply best practices as standard when at sea.

I sit on the Fishing Industry Safety Group training committee along with fishing industry representatives from across the UK. We work hard to discuss new safety regulations and training requirements to achieve the best safety outcomes for the fishing industry but this is often regulation-based.

The need to focus on the human issues that form the basis of many accidents is now more important than ever.

HAZEL BENNETT | Training Director, Western Maritime Training

Hazel came to Western Maritime Training (WMT) having previously worked for both large UK corporations and small local businesses, with responsibility for MBA programmes, the development and delivery of management and running UK-wide Youth Training Schemes.

Her role at WMT has included securing funding from four EU budgets to pay for fishermen's training schemes, exchange visits for aquaculture farmers, production of Deck Officer Class 2 fishing courses, specialist engineering training for fishing boat engineers, fishing safety training videos and management level training for fish processing workers.

Hazel runs a team of 15 instructors and sits on the MCA-chaired Fishing Industry Safety Group (FISG). She also provides secretariat support for the South West Fishing Safety Forum (SWFSF) and is the UK representative for the Seafish training provider network.

17

Where did that come from?

cargo vessel and fishing vessel | collision

A general cargo ship was on passage in daylight in restricted visibility. The officer of the watch (OOW) had not seen any traffic of interest on his automatic identification system (AIS) unit or radar so was busy completing administration on the ship's computer. An AB was on lookout duties but was not monitoring the active radar on the other side of the bridge; the radar near to him was in standby mode. Fog signals were not being sounded; aside from no apparent traffic, the ship's whistle was intrusive and disturbed the crew.

A 10m wooden fishing boat was nearby and headed back to port. Its two crew had finished their work for the day and the skipper was adjusting his new radar, which had been fitted a few days earlier. Once this was done, and seeing no traffic on the screen, he went to the aft shelter deck to check on the deckhand's progress with boxing the catch. The fishing boat was also not sounding any fog signals.

The OOW on board the cargo ship turned from his workstation and saw a small target appear on the radar, close on the port bow. He reduced the radar range scale that was in use and instructed the lookout to keep watch on the port side. The OOW picked up the binoculars and searched the foggy gloom. Suddenly, a fishing boat appeared three points to port. The OOW looked to the wheelhouse of the boat but could not see anyone. He sounded a long blast on the whistle and altered course to starboard, but it was too late to avoid a collision (see figure).

The fishing boat's bow was severely damaged and water flooded the forward space. Despite the efforts of the crew and local boats, it sank 2 hours later while being towed back into port. The crew were rescued without injury.

Figure: Tracks of both vessels up to point of collision

The Lessons

1. **Risk →** Leaving the wheelhouse in restricted visibility, even briefly, is risky. The fishing vessel's wheelhouse should not be left unattended when on passage. Similarly, having an extra lookout on watch in restricted visibility adds little if the main watchkeeper is not looking out. On this occasion the OOW would have been better advised to delay the administrative tasks.

2. **Aware →** The wooden fishing boat did not have a strong radar return and was not equipped with AIS. It can be difficult to spot an intermittent target on a radar, especially when it is close to your own ship where there may be sea clutter. Particular focus is required during periods of reduced visibility.

3. **Equipment →** Make sure your vessel is fitted with a radar reflector. Better still, invest in an AIS unit as well.

4. **Action →** The Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) collision rules change in restricted visibility and there is no *give way* or *stand-on* vessel. Do not expect another ship to alter course because it is on your port side as its crew may not have seen you in the fog. Take immediate action if the vessel is very close; do not waste time trying to attract the crew's attention or call them up on VHF.

5. **Procedure →** The sounding of a fog signal in or near areas of reduced visibility is required by COLREGs and can help attract the attention of another vessel that is close by.

Far too close for comfort

stern trawler and yacht | risk of collision

On a bright summer morning, while trawling at about 3kts on a westerly course, a fishing vessel skipper sighted a fast-moving yacht closing from the starboard side and assessed that it was at risk of collision with his vessel.

The skipper noted that the yacht was not taking action to keep clear and used VHF channel 16 to make contact, but there was no response and the yacht continued to approach. The fishing vessel skipper was unable to alter course due to the active trawl and so he knocked the fishing vessel's engine out of gear to reduce its speed to a minimum and shouted for his resting crew member to quickly come to the wheelhouse, where they both put on their lifejackets.

A few minutes later the 20m yacht passed about 1m ahead of the fishing vessel, travelling at about 8kts (see figure). The skipper and crew member on board the fishing vessel could see that neither the yacht's cockpit nor deck was manned as it passed them. The fishing vessel's skipper subsequently reported the incident to the coastguard.

Figure: The near miss

The Lessons

1. **Aware →** It is essential that every vessel maintains a proper and effective lookout by sight, hearing and all available means; however, the yacht's crew did not do this. The on-watch crew member had conducted a 360° visual sweep of the horizon a few minutes earlier before leaving the cockpit, having not identified that there was a risk of collision with the fishing vessel. He then joined the yacht's skipper in the cabin to listen to the weather forecast on VHF channel 67, missing the fishing vessel skipper's call on channel 16.

2. **Action →** The fishing vessel was stern trawling at 3kts with over 150m of fishing gear over its stern, which severely restricted its ability to manoeuvre. This was a condition recognised in the COLREGs that require sailing vessels to keep clear of vessels engaged in fishing. Fortunately, the fishing vessel's skipper had been keeping a good lookout and identified that the vessels would collide if no action was taken. He had sensibly called the yacht on VHF channel 16 in an attempt to alert its crew and then mustered and donned lifejackets to try to minimise the risk to himself and his crew member, as well as reducing his speed. The only additional measure available to him might have been to sound five short and rapid blasts on the fishing vessel's whistle. His decisive emergency response paid off and the two vessels involved in this case missed each other, albeit by just 1m.

Mind the gap

whelk trawler | accident to person

A whelk trawler was berthing starboard side to the quay after a 5-day fishing trip; the conditions were calm and dark and it was raining. The skipper manoeuvred alongside, bow first, before then swinging the stern in. Nobody was ashore to assist the vessel to come alongside until one of the crew jumped across to attach the lines when its stern was close to the quay.

A second crew member also attempted to jump ashore but slipped on the edge of the quay and fell between the trawler and the berth. The crew member managed to stop their fall by grabbing the edge of the quay and was able to cling on to it, before being helped to safety by their colleague who was already ashore.

The crew member suffered broken ribs and a punctured lung from the force of the impact against the quay and required hospital treatment for these injuries.

The Lessons

1. **Hazard →** The crew member was fortunate not to fall into the sea. CCTV (closed-circuit television) analysis (Figure 1) identified that the distance between the stern and the quay was about 1m horizontally and 0.5m vertically, with the stern higher than the quay. The edge of the quay was uneven and sloping and it was slick with rainwater; these were hazardous conditions in which to attempt to jump across from the vessel. Shore assistance was available for berthing and, although not routinely provided, would have minimised the risk.

2. **Maintain →** The condition of the quay was not ideal. The disintegration of the concrete had resulted in a downward slope (Figure 2), increasing the likelihood of slipping when walking or stepping onto it. Regular inspection and maintenance of quaysides, ladders and railings reduces the risk of further hazards being introduced by surfaces or equipment that is designed to provide protection.

3. **Communicate →** This incident resulted in a significant injury to a fishing vessel crew member; however, it was not reported to the harbour authority at the time it happened and the injured crew member was taken to hospital by taxi. It is important to notify harbour authorities of accidents so that action can be taken to prevent recurrence.

Figure 1: CCTV still of whelk trawler berthing

Figure 2: The sloping quayside

Asleep at the wheel

gill-netter | grounding

An old, wooden, under 15m gill-netter was on its passage home after a 3-day fishing trip. The crew were looking forward to landing their catch the following day and enjoying some well-earned time off.

The vessel left the fishing grounds at about 2030 in the evening and an hour later the mate informed the skipper that the last of the catch had been processed. The skipper had been up since 0800, although he did not feel tired. He told the mate and the rest of the crew that they should get some sleep until he called them at about 0400 to prepare the vessel for entering harbour.

The vessel was set to autopilot, proceeding at about 8kts, and the first few hours were uneventful. However, the skipper fell asleep at just after 0300 and about an hour later he and the crew were awoken by the gill-netter grounding on a rocky shelf close to shore (see figure).

The skipper had been awake for about 20 hours at the time of the accident. Thankfully, the crew found only minor damage during an inspection of the hull and it was quickly repaired. The vessel was later refloated and returned to its home port under its own power.

Figure: The fishing vessel aground

The Lessons

1. **Risk →** The fishing vessel and its crew had a narrow escape when the skipper fell asleep. The application of working time regulations in fishing vessels is explained in MSN 1884 (F), which states that *every fisherman shall have minimum rest of 10 hours in any 24-hour period*. It also warns that without at least 8 hours asleep an individual will build up a ***sleep debt***, causing them to: *fail to stay alert; misread situations; overlook key information*; and, as in this case, *fall asleep and put themselves and colleagues at extreme risk*.

2. **Action →** The only effective measure to prevent fatigue is to ensure that the crew are properly rested. Continuing to operate a vessel while severely fatigued places both the crew and other seafarers at significant risk of harm. Skippers in similar circumstances to those in this case have put their vessels alongside or at anchor for 7 to 9 hours so that their crew can properly rest.

Nail your maintenance

potter | foundering

Early one grey and wet December morning, the owner of an 11-metre clinker built wooden potting vessel (see figure) arrived at the boat to discover that it had sunk overnight while securely moored alongside its regular quayside pontoon in its home port.

The 50-year-old vessel had been out of service due to bad weather and seasonal fishing patterns when, within 24 hours of the owner's last inspection, its watertight integrity failed and it was found submerged and resting on the seabed at a depth of 2 metres. The vessel had been checked at regular intervals while in use and when laid up; however, there had also been periods of 24 hours or longer when it was left unattended.

The wooden hull was fastened with nails, some of which the owner had identified in recent years as rusted below the waterline; these had been marked up and replaced when the vessel was lifted out of the water during its repair periods, although this had not taken place within the previous 12 months. The sunken vessel was eventually raised and the source of the leak was found to be failure of its hull due to a rusted and badly corroded nail.

Figure: The potting vessel

The vessel's electric bilge pumps were powered by its service batteries and activated by float switches. The reserve voltage held in these batteries was insufficient to power the bilge pumping system for longer than a few hours. The batteries were quickly drained of power when the water started to enter the hull during the night and the bilge pumps had stopped working before the owner arrived early the next morning.

The Lessons

1. **Check →** It is essential that unmanned vessels are checked at regular intervals either in person or by remote monitoring systems as this can help with the early detection of emerging issues such as water entering the bilges.

2. **Revise →** Consider alternative means of charging if a vessel is left unattended for lengthy periods without shore power, or generators to maintain its service batteries. The installation of a small solar panel power system or wind turbine generator could help to prevent depletion of the battery reserves that are used to power bilge pumping systems.

3. **Maintain →** Older vessels can be more susceptible to issues regardless of what material they are constructed from and so frequent out of water hull inspections are required to monitor their condition; faults will also need to be promptly rectified before the vessel is refloated.

The hole story

fishing vessel and yacht | collision

At 0745 on a bright and clear cloudless summer morning, about 3 hours after sunrise, a small commercial fishing vessel was involved in a collision with a sailing yacht near a port in the south-west of England. The collision resulted in both craft being holed above the waterline.

The trawler's skipper was in the wheelhouse but could not see the approaching yacht because of the very bright sunlight. The yacht was not observed on the trawler's radar. The trawler was displaying the correct day shape signals and transmitting its position as a fishing vessel via AIS.

The 12-metre sailing yacht was on passage from France to the UK and was crewed by a family of three. It was the first time the family had sailed their yacht to England on an overnight passage. The yacht was under engine power assisted by sail to achieve a speed of 5.5kts on a north-westerly course as it made its approaches into a popular tourist port. The single-handed 11-metre fishing vessel had departed from its local port and was towing its net over regular coastal fishing grounds at a speed of 2.2kts on a south-easterly course, into the glaringly bright sun.

As the yacht closed in on the coast the owner went below deck to make a call to UK customs, leaving a family member at the helm.

The angle of approach between the two vessels meant that the mast and sails of the yacht obscured the trawler and so the yacht's helm did not see it in its path and the two vessels collided.

Fortunately, there were no injuries to either vessel's crew. The trawler's skipper reported the collision to the coastguard using his VHF radio. The coastguard then made attempts to contact the yacht by VHF radio, but without success.

Although damaged (see figure) neither vessel was taking on water and both were able to return to port unaided to carry out necessary repairs.

Figure: The damaged fishing vessel (above) and yacht (below)

The Lessons

1. **Plan →** Skippers planning a seagoing voyage should identify areas that may require extra vigilance due to high volumes of marine traffic such as fishing vessels, ferries, workboats and pleasure craft.

2. **Observe →** Maintaining a proper lookout by all available means can provide early warning of the risk of collision. This includes the use of electronic equipment such as radar and AIS. Moving your position frequently can offer the best opportunity to observe approaching vessels that may be obscured by window frames, masts, sails, cockpit canopies and other on board structures.

3. **Equipment →** All seagoing commercial vessels should be fitted with an AIS transceiver to transmit and receive signals that can be observed by anyone on mobile phones when in areas of network coverage. Pleasure yachts are not required to be fitted with AIS transceivers; however, recreational skippers should consider the safety benefits of installing AIS equipment.

4. **Monitor →** It is important that all vessels at sea maintain a listening watch on both VHF channel 16 and any working local port frequency to ensure the reception of important safety information and remain contactable.

RECREATIONAL VESSELS

Have you heard about the man from New Zealand who learned to sail from YouTube, set sail on his maiden voyage from Bluff and was never seen again? This happened in April 2014 and, almost a decade later, there is an ever-increasing presence of online 'experts' offering boating advice who perhaps shouldn't be!

Anyone with an interest in boating and a social media account will more than likely have been presented with videos showing all manner of content. Delve into the comments section and you will encounter a plethora of quips such as *red right returning* (without mention of IALA A[1]), *if in doubt throttle out* and *a couple of times the depth in anchor scope will be fine.* Comments by these pundits are so numerous, and many consistently wrong, that they can leave a competent mariner scratching their head almost doubting their schooling.

It is my opinion that the Dunning-Kruger effect is widely to blame for the prevalence of poorly advised guidance online, where zero checks and balances exist. The Dunning-Kruger effect is a cognitive bias whereby people with low ability, expertise or experience for a certain type of task or area of knowledge tend to overestimate their proficiency in that field. It is an unfortunate fact that those seeking educational information from social media really have no idea as to the credentials or competence of commentators, whose misinformation is usually imparted with an air of authority.

Logic would suggest this is leading to a self-perpetuating cycle of misinformation the scale of which I have observed accelerating since the onset of chronic pandemic 'online-ism'. The number of recreational boat users is escalating as is the volume of media content that glorifies unsafe acts and should raise concern among the recreational sector. For example, bad viral videos; and when I say bad, I mean encouraging people to conduct unsafe operations on board their craft. The Instagram algorithm works to push and promoting the glitzy, colourful, engaging videos irrespective of how safe the act being depicted is.

Perhaps you have seen the viral videos of jet skiers chasing ships or the solo occupant of a ski boat setting the throttle and climbing overboard for a quick ski. One of the worst in my opinion is *The flying fish* clip of a towable tube that becomes airborne with people on board; while it does indeed look spectacular, the posters fail to mention the lack of control one has over this apparatus and nowhere on the clip, caption or comments does it mention the disproportionate risk these inflatables pose. There have been an unprecedented number of injuries and deaths associated with these types of apparatus. However, the viewer remains uninformed of the risks and disclaimers cannot be found anywhere.

...it sure is the Wild West out there

The grip of boating spectacularism in these irresponsibly posted videos concerned me so much that, in conjunction with a lockdown-induced surplus of spare time, I decided to set up a boating education social media page disguised as yet another spectacular boat crash channel. My content, however, adds disclaimers and, in some circumstances, mildly graphic content. It is a sad reality that boating safety messages are just not exciting enough for the social media algorithms so, unless some sparkle is added, the clips' reach will just plummet without propagating the safe practice messages.

I have found it to be quite challenging, trying, in my way, to promote and proliferate these safety messages. I regularly receive jibes that accuse me of being a spoilsport; my messaging inbox is filled with people typing in all caps that I am an *IDIOT* because *EVERYONE KNOWS IT'S ESSENTIAL SURF BARS ARE TO BE CROSSED AT FULL SPEED!* However, I am holding the line on all manner of issues, from appropriately securing to a cleat, despite the howls of *multiple half hitches required*, to irresponsible speeds. I am standing behind my shield of solid RNLI and RYA education, firing flaming arrows of COLREGS because it sure is the Wild West out there.

Of further growing unease, and increasing in number, are sensationalised clips such as jet boats traversing incredible white water rapids on their ascent to a raging spilling dam, with no reference to the months of training, safety procedures and planned emergency escapes. Some viewers look upon such videos as *another great day on the water* and, judging by the comments, many are showing a desire to emulate the stunts without any mention of safety considerations.

Boating safety content might be far less impressive than spraying your mate with the prop wash, but the messages can be delivered. I have achieved a reasonable subscribership and am delivering appropriate safety messages that are sneaking past the algorithm's dull-o-meter. As readers of the MAIB Safety Digest we generally have a vested interest in boating safety and I believe it is in all of our best interests to actively engage in the comments section of boating videos you may see online. I know from experience the instinctive reaction for knowledgeable folk is to shake one's head in disbelief and scroll on, but perhaps adding a respectful corrective comment, if appropriate and you have the time, will incrementally and steadily help turn the tide.

The sail v. fishing boat nature of *The hole story* and *Far too close for comfort* cases featured in this digest reminded me of a particularly ingrained belief that I think requires correcting: many advise that all classes of power-driven vessel must give way to sail without reference to COLREG Rule 18 (Responsibilities between vessels), among others. I deduce from online comments a growing belief that a sail boat is infallible and that if it floats and has an engine it needs to keep clear of the sailing vessel. Perhaps this is one to keep an eye out for: we should be promoting the IMO version of COLREGS, not the Zuckerberg edition.

ANDREW FLANAGAN | Chief Instructor, Powerboat Training NZ

Andrew Flanagan began his maritime career with a phone call from an RNLI lifeboat operations manager informing him that his fellow lifeboat crew members had just capsized enroute to an emergency. A year later, almost to the day, he participated in a similar rescue and because of this was awarded the RNLI Bronze Medal for Gallantry for saving a father and his two sons.

Andrew was born in Ireland and moved to the UK to attend university, whereupon he joined the RNLI Whitstable lifeboat crew. He subsequently progressed to become a full-time RNLI trainer for several years before the lifestyle afforded by the role of an offshore SAR commander for the BP Jigsaw project tempted him away.

Andrew later emigrated to New Zealand, where he founded his Royal Yachting Association (RYA) powerboat training school and launched the @powerboat.training social media channel, which has amassed 250,000 followers and an average of over 15 million views per month across the major social media platforms. Andrew also provides maritime search and rescue training to international commercial organisations.

[1] International Association of Marine Aids to Navigation and Lighthouse Authorities Region A (Europe, Australia, New Zealand, Africa, the Gulf and some Asian countries).

23

Our revels are now ended

motor cruiser | grounding

As the summer season transitioned into autumn the skipper of a 33ft motor cruiser planned a day out with friends. The group aimed to head over to a restaurant for a long lunch and then return to harbour by early evening. Their passage to the restaurant was pleasant, with the slowly strengthening wind behind them, and time passed quickly as they enjoyed their meal and each other's company. Before long, the skipper realised that it was starting to get dark and that the weather had deteriorated.

Once back on board, the skipper was wary of taking the coastal route home and decided to head further offshore before making a course to their home port. He had navigated these waters many times and was confident he would be able to find his way despite the onset of night. The motor cruiser set off at full speed into the darkness and the chop of the sea, which was made steeper as the wind blew against the tide.

The mood on board was buoyant as the crew discussed their day. One crew member went to find a jumper and in doing so switched on all the lights in the forward cabin (Figure 1) and along the passageway. The skipper's night vision was compromised by a combination of the glare created by the bright cabin lights and spray on

Figure 1: View from inside main cabin

the windscreen. Suddenly, and before he could appraise the situation, a cliff appeared from nowhere ahead of him. The motor cruiser hit the shore at full speed and came to a crashing halt, the sudden jolt propelling the crew forward (Figure 2).

At least two crew members were found to need immediate medical attention when the group came to after the impact. Calls to the emergency services elicited a swift response and the two most seriously injured crew were airlifted to a specialist hospital for treatment. The remainder were taken to a nearby hospital for assessment. The motor cruiser was a write off.

Figure 2: Motor cruiser aground on rocky shoreline

The Lessons

1. **Plan →** It is vital to be aware of and use the times of sunset and civil twilight to frame your plan for the day. The skipper was unprepared for the changing season and so he altered his route and attempted to rush home in the deepening darkness. Time and tide wait for no one and you must think ahead.

2. **Hazard →** The glare of your own lights can significantly impact your ability to keep a good lookout at night. Everyone on board should make sure that the watchkeeper is given the best opportunity to see hazards. White light can seriously affect night vision and the glare on windscreens can make it almost impossible to see out effectively. Use torches or red lighting to move about or keep doors, curtains and scuttle covers closed.

3. **Margin of safety →** Travelling at speed in darkness while unable to see out properly can increase the chances of an accident. Give yourself more time by slowing down early or stopping.

4. **Risk →** Alcohol can impair the ability to make good decisions and does not mix well with boating and safe navigation. It is far better to assign a duty driver, who stays on the soft drinks, than repeat what happened here.

Biting the hand that feeds you

sailing yacht | accident to person

Two family groups of experienced sailors chartered a yacht to sail around the west coast of Scotland and were looking forward to exploring remote islands and sailing in challenging conditions. On the evening of their first day, the genoa sail failed to stow easily and so one of the crew went forward to help rotate the furling gear and secure the sail.

The furling gear continued to be problematic on the second day and the same crew member needed to manually intervene every time the genoa sail was stowed. He noted that the line guard housing had started to work loose (see figure) but managed to operate the furling gear successfully enough with a bit of effort.

While out sailing on the third day the wind was due to pick up again and so the crew sought shelter in a secluded bay and set about stowing sails as they motored towards their destination. By this time the line guard around the furling gear had loosened further and the crew member once again went forward to help furl the genoa sail. As he rotated the furling gear the genoa sail suddenly released and started furling quickly, catching the crew member's fingers between the line guard and the drum. The pressure was intense enough to amputate the tips of the index and middle finger on his right hand.

The remote location of the yacht made it challenging for the crew to raise the alarm. They eventually contacted the coastguard but language difficulties and pronunciation of local landmarks made obtaining an exact location difficult. The injured crew member was eventually rescued and transferred to a hospital for treatment. The holiday had come to an abrupt halt.

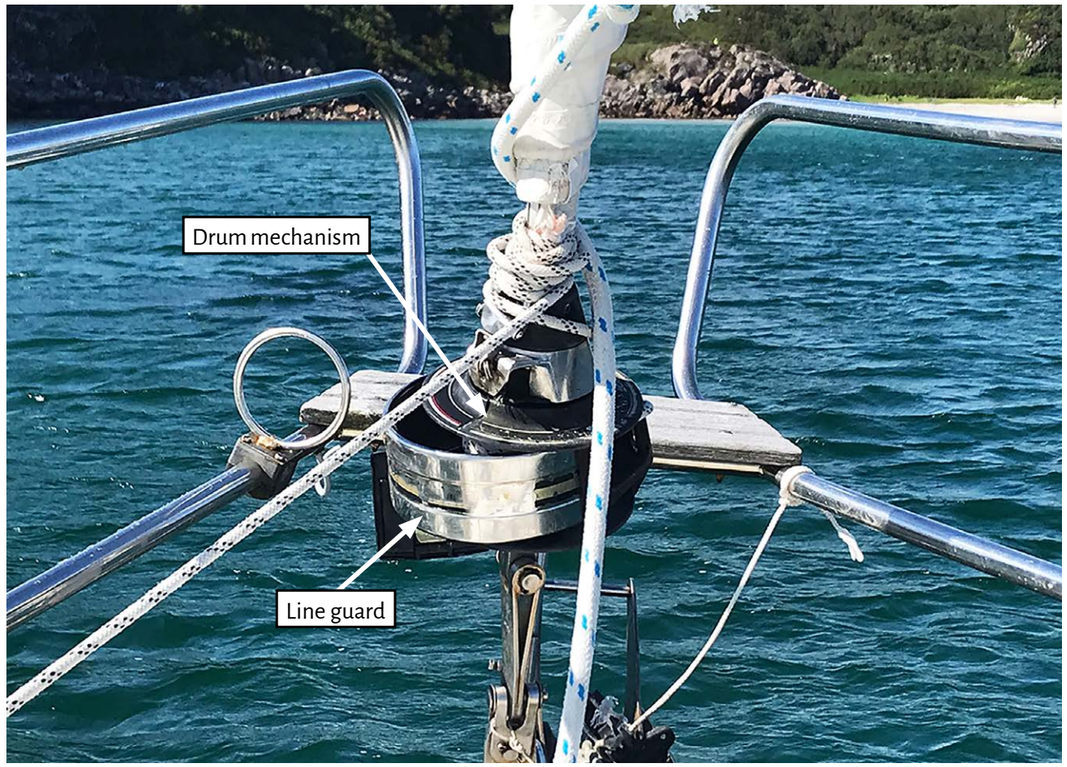


Figure: Defective furling gear with a gap between the line guard and the drum

The Lessons

1. **Maintain →** It can be tempting to ignore defects and make the most of precious holiday time. However, reporting problems to the charterer at the earliest opportunity can save everyone a deal of pain and heartache. Some repairs will be quick and allow a speedy return to the holiday, others may take much longer; the impact of avoidable injuries will last a lifetime. Be safe and get it fixed.

2. **Qualified →** The beauty of the remote Western Isles is counterbalanced by the fact that they are difficult to access and help is not always on hand. All crew must know how to raise a distress message and be able to clearly communicate the vessel location and nature of the problem to the coastguard.

3. **Revise →** This was not the first time that the furling gear on this yacht had needed repair. The equipment itself was well made and serviced competently but its location above the anchor cable exposed it to damage. Additionally, the furling line was misaligned and did not feed into the centre of the drum mechanism. These two separate issues meant that the problem was set to recur no matter how often the furling gear was serviced and repaired. Time spent learning lessons is seldom wasted.

Giving up smoking is not easy

motor cruiser | fire

A 40ft private motor cruiser had travelled out to a secluded bay so that its skipper and crew member could enjoy a relaxing meal on board, after which their plan was to set off again in the early evening and practice some night navigation in preparation for a longer trip later in the year.

Following the meal, the crew member popped forward to switch on the cabin heater and charge their e-cigarette and mobile power bank. The skipper was at the helm, focusing on the encroaching darkness. The crew member returned to the galley to do the washing-up and then relaxed on a couch seat in the main lounge and talked with the skipper about potential destinations for their planned trip further afield.

The skipper began to realise that he could detect a faint smell of smoke and asked the crew member to take over at the helm while he checked the engine bay. All was fine with the engines so he went down into the forward cabin area. The main cabin was clear but, as the skipper opened the door to the crew member's cabin, black smoke belched out and he caught a brief glimpse of a fire. The skipper ordered the crew member to launch the liferaft and grabbed a fire extinguisher but was beaten back by the flames. He sent an undesignated digital selective calling (DSC) distress on his radio, collected the emergency grab bag and headed to the liferaft.

Once clear of the burning boat (Figure 1) the skipper called the coastguard on his handheld VHF radio and then attended to his crew member, who had badly twisted their ankle while scrambling to get into the liferaft. A nearby pilot boat diverted to attend the scene and was soon joined by the lifeboat. The skipper and crew member were recovered safe and well. The boat was lost (Figure 2).

Figure 1: RNLI video still, showing cabin engulfed in flames

Figure 2: RNLI video still, showing whole cabin destroyed by flames with only the hull remaining intact

The Lessons

1. **Hazard →** Mobile devices, e-cigarettes and power banks are all at risk of overheating when on charge. The fire and rescue service advise only using the individual chargers supplied with the device and charging such items on a clean, flat surface away from anything that could easily catch fire. In this case the items were left to charge out of sight on a bed and with the compartment door closed. It is fortunate that the skipper investigated the source of the smoke and took swift and decisive action on discovering the fire.

2. **Communicate →** The coastguard and nearby vessels had the chance to react in good time because the alarm was raised rapidly. Early use of the DSC alert is fundamental to improving a casualty's chance of survival. Good use was made of the portable VHF to give the coastguard a full understanding of the nature of the distress.

3. **Plan →** A well-prepared grab bag can make a huge difference. Consider what goes in this bag and who on board knows its whereabouts and contents; it can save lives in an emergency.

The RYA provides advice on grab bags and what to keep in them. It is useful if the grab bag is waterproof, brightly coloured and can float. Contents can vary dependent on whether a liferaft is available but should address your chances of rescue within the shortest time possible and enable you to:

- indicate you are in distress;
- attract the attention of nearby vessels;
- support your survival (sea sickness tablets, sun cream, energy bars, sunglasses, etc.); and
- help yourself once rescued (passport, credit cards, spare keys, insurance documentation, etc.)

This list is not exhaustive and can vary according to your individual circumstances.

Visit https://www.rya.org.uk/blog/grab-bags-what-do-you-keep-in-yours for more information.

Burn voyage

motor cruiser | fire

On a mild summer afternoon a couple took their recreational motor cruiser out onto the water in a light breeze and clear skies to enjoy the pleasant weather. Their recently purchased cabin cruiser was equipped with a kitchen and sleeping area and powered by two diesel engines, for which they had a fuel tank on board.

As they were returning to port after their excursion, the couple noted that smoke was emanating from the starboard engine and into the cabin compartment on board. Acting swiftly, they stopped the engine and closed the hatches before releasing the fixed fire extinguishing system. This proved to be ineffective in containing the fire and so the couple donned their lifejackets and issued a VHF distress message before evacuating to the open deck area, furthest from the flames that were beginning to spread throughout the vessel. The couple could not access their liferaft as it was on the vessel's stern, near to the seat of the fire.

Fortunately, a local lifeboat crew was undertaking a training exercise nearby and responded quickly to the distress call. The unharmed couple were rescued by the lifeboat just moments before their vessel was fully engulfed by flames (Figure 1).

Because the vessel was in a busy shipping channel approaching a port, a second lifeboat was tasked to tow the burning vessel to a place of safety. The lifeboat crew attached a line to the motor cruiser and towed it out of the channel before using the towline to set its anchor. A duty tug from the port also attended and attempted to extinguish the fire; however, this was unsuccessful and the vessel sank, extinguishing the fire and resulting in diesel fuel and debris entering the surrounding water (Figure 2).

Figure 1: Motor cruiser after crew abandoned it

Figure 2: Remains of motor cruiser before it sank

The Lessons

1. **Action →** The motor cruiser's owners took quick and decisive action by attempting to fight the fire in the first instance and then calling for help and preparing for abandonment. The proximity of the local lifeboat crew was also timely; the couple would have been forced to enter the water without a liferaft to avoid the flames had they needed to wait any longer.

2. **Maintain →** A fixed firefighting system is no use if, as in this case, it fails to suppress the fire and contributes to its uncontrollable spread. Fixed firefighting equipment is not required on board private pleasure and recreational craft; however, where such a system is installed it should be inspected and serviced regularly to ensure it works in an emergency.

3. **Equipment →** Stowed lifesaving appliances should be accessible in an emergency. When deciding what storage locations are suitable, apply various scenarios to each type of essential survival equipment and consider how easy it would be to retrieve the item in an urgent situation.

INVESTIGATIONS

started during the period 1 September 2022 to 28 February 2023

Date	Occurrence
1 October 2022	Person overboard from the keelboat ***LimBitless*** off Cowes, Isle of Wight, resulting in 1 fatality.
2 October 2022	Mechanical failure and ejection of 10 of the 11 occupants from the powerboat ***Awesome*** off Tortola, British Virgin Islands, resulting in multiple injuries and 2 fatalities. Under investigation on behalf of the government of the British Virgin Islands.
6 October 2022	Collision between the UK registered pair trawlers ***Guiding Light*** and ***Guiding Star*** south-east of Fair Isle, the North Sea, resulting in the flooding and sinking of ***Guiding Star***.
7 October 2022	Man overboard, presumed deceased, from the UK registered fishing vessel ***Eder Sands*** in the Atlantic Ocean, south-west of Shannon, Republic of Ireland.
24 October 2022	Grounding and loss of the UK registered vessel ***Ocean Maid*** on Cairnbulg Point, Scotland.
25 October 2022	Collision with a berth of the Malta registered chemical tanker ***Ali Ka*** on Canvey island in the Thames Estuary, England.
12 November 2022	Capsize and loss of the UK registered fishing vessel ***Crig-A-Tana*** south-east of Bass Point, Cornwall.
14 December 2022	Sinking of a migrant boat while attempting to cross the English Channel, resulting in 4 confirmed fatalities. The exact number of people in the boat has not yet been established.
8 January 2023	Fall from height on boarding the Finland registered ro-ro cargo ship ***Finnhawk*** from the UK pilot vessel ***Humber Saturn*** off the Humber Estuary, England, resulting in 1 fatality.
11 February 2023	Fire in the engine room and funnel space on board a UK registered ro-ro passenger ferry ***Stena Europe*** while approaching Fishguard Port in Pembrokeshire, Wales.
24 February 2023	Capsize and foundering of the UK registered tug ***Biter*** off Greenock, Scotland, resulting in 2 fatalities.

Correct up to 28 February 2023. Go to www.gov.uk/maib for the very latest MAIB news

Preliminary Assessments 2022

Maud/Gardenia Seaways
Close quarters near miss between cruise vessel and a ro-ro ferry near the North Shipwash Buoy, England on 4 November 2021.
PA1/2022 Published 25 February

Chem Alya
Grounding of a chemical tanker in the Needles Channel, England on 25 October 2021.
PA2/2022 Published 18 March

Francisca
Loss of 34 containers overboard from a cargo vessel near Duncansby Head, Scotland on 31 October 2020.
PA3/2022 Published 13 April

Thorco Angela
Fumigant poisoning on a general cargo vessel in Liverpool, England on 11 October 2021.
PA4/2022 Published 18 May

REPORTS

issued in 2022

Galwad-Y-Mor
Subsea explosion resulting in crew injuries and damage to a fishing vessel off Cromer, Norfolk, England on 15 December 2020.
1/2022 Published 20 January

Diamond D
Flooding, capsize and foundering of a prawn trawler 20 nautical miles north-east of Tynemouth, England on 16 August 2020.
2/2022 Published 9 February

***Rib Tickler*/personal watercraft**
Collision between a RIB and a personal watercraft on the Menai Strait, Wales on 8 August 2020, with 1 loss of life.
3/2022 Published 17 February

Wight Sky
Two catastrophic failures, one resulting in a fire, on board a ro-ro passenger ferry in the entrance to Lymington River, and at Lymington Pier, England on 26 August 2018.
4/2022 Published 28 April

Diamond Emblem 1
Person overboard from a motor cruiser on the River Bure, Great Yarmouth, England on 19 August 2020, with loss of 1 life.
5/2022 Published 5 May

Saint Peter
Person overboard from a single-handed creel fishing vessel near Dunbar, Scotland on 2 May 2021, with 1 loss of life.
6/2022 Published 16 June

Joanna C
Capsize and sinking of a scallop dredger south of Newhaven, England on 21 November 2020, with loss of 2 lives.
7/2022 Published 22 June

Nicola Faith
Capsize and sinking of a whelk potter in Colwyn Bay, Wales on 27 January 2021, with loss of 3 lives.
8/2022 Published 23 June

Teal Bay
Mooring deck accident on a general cargo vessel at the Kavkaz South anchorage, Russia on 30 August 2021, with loss of 1 life.
9/2022 Published 14 July

Bella
Flooding and sinking of a survey workboat on the approaches to Lynmouth, England on 6 July 2021.
10/2022 Published 2 September

Goodway
Capsize of a single-handed creel fishing vessel near Cairnbulg, Scotland on 16 October 2021, with loss of 1 life.
11/2022 Published 22 September

Annie E
Failure of a suspended buoy on a workboat near the Isle of Muck, Scotland on 3 April 2021.
12/2022 Published 2 December

Stand up paddleboarding accident
Commercial stand up paddleboarding accident on a river weir on the River Cleddau, Wales on 30 October 2021, with loss of 4 lives.
13/2022 Published 8 December

Reul A Chuain
Persons overboard from a prawn trawler in the Sound of Rùm, Scotland on 24 June 2021, with loss of 1 life.
14/2022 Published 16 December

Svitzer Mercurius
Failure of a towline pennant on a tug in Southampton, England on 22 December 2019.
15/2022 Published 22 December

SAFETY FLYERS

issued during the period 1 September 2022 to 28 February 2023

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE FISHING INDUSTRY

Capsize of the single-handed creel fishing vessel *Goodway* (FR23), with the presumed loss of one life, near Cairnbulg, Scotland, on 16 October 2021

Figure 1: *Goodway*

Narrative

At 1140 on 16 October 2021, the 6.85m creel fishing vessel *Goodway* **(Figure 1)** left Cairnbulg harbour, Scotland, to work creels locally. The owner was the only person on board. At 1340, the owner's mobile phone suddenly disconnected from the network and it is highly likely that *Goodway* capsized at that time, while the owner attempted to free creels that had become fast to rocks on the seabed. At 2018, a concerned family member alerted the coastguard that the vessel was overdue and the RNLI and coastguard helicopter assets were immediately tasked to search for both *Goodway* and its owner. At 2233, a coastguard helicopter found *Goodway*'s upturned hull anchored to rocks by a snagged fleet of creels that were attached to a cleat on the starboard side of the vessel. The hull was briefly inspected before being freed from the rocks by the tide and washed ashore, where it was turned over and thoroughly examined **(Figure 2)**.

Figure 2: The wreck of *Goodway* washed ashore on Cairnbulg Point

The evidence indicated that the owner had attached the back rope of the snagged fleet of creels to the cleat on the starboard side of his vessel. It is likely that *Goodway* capsized when the owner used the outboard engine, which was offset to port, to drive the vessel forward in an attempt to free the fleet. It is presumed that the skipper fell overboard when *Goodway* capsized and he was unable to board the upturned hull or send a distress alert. It is unknown if the owner was wearing a personal flotation device (PFD) or carrying his recently purchased automatic personal locator beacon (PLB) at the time of the accident, as he has not been found and no alert was received from his PLB. *Goodway* was not fitted with a float free Emergency Position Indicating Radio Beacon (EPIRB) and the PLB purchased by the owner did not operate on the 406 megahertz (MHz) frequency required to transmit a distress alert to the coastguard.

Safety lessons

1. The Maritime and Coastguard Agency does not recommend single-handed fishing operations due to the risks involved: there is no one to raise the alarm or help recover you if you fall overboard.

2. There must be a means of reboarding the vessel or climbing onto an upturned hull from the water. A boarding ladder or tyres rigged down the vessel's side can improve a fisherman's chances of survival.

3. The ability to send a distress signal from the water could save a life. Many types of PLB are available on the market and fall into two distinct groups: 406MHz and AIS. A single-handed fishing vessel must carry a 406MHz PLB if it is not fitted with an EPIRB. This is the only frequency that operates on the global satellite alerting network and, when manually operated, can immediately transmit an alert. To be effective in an emergency situation, a PLB must be fit for its intended purpose. It should be attached to a PFD and its user should know how to activate it.

4. PFDs save lives, once the emergency services have been alerted to your distress, you need to float to live until they reach you. Wearing a PFD will keep you afloat to enable you to be rescued.

This flyer and the MAIB's investigation report are posted on our website: www.gov.uk/maib

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Extract from The United Kingdom Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an such investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

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MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE FISHING INDUSTRY

Two men overboard, resulting in one fatality, from the fishing vessel *Reul A Chuain* (OB915) in the Sound of Rùm, Scotland, on 24 June 2021

Image courtesy of Fishing News (published 2019)

Reul A Chuain

Narrative

At about 1900 on 24 June 2021, the senior deckhand of the wooden fishing vessel *Reul A Chuain* (OB915) fell overboard during the recovery of a trawl net that had slipped over the stern while the vessel was returning to harbour. The skipper subsequently also fell overboard as he attempted to rescue him. Neither crew member was wearing a personal flotation device (PFD) or safety harness and lifeline. The remaining deckhand was able to recover both men, but the skipper did not survive.

Reul A Chuain was on passage from its fishing grounds west of the Isle of Rùm to Mallaig, Scotland. While the vessel was transiting the Sound of Rùm, the wind veered from south-westerly force 4 to northerly force 6, creating a short steep swell. The vessel rolled heavily and the trawl net, which was stowed on deck behind the wheelhouse and had not been lashed down, slipped overboard.

The vessel was immediately stopped, and the net was partially recovered. The retrieval gear then failed and the crew attempted to haul the rest of the net in by hand. The vessel rolled heavily and more net went over the stern, this time taking the senior deckhand, who was standing on the net on the deck, with it. The skipper leaned over the stern and tried to pull him back on board, but also fell overboard when the vessel again rolled heavily. With only 4 months' experience, the junior deckhand managed to recover both men and radio a "Mayday" message. Despite the efforts of the vessel's crew and search and rescue personnel, the skipper was declared deceased at the scene.

Safety lessons

1. *Reul A Chuain*'s risk assessments identified the hazard from loose gear and listed securing and tying down as control measures. With the worsening weather and the low bulwark height at the stern, the trawl net could have been prevented from going overboard had it been lashed down following a final trawl of the day. The risk assessment's control measures were ineffective because they were not implemented.

2. Ignoring safe practices can have serious consequences. By not wearing fall restraint harnesses or PFDs, the crew put themselves at risk by hauling in the net by hand when the net retrieval gear failed.

3. Adverse weather conditions and a man in the water without a PFD was a serious emergency. The instinctive action of the skipper to try and pull the senior deckhand back on board had tragic consequences. He was not wearing a PFD, which limited his ability to help himself. A PFD can keep a casualty afloat sufficiently long enough to allow time for an effective recovery to be conducted that does not put others at risk.

4. Training and drills are meant to provide a coordinated and practised response when action is needed. *Reul A Chuain*'s crew had not undertaken man overboard drills, and although the vessel was equipped with man overboard recovery equipment, the crew were unaware of its existence on board and had never practised with it. Their reactions to the emergency were therefore instinctive rather than well thought out, tried and tested. With no plan or training, the inexperienced junior deckhand's rescue of both men is commendable. The only way to prepare for an emergency is to undertake regular training and drills, and become familiar with on board equipment.

This flyer and the MAIB's investigation report are posted on our website: www.gov.uk/maib

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