MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY DIGEST

Lessons from Marine Accident Reports

2/2024

Featuring introductions by Jeremy Dale | Robert Greenwood | Samantha Ward

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

°C	degrees Celsius
AIS	automatic identification system
C/E	chief engineer
C/O	chief officer
CCTV	closed-circuit television
cm	centimetre
CO	carbon monoxide
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea, 1972
DfT	Department for Transport
DP	dynamic positioning
ft	foot/feet
kts	knots
m	metre
nm	nautical mile
OSV	offshore supply vessel
“Mayday”	the international distress signal
MGN	Marine Guidance Note
“Pan Pan”	the international urgency signal
PFD	personal flotation device
PLB	personal locator beacon
PPE	personal protective equipment
RIB	rigid inflatable boat
RNLI	Royal National Lifeboat Institution
ro-ro	roll-on/roll-off
UKC	under keel clearance
VHF	very high frequency

CHIEF INSPECTOR’S INTRODUCTION

Welcome to the second MAIB Safety Digest of 2024. As usual, I will start by thanking our guest introduction writers, Jeremy Dale, Robert Greenwood and Samantha Ward, for introducing the merchant, fishing and recreational sections of this edition. Each is an expert in their own field, and their insights to safety help bring contemporary context to the cautionary tales in the following pages. I hope you will find time to read the whole edition – there is something here for every mariner – but please do read the section introductions. And, when you have finished, please pass the digest on to others.

Jeremy Dale makes the point that safety has come a long way since he was first in the industry. Risk assessments, toolbox talks, and personal protective equipment (PPE) are all examples of genuine attempts to improve safety that have developed over the last few decades so we can all return home intact at the end of a trip. Safety, in one form or another, is usually a standing agenda item at board meetings, and whole safety management systems are devoted to the topic. However, as Jeremy also points out, the “*It won’t happen to me*” attitude prevails. Further, in the Efficiency-Thoroughness Trade-Off, safe behaviours are often early casualties (if you will excuse the pun).

So, what is to be done?

Regular readers of the MAIB Safety Digest and the introductions to each of its sections will have detected that planning is a regular theme. Not just planning how to achieve a particular goal, but also precautionary planning for dealing with unwanted events. As I have written before, a wise captain once told me, “*It is not what happens but how you deal with it that matters*”. Preparing for unfortunate events needs a shift of mindset from “*It won’t happen to me*” to thinking about those we are responsible for. If 'it' did happen, what would be the effect on my team, my family, and others I am responsible for?

Events have consequences, and a good safety culture starts with everyone taking responsibility for their decisions and actions, and the possible outcomes. As you read the articles in this digest, once you are over that sense of smug self-satisfaction at others' misfortunes, ask yourself whether, in similar circumstances, you would have made safer choices.

Andrew Moll OBE
Chief Inspector of Marine Accidents

MERCHANT VESSELS

It is fascinating to look back over one's life to see how safety has changed. Or has it?

As a teenager I was lucky enough to live in Helford in Cornwall, a quintessential English village of twenty or so houses, two tea rooms, a post office, a pub, a boatyard and a sailing club situated on the banks of a small creek opening out to the Helford estuary. In my early teenage years, I spent my holidays hiring out boats at the boatyard and loved every minute of it. There was no such thing as PPE back then; these days, wearing thigh-high waders and no lifejacket and running across the foredecks of eight to ten hire boats to reach the boat at the end of the pontoon would not be an option.

Lifejackets were never worn, and extra PPE was never carried

At 16 years old I started a boatbuilding apprenticeship at a bespoke yacht manufacturer in Falmouth. During this period, I was also an active member of the Helford River Sailing Club and became responsible for rescue boat duties. While there was always a rescue boat to support club races there were times that the borrowed boats used for the task had to be rescued themselves. Lifejackets were never worn, and extra PPE was never carried. The most important thing was to make sure that the R flag was flying somewhere on the vessel.

I finished my apprenticeship and moved to Southampton to join the family boatbuilding business. This gave me the opportunity to expand my laminating skills and to be trained in the art of spray lay up; there was no clean air or filters for such processes in those days. The business moved to Stone Pier Yard in Warsash and my duties increased from running the laminating shop to being the only person able to drive all the yard equipment, which included a travel lift, tractor and crane. I was very capable, practical and safety conscious, but there was no training for any of the equipment and not a hard hat, hi-vis jacket or steel-toed boot to be seen anywhere.

...people did not want to be seen dead in hi-vis

Moving forward to my late twenties I started a hunting, shooting and fishing clothing manufacturing company. Safety was at the forefront of my mind and we were very much ahead of the curve when we launched the only full range of hi-vis clothing for horse riders, but people did not want to be seen dead in hi-vis back then. Dead being the operative word. Oh, how things have changed.

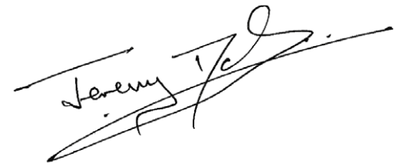
Having been directly involved with maritime safety for over 30 years, I can compare my own experiences with today's standards and be in no doubt things have moved on. From lifejackets to protective footwear, a full range of PPE is now required for anyone to work in a boatyard or near the water. The commercial world has definitely upped its game, but the recreational side is still lacking in safety awareness. It is quite ridiculous that, were a commercial maritime training organisation and a recreational training enterprise to be located alongside one another, both teaching the same marine courses, the commercial training organisation would reprimand you for leaving dry land without wearing a lifejacket while the recreational enterprise would not.

I believe that the noncompulsory wearing of lifejackets when going afloat recreationally contributes to the "*It's never going to happen to me*" attitude towards safety in this sector and generates a lack of understanding about lifesaving products and their upkeep. A high proportion of recreational lifejackets are not serviced annually because people dislike spending money on things they do not use.

Our service department is staggered by the number of lifejackets that would prove unfit for purpose in an emergency for reasons such as being repacked without a CO_2 bottle or firing cap or having a slit in the bladder. It is great news that we are seeing an increasing number of lifejackets with personal locator beacon (PLB) products; however, a high percentage of these products will never work as intended because very few are fitted correctly and it is worrying that this also applies to commercial lifejackets that come to us for a service. It appears there is no understanding of how to fit these products correctly.

...it is worrying that this also applies to commercial lifejackets that come to us for a service

SeaSafe Systems has helped several companies and individuals to get their safety products to market and sometimes those organisations have become competitors. You might wonder why I support the development of such products and my answer is simple: What if that product could save someone's life? We know there have been two occasions in the last 5 years when products that we helped to market have done just that.



JEREMY DALE OBE Hon FNI | Director, SeaSafe Systems Limited

Jeremy's career has taken him from Cornwall to Hampshire and back again. Following the sale of the family's Southampton-based boatbuilding business Jeremy returned to the Helford River and started a boat repair business. He established one of the first windsurfing schools in the West Country and became director of Helford Hotels, which owned the Ferryboat Inn and the 30 or so flats and properties in the surrounding area as well as the boat hire, ferry operation and windsurfing school. Some years later, Jeremy was persuaded to move out of Cornwall to join a boat manufacturer in Southampton.
It was during this time that he set up a hunting, shooting and riding clothing company, which flourished for 10 years until the recession of the early 1990s. It was around this time that Jeremy happened upon SeaSafe on the Isle of Wight, which he has now owned for over 30 years.

Alongside the day-to-day running of SeaSafe Jeremy has served as a local school governor for 7 years, taken an active role in the Isle of Wight Rotary, was a member and area chairman of British Marine, served two 3-year terms as a Cowes harbour commissioner and is currently chair of the Miss Isle School of Sip & Puff Sailing, Cowes Yacht Haven and Cowes Town Waterfront Trust.

In 2016, Jeremy was made an Honorary Fellow of The Nautical Institute and an Honorary Member of the United Kingdom Maritime Pilots' Association. In 2021, he was awarded an OBE for his services to maritime safety in the Queen's Birthday Honours.

A step too far

passenger vessel | accident to person

A task involving a ladder had unfortunate consequences for a crew member on board a berthed cruise ship. The crew member was standing on the top step of a small folding stepladder to secure lighting power cables when the step gave way, causing the crew member to fall to the ground.

The impact resulted in back and head injuries, leading to a brief loss of consciousness and severe back pain. Immediate medical attention was sought at the ship's medical centre where, after assessment, the crew member was deemed to be unfit for work for 72 hours. The crew member was subsequently transferred to hospital at the cruise ship's next port of call for further comprehensive medical evaluation.

An investigation was conducted on board and established that the accident was caused by the failure of the welds securing the stepladder's top step supporting rod to the frame (Figures 1 and 2).

Figure 1: The stepladder, showing the location of the failed metal support

Figure 2: The points of failure and damage

The Lessons

1. **Equipment →** It is unlikely that the weight of the crew member would have been sufficient to cause the catastrophic failure of a metal support on a new stepladder. The stepladder used in this incident was of an indeterminate age but was not being overloaded so it is almost certain that the damage to the metal support was pre-existing.

2. **Check →** The Provision and Use of Work Equipment Regulations 1998 require work equipment to be thoroughly inspected before use to make sure it is fit for the intended purpose. Work equipment should also be maintained in good repair and, where applicable, with maintenance and inspection logs kept up-to-date.

3. **Maintain →** Accidental damage to equipment can sometimes occur. A just culture working environment balances fairness, learning and shared accountability and supports staff to adopt an open and honest approach to reporting incidents. Where damaged equipment could affect the next user, a just culture is essential to understand why the failure occurred and how to prevent it happening again.

A hidden trap

charter angling boat | machinery

Sometimes, it is the smallest things that cause the biggest problems. In this case, a 38ft charter angling boat became stranded due to a tiny mechanical fault while at sea with eight anglers and a lone skipper aboard.

The angling boat was some 800m from shore and in an area prone to fast-running tidal streams when the engine stopped. Attempts to get it going again proved unsuccessful and the skipper used very high frequency (VHF) radio to call for assistance. The local Royal National Lifeboat Institution (RNLI) all-weather lifeboat was dispatched and towed the angling boat back into port, where the anglers and their catch were landed ashore. A simple tale with a happy outcome, but certainly one to learn from.

The skipper investigated and found the problem with the engine after many hours of head-scratching. Within the fuel filter was a ball check valve comprised of a buoyant aluminium ball designed to prevent fuel being syphoned back through the fuel system when the engine was switched off. This ball check valve was positioned at the inlet to the fuel filter and so exposed to a flow of fuel that had not yet been cleaned (see figure). The restrictions in the chamber where the buoyant aluminium ball sat had become clogged with debris over time and eventually jammed the ball, stopping the flow of fuel to the engine and causing it to stall.

Source: RacorStore

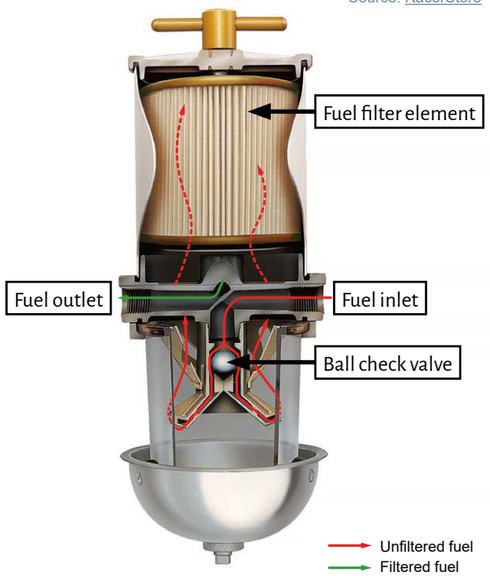


Figure: Fuel flow through the filter

The Lessons

1. **Aware →** The position of the ball check valve, and the risk of it blocking, was neither obvious nor known to the skipper. A routine change of the filter element following the instructions in the manual did not include a requirement to strip down the check valve. It is important to know the systems and be aware of possible issues. This particular issue, though thankfully rare, is one that many users of such filters know about.

2. **Maintain →** The upkeep of equipment should cover all the necessary actions to make sure it remains in good working order. A clean fuel system is vital to the safe operation of an engine and maintenance tasks for all component parts should be identified and carried out on a routine basis to promote reliable operation.

3. **Plan →** The skipper in this case made a good decision to call for help before the angling boat got into serious trouble. It is prudent to be aware of the hazards around you, especially when you are reliant on a single piece of machinery for your safety. Operating close to shore in a fast-moving current needs careful consideration when a single failure could leave you in a perilous position.

Fire in the hold

bulk carrier | fire

Arriving in harbour late at night the crew of a bulk carrier prepared to offload their cargo of loose animal feed pellets the following morning. The pellets were an International Maritime Solid Bulk Cargoes Code group C cargo, classified as neither a liquefaction hazard nor a chemical hazard, and had low inherent fire risk when dry. Weather conditions were cold but dry when the first loads of cargo were taken ashore.

Sometime later, the stevedores noticed that some of the cargo was wet and very warm. On checking the warehouse, the stevedores found that some of the pellets had started to burn and these were quickly broken up and extinguished. An investigation of the hold found that small areas of damp cargo were smoking; these were removed to the quayside and dealt with. Cargo operations were suspended to allow surveyors to board and examine the situation.

The testing revealed that the cargo had suffered an ingress of salt water, meaning the holds had probably suffered a leak at sea (see figure). The ship had encountered very rough seas two days before arrival into the port, and this was a likely culprit. However, there was also evidence of significant condensation dripping onto the cargo from the hatch cover beams. Once wet, this cargo could start to ferment, heat up and catch fire.

When the cargo hold hatches were opened, a large cloud of smoke was seen. The cargo was smouldering heavily in places. Crews from the local fire services, a tug equipped with a fire monitor, and the ship all teamed up to fight the fire. Unfortunately, approximately 40% of the cargo was destroyed.

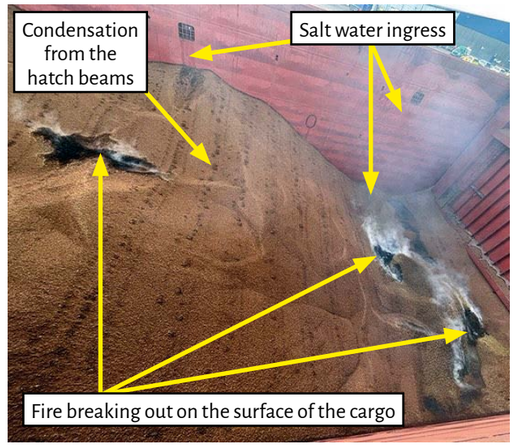


Figure: The cargo of animal feed pellets smouldering and smoking in the hold

The Lessons

1. **Risk →** Some bulk cargoes present a fire risk when damp. Aside from making sure that the cargo is in good condition before loading, it is also vital to ensure the cargo is loaded in dry weather. Further, it is important to consider the fire risk from damp cargo by having appropriate plans for ventilation control, atmosphere monitoring, and temperature checking. With suitable control measures in place, you can make sure that your cargo reaches its destination in the best order and the ship and its crew stays safe.

2. **Maintain →** Well maintained and properly sealed hatch coamings provide the best protection for the cargo against water ingress during bad weather. Poor maintenance and ineffective seals can lead to water leaking into the cargo and increasing the risk of fire.

3. **Plan →** A fire in the hold can be a very serious business and can risk the safety of the entire ship and its crew should it get out of control, especially at sea. Make sure you have a carefully considered, well-exercised plan to deal with any such event.

It all makes sense now

supply vessel | flooding

Operating close inshore in support of a pipe-laying barge, an offshore supply vessel (OSV) was engaged in the routine delivery of pipes and personnel from a nearby port. Although some of these deliveries required the OSV to operate in shallow water, the master was confident that safety could be assured by using the locally supplied large-scale charts, operating at slow speed with dynamic positioning (DP) and paying close attention to the on board echo sounder. The weather was fair; however, the low-lying land offered little protection from the strong offshore winds that had been blowing for the past week.

One delivery required the OSV to cross the 5m depth contour (Figure 1) with an under keel clearance (UKC) of around 0.5m. The master concentrated on the echo sounder and manoeuvred the OSV slowly in DP mode. All seemed to go well and the OSV made passage back to harbour for the next load. During that passage a contents sensor in one of the empty port side double bottom fuel tanks started to give a positive reading. The chief engineer (C/E) thought that the sensor had developed a fault and made a note to change it when the OSV was on a longer break in harbour.

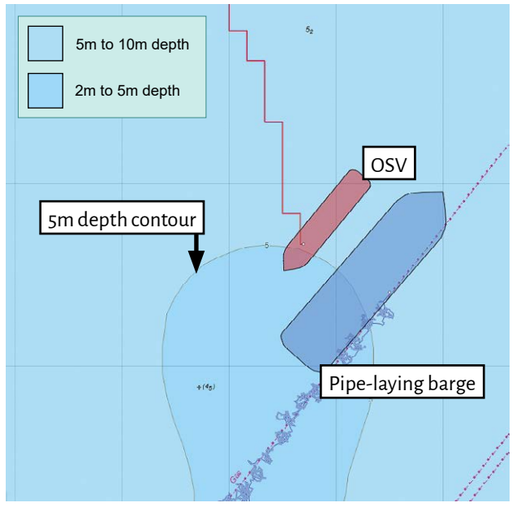


Figure 1: The OSV crossing the 5m contour on approach to the pipe-laying barge

Almost a month later, the C/E had completed their time on board and mentioned the faulty sensor to the incoming C/E during handover. The newly arrived C/E decided to investigate the sensor problem and, on sounding the tank, found that it was full of salt water and that the sensor had been correctly reading the entire time. The C/E and master examined the tank sensor trend data (Figure 2) and the OSV's track and discovered that, despite all their precautions, the vessel had hit an underwater obstruction when crossing the 5m contour several weeks earlier. A dive survey of the hull found some scraping damage and a 1cm diameter hole in the external surface of the tank (Figure 3).

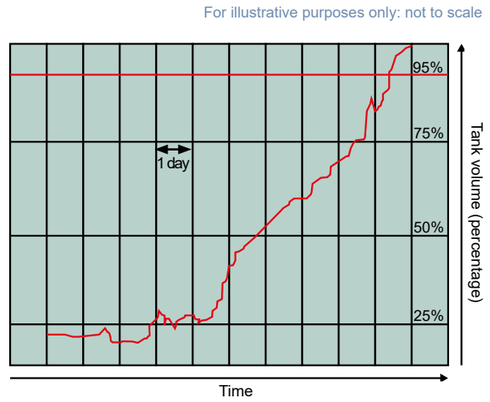


Figure 2: Tank sensor trend data, showing the tank slowly filling up over 9 days

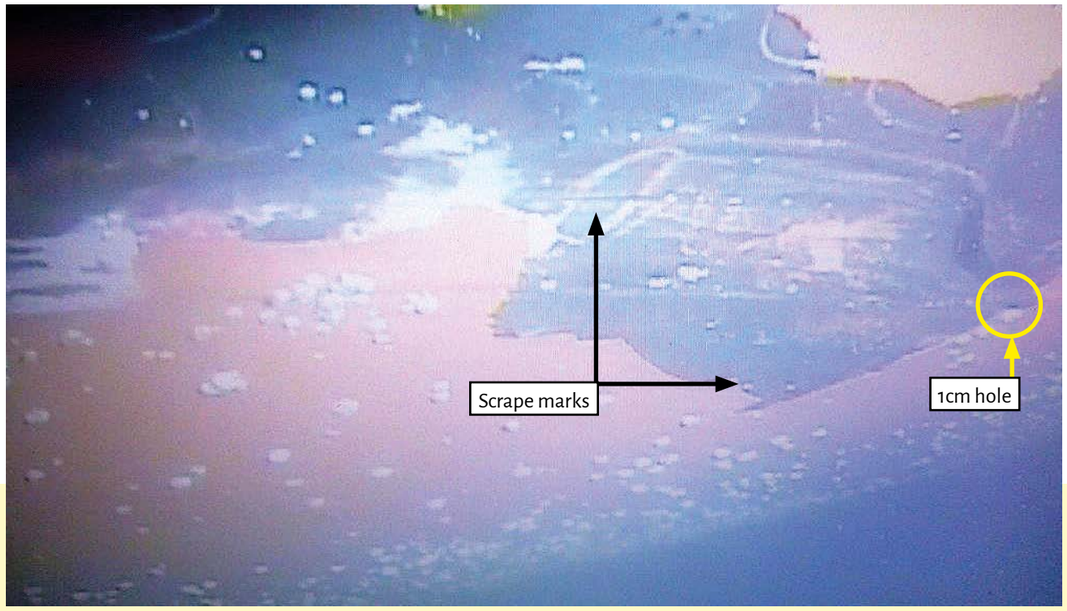


Figure 3: Damage to the hull

The Lessons

1. **Equipment →** Trust your sensors. Although possible, failures and inaccurate readings are rare and in this case the breached tank was slowly filling with seawater because the positive reading went unchecked.

2. **Check →** Use other means to verify readings when in doubt. Sounding the affected tank might have highlighted the problem sooner and confirmed whether the sensor was working correctly or had actually failed. Follow documented safety procedures before entering a confined space to undertake checks.

3. **Margin of safety →** The master took decent precautions to manage the UKC for these operations. However, it was later established that local sailing directions mentioned the mean sea level could be reduced by up to 0.9m by sustained offshore winds. Sailing directions represent the amassed knowledge of mariners and UKC should reflect this. It is also worth considering your vessel's footprint and the position of the echo sounder within it; an echo sounder located away from the hazard and the extremities of your vessel could give a false sense of security.

4. **Communicate →** The company involved completed a thorough investigation with a no-blame approach and shared the lessons widely. This maximised the opportunity to learn from the case and everyone in the fleet had the chance to benefit.

It was all back to front

rigid inflatable boat | accident to person

A group of 12 passengers gathered to board a commercial 10m rigid inflatable boat (RIB), that was to take them on a wildlife sightseeing tour. The passengers received a pre-departure safety briefing, which included how to sit on the RIB's jockey seats. The skipper used the main console at the stern to manoeuvre the RIB out of the harbour while the on board wildlife guide sat on a lifejacket locker at the bow, facing aft towards the passengers but twisted around a little to grip the nearby handrail for extra support (Figure 1).

The weather was choppier than it had been for the first two trips of the day and the skipper was in two minds about shortening or even cancelling this last trip. The wind whipped up the sea, but the RIB was riding well. As normal, the skipper found a bit of shelter at the first and second stops and slowed the RIB down so that the guide could stand and talk about the wildlife while the passengers took photos and asked questions.

The skipper was aware that the route to the third stop crossed open water and so watched the waves closely as the RIB travelled along at 18 knots (kts). It was getting bouncier and some spray was coming on board, but the passengers seemed happy enough. The RIB took a couple of bigger waves at about 700m out from the third stop and bounced more heavily than before. The skipper became aware of a bit of a kerfuffle among the passengers near the bow and, on slowing the RIB down, it was clear that something was up with the guide. The passengers reported that one of the bigger waves had lifted the guide from their seated position and they had banged their head hard on the fitted handrail before landing heavily on the lifejacket locker (Figure 2).

With an evident head injury and increasingly severe back pain, the guide made their way to the back of the RIB. On return to harbour the guide was examined and taken to hospital by ambulance. The impact of the bounce caused by the wave had been hard enough to deliver a severe compression fracture to the guide's L1 vertebrae in their spine. Fortunately, the guide underwent an immediate operation to pin the fracture and was still able to walk, making a slow and painful, but steady, recovery.

Figure 1: The guide's seated position in the RIB's bow

Figure 2: Representation of the guide's seating arrangement

The Lessons

1. **Risk →** When a boat comes off a wave and falls into a trough or impacts the next wave the forces and accelerations experienced by those on board can be high, even at relatively slow speeds. The risk of injury increases the nearer a person is to the bow. Sitting on a hard surface with your back to the direction of travel limits the body's ability to absorb shock through the legs. Sitting with one's back twisted makes this even worse. Risk assessments should consider how a craft's design and operating practices might affect crew and passengers. Identifying workable strategies and employing good boat and seat design can assist vessel operators to mitigate these risks appropriately. Marine Guidance Note (MGN) 436 (M+F)[1] provides more detail.

2. **Aware →** Where small craft are designed with the helm position towards the stern and passenger seating forward of this, the skipper is less exposed to vertical impact and so might drive the vessel in a manner that is more comfortable for them rather than in consideration of others. Skippers should be aware of the effects of shocks and impacts on their craft's seating configuration and navigate in a manner that is comfortable and safe for everyone.

3. **Communicate →** The positions of the guide and skipper at opposite ends of the RIB made communication between them challenging. It took a while for the skipper to realise the guide had been injured and to abort the trip. The skipper believed the guide was concussed and the emergency services prioritised their response to deal with a minor head injury rather than a broken back. Clear and accurate communication is important to ensure best outcomes, especially during an emergency.

4. **Plan →** A well-prepared voyage plan is important but a change to circumstances can drive the need to revise it. In this case the declining weather conditions increased the risk of injury of those on board and could have confirmed the skipper's earlier thoughts about shortening or cancelling the trip.

1 Guidance on Mitigating Against the Effects of Shocks and Impacts on Small Vessels.

Feeling a little ripped off

charter angling vessel | loss of control

A charter angling vessel was returning home with five passengers on board at the end of a long, cold day of fishing. Noting that the ebb tide was still running and that the waves were heightened by the strong south-westerly wind, the skipper decided to wait until the start of the flood tide to make the entry into port. While manoeuvring towards the harbour entrance, the skipper noticed the vessel was no longer responding to the helm.

Having lost the primary means of steering, and in steadily worsening weather, the skipper made a "Pan Pan" call to alert the coastguard that urgent assistance was required. The skipper could still control the vessel using the two engines and managed to maintain a heading.

Two lifeboats were sent to assist and one crew member from each lifeboat boarded the stricken angling vessel; the lifeboat crew decided not to evacuate the crew or passengers and took the vessel under tow. The towline from one of the lifeboats was led through two cleats on the angling vessel's bow and tied to a staghorn. As the lifeboat put weight on its towline both of the cleats and the staghorn were ripped from the bow and lost overboard (see figure). The angling vessel's skipper managed to steer into harbour using the engines, but it was some 5 hours after the accident before the vessel was brought alongside. Despite being a little cold and wet, everyone was happy to be safely ashore.

An investigation of the steering system found a bolt had dropped out from one of the arms connecting the helm to the hydraulic motor that controlled the rudders.

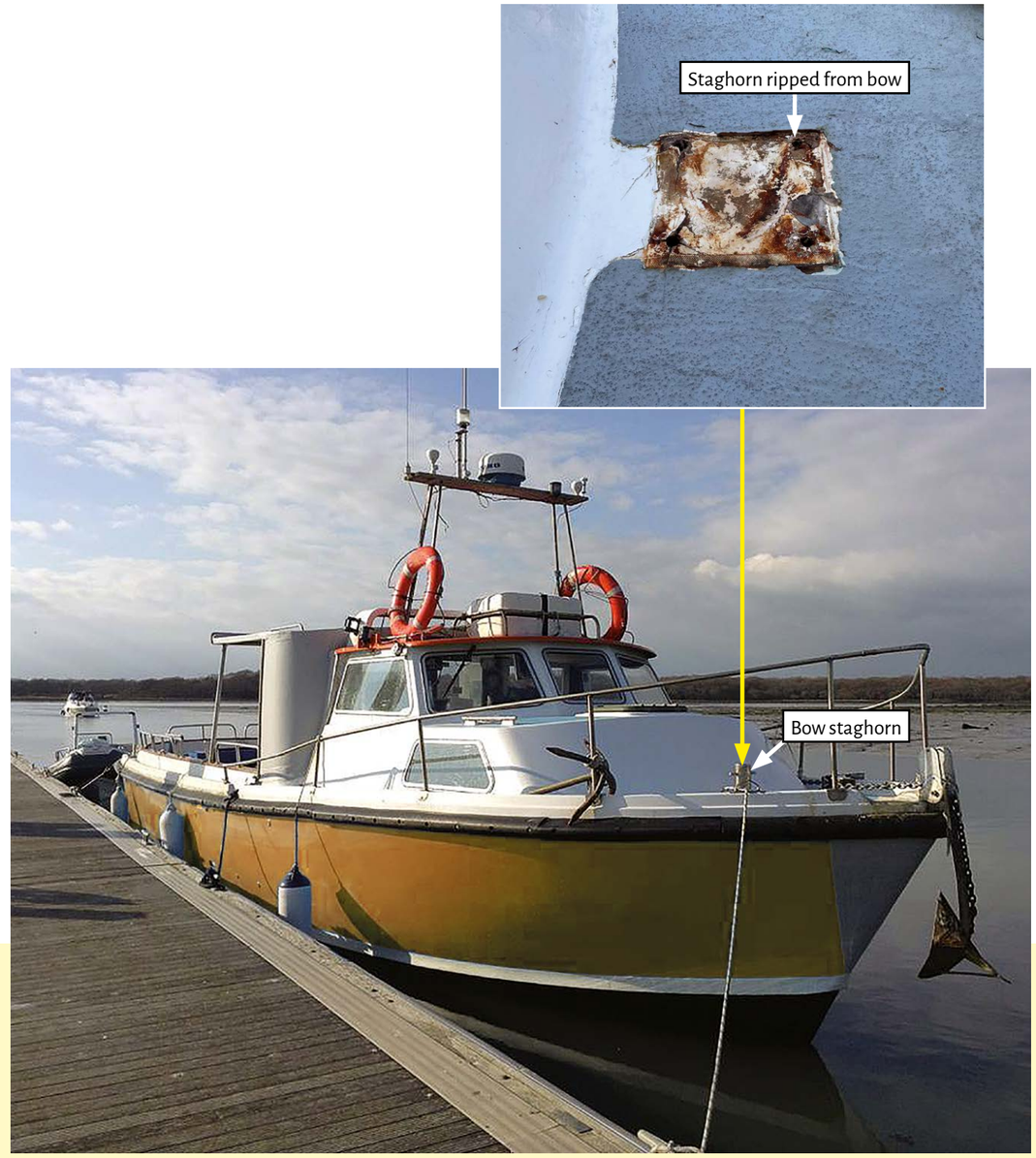


Figure: Bow staghorn on the charter angling vessel

The Lessons

1. **Communicate →** Given the angling vessel's proximity to the shore, the increasing wind and onset of darkness, the skipper's decision to make an early call for assistance meant that rescue services were already on the way, securing the safety of the crew and passengers should the situation worsen.

2. **Procedure →** Once the tow failed the skipper had few options but to attempt to steer the vessel into harbour using the engines alone. This took some practice, but proved effective as an emergency form of steering. Regular practice of reversionary modes is always worthwhile and in this case might have resulted in the skipper being more confident in their ability to safely navigate the vessel.

3. **Revise →** Following the accident the vessel's owner decided to fit a large backing plate to the new staghorn and cleats at the bow. The original staghorn and cleats had been fitted directly to the fibreglass using bolts, which had been ripped out as soon as substantial weight came onto the towline. A suitable backing plate will spread the load across a wider area, reducing the likelihood of a reoccurrence.

4. **Maintain →** The bolt that fell free from the steering system had been held in place by a locking nut that had worked loose over the years. Regular checks are important and taking a few seconds to conduct them can be worth their weight in gold, especially on vital equipment such as steering systems.

Barrel of laughs

workboat | near miss

A crew member on a workboat was tasked with using disinfectant detergent to clean the decks. When they opened the 20-litre container to decant some detergent into a bucket, the liquid inside the container had the appearance of oily water rather than disinfectant.

Suspecting that the disinfectant container had been used to store oily water, the crew member decided to pour the contents into an old steel oil drum that the crew used to collect waste oil and oily water from the vessel's bilges. Once the unknown contents of the 20-litre container had been poured into the steel oil drum, which was stored on the open deck, the crew member sealed its lid. In the early hours of the next morning, the workboat's crew were awoken by a load bang. They went to investigate the noise and found that the steel waste oil and oily water drum had exploded. The force had been sufficient to separate the drum from its base (see figure), sending it into the air to such a height that it damaged a guardrail when it fell back to the deck.

Figure: The base of the steel oil drum

The Lessons

1. **Hazard →** Mixing unknown substances is hazardous and can result in the release of toxic gases, causing heat and pressure to build up if stored in sealed containers. It is fortunate that none of the crew were on deck when the drum exploded as they could have been struck by the flying oil drum or suffered skin and respiratory effects due to chemical exposure.

2. **Check →** Drums used for waste oil should be the minimum size possible, clearly labelled, emptied regularly, and allowed to ventilate to prevent pressure building up inside. Never add other chemicals or substances to a waste oil drum and always store and dispose of unknown or unlabelled materials separately.

Jumping into trouble

training vessel | man overboard

It was a warm sunny day and an anchored training ship had just recovered its sea boat after an exercise. While cleaning the sea boat the coxswain dropped a small engine part into the water and it began to float away. Without thinking, the officer on the ship's deck removed their lifejacket and jumped overboard to recover the engine part. The officer managed to swim to the floating engine part and retrieve it, but realised they were unable to swim against the current and that they had started to drift away from the vessel.

Once the coxswain realised what had happened they immediately called the chief officer (C/O) to the deck and awaited orders. The speed of current was 1.3kts, meaning that the officer was being pushed 30m away from the ship every minute they were in the water. As well as fighting against the current, the officer was also experiencing the difficulty of swimming while fully clothed in water temperatures around 15°C. As the officer struggled on, they slowly lost their ability to swim and suddenly realised the danger they were in with no lifejacket to keep them afloat.

The C/O decided the best course of action was to relaunch the sea boat and send a crew member to recover the officer. The sea boat was deemed the fastest method of recovery and quickly reached the officer, who managed to climb into the boat unaided. The officer was medically assessed once back on board the training ship and was closely monitored for the next few hours despite no signs of injury.

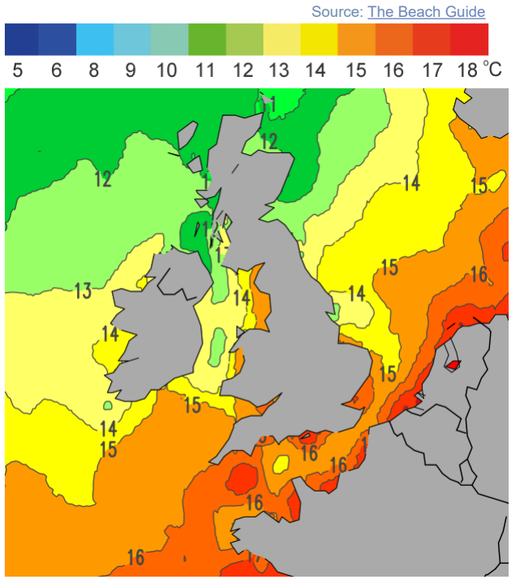


Figure: UK sea temperatures in early summer

The Lessons

1. **Equipment →** Lifejackets save lives. The officer in this case decided to remove their lifejacket before jumping into the water because they thought the automatic inflation of the lifejacket would impede the retrieval of the engine part. Fortunately, the officer was unharmed, but the consequences of being in the water without a means of flotation could have been far more serious.

2. **Cold water shock →** The effects of cold water shock on the body can result in drowning. The officer survived the initial immersion, but the water temperature quickly affected their ability to swim as their muscles began to weaken. At 15°C the water temperature was within the bounds of cold water shock and had started to cause cold water incapacitation and swim failure. Remember: water temperatures in UK summer months can be low enough to pose risk (see figure).

3. **Plan →** Take a moment to think. The officer reacted instinctively and with more concern for the engine part than their own safety. Discussion between the officer and the coxswain would have resulted in an agreed safer course of action to retrieve the part and avoid danger.

9

Time and tide wait for no one

transfer vessel | grounding

A transfer vessel was preparing to leave harbour to conduct some last-minute work at a local wind farm. The harbour exit was controlled by lock gates so the master called the harbourmaster's office to book a departure time. Knowing that the main channel dried to a height of 1m, the harbourmaster's office recommended either an immediate departure or a wait of almost 7 hours to ensure a 1m UKC. The master was neither ready to depart right away nor prepared to wait that long and, having mulled it over, decided to reduce the vessel's required UKC to 0.5m and book a departure on the earlier tide.

The vessel entered the lock a little later than planned. The actual tides were slightly lower than predicted but the master decided to press on. When the lock gates opened the master went ahead slowly to avoid too much squat. The vessel was 30m clear of the lock gates when it suddenly ground to a halt (Figure 1). The master's efforts to power the vessel through the mud were to no avail; it was well and truly aground (Figure 2).

For illustrative purposes only: not to scale

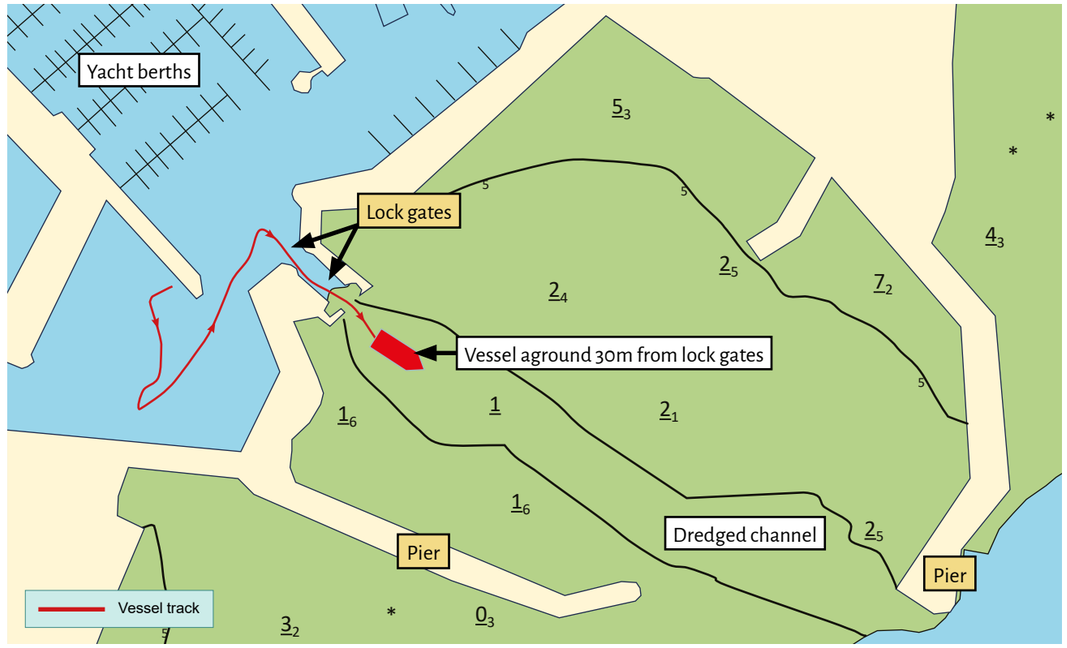


Figure 1: Vessel track and grounding

The Lessons

1. **Plan →** Tides are predictable and low water follows high water with monotonous regularity. Sailing on a falling tide can be particularly susceptible to delays and it might be best to wait if the observed tides are lower than forecast. The master's initial plan was reasonable, but the decision to depart on the early tide and the ensuing short delay put everyone at risk. Following this incident the harbourmaster imposed strict constraints on lock opening times.

2. **Margin of safety →** The UKC is the main margin of safety applied to navigational plans. As well as the extent and reliability of the charted depth and the anticipated tide, the UKC margin should consider vessel factors such as maximum draught; potential for squat or increase due to heel; and local effects, including changes to water density (fresh water is less buoyant than salt water) and allowances for sea state and storm surges etc. The more the safety margin is whittled away, the more risky the operation becomes. A further delay of 15 minutes on a falling tide can bring everything to a rapid halt.

3. **Action →** Once everything came to a halt, the master ordered soundings to be taken and inspected the hull integrity as thoroughly as possible to establish there was no water ingress. A plan of action was also prepared with the harbourmaster for when the tide had risen sufficiently for the vessel to float free. However, the initial decision to power through the mud likely resulted in the damage described below.

4. **Check →** The master's inspection of the propulsion system once the vessel had refloated found that one of the propeller shafts was not responding as expected. Divers subsequently confirmed there was minor damage to the hull but substantial damage to one of the propellers. Prompt checks enable early identification of defects and prevent further damage.

Figure 2: Vessel aground at low water

Mooring deck tragedy

cargo vessel | accident to person

An ultra large container vessel was berthed alongside in port. Cargo operations had been suspended due to very strong winds of over 50kts and the master had taken the precaution of posting a crew member at the vessel's forward and aft mooring stations to monitor and adjust its lines.

Just before lunch, one of the vessel's deck officers went onto the upper deck to inspect the safety and security of the vessel. When the officer reached the forecastle, they went forward of the mooring winches to inspect the lines. While the officer was in this exposed position, standing close to a mooring line, a strong gust of wind hit the vessel and the rope parted close to the bollard ashore (Figure 1). On board, a bight of the mooring line flew up as the tension was released, striking the deck officer's head (Figure 2) and throwing them to the deck.

The ship's crew quickly raised the alarm and paramedics attended the vessel. The injured deck officer was taken to hospital, where they sadly died from their injuries a few days later.

Figure 1: Parted head rope

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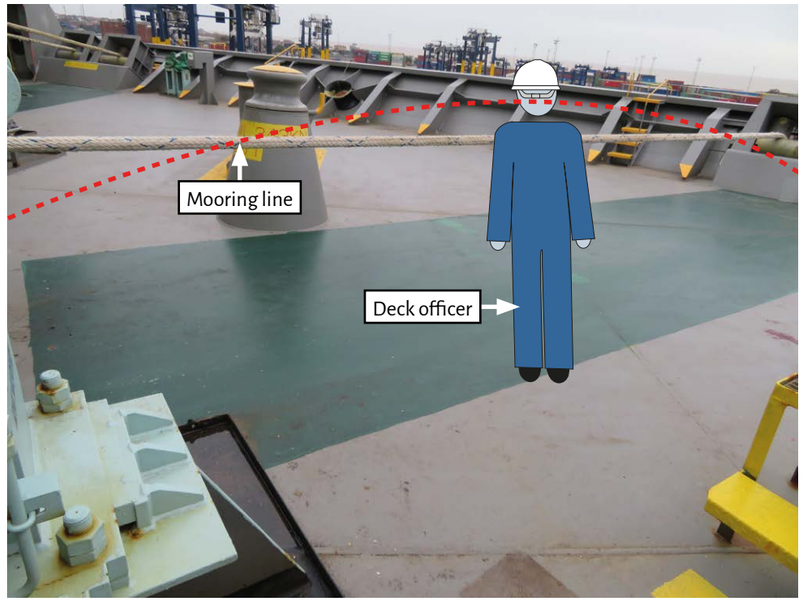

Figure 2: Bight of mooring line striking deck officer's head

Figure 3: Snap-back zone sign

The Lessons

1. **Risk →** Mooring lines under tension in bad weather present a very significant risk to life and it must be assumed that they are liable to fail without warning. On this occasion the line parted just behind the mooring eye close to the jetty. Although the end of the rope did not snap back onto the forecastle, the sudden release in the line's tension caused a bight of the rope on board to fly up and strike the deck officer. It is possible that the deck officer underestimated the risk because the vessel's mooring lines were almost new, still in good condition and no audible creaking or groaning was present to indicate imminent failure (Figure 2).

2. **Action →** Sensibly, the entire forecastle mooring station had been identified as a snap-back zone (Figure 3). Additional measures to reduce risk could include fitting snap-back arrestors to mooring lines. These arrestors absorb the force within a parted line and significantly reduce the probability of the parted line striking crew members. The vessel operator in this case also introduced a campaign to encourage crew members to challenge colleagues who they observed as about to put themselves at risk.

Loose logs

cargo vessel | cargo loss

A coaster carrying a deck cargo of logs was on passage between two UK ports. Overnight the vessel encountered bad weather and began to roll heavily. The next morning the crew observed that the logs, which had previously appeared tightly stowed, had worked loose within the lashing straps securing them to the hatch covers (Figure 1).

Figure 1: Failed log deck cargo lashings

The officer of the watch called the master to the bridge. The master assessed the situation and altered the vessel's course to reduce the ship's deck motion. Despite this action, the lashings and upright stanchions that secured the cargo were unable to prevent a large quantity of logs being lost overboard.

The master witnessed the loss and immediately informed the coastguard and diverted the vessel to a nearby port, where the deck cargo was discharged and restowed.

Source: IMO

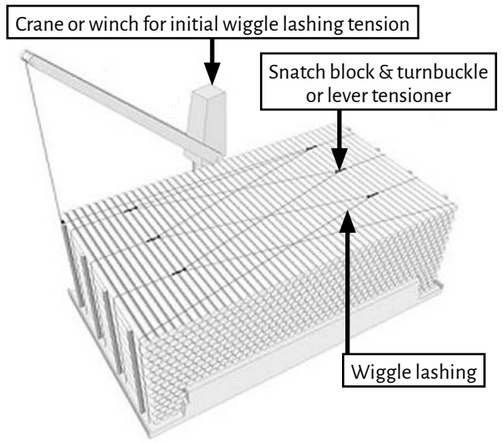

Figure 2: Example of wiggle lashings

The Lessons

1. **Lashings →** The timber deck cargo had been incorrectly secured. The vessel's crew was accustomed to carrying sawn timber that could be tightly stowed and secured with nylon lashing straps. However, for deck cargoes of logs the vessel's cargo securing manual required the use of wiggle wires to tighten and compress the stow (Figure 2) before the lashing straps or hog wires/chains were tightened to secure the logs in place. In this case, the crew had rigged lashing straps rather than a wiggle wire. This meant that the logs, while initially appearing to be tightly stowed, were able to move and work loose from the lashing straps securing them to the hatch top. It was also identified that the stanchions positioned along the edge of the hatch cover, while adequate for sawn timber, should have been 40% larger when logs were carried. It is vital to secure log cargoes in line with the vessel's cargo securing manual; wiggle wires must be used to compress the stow and the lashings and stanchions must be fit for purpose. Additionally, lashings need to be regularly tightened during passage to maintain secure stowage.

2. **Emergency response →** The master responded proactively, immediately reporting the lost cargo and associated navigational risk to the coastguard before diverting to a nearby port to restow the cargo.

Pan pan

supply vessel | fire

A cook on an offshore support vessel was frying fish in a gyro pan filled with oil. Unbeknown to the cook the pan's thermostat was defective. The oil overheated, started smoking and then ignited shortly afterwards. The cook activated the fixed wet chemical fire-extinguishing system. As the wet chemical filled the gyro pan the burning oil spilled out onto the galley deck (see figure), covering the cook's legs and feet in boiling oil.

The cook collapsed to the deck of the galley in agony, shouting for help. The cook's screams were heard by a passing able seaman, who ran into the galley and dragged the cook out of the pool of hot oil. The wet chemical had successfully extinguished the fire in the pan, but had made a mess of the galley and severely injured the cook.

The electric supply to the gyro pan was isolated and the oil was left to cool in the pan before being removed. The cook was airlifted to hospital and treated for their burns.

Figure: Cooking oil on galley deck

The Lessons

1. **Equipment →** The cook routinely used the gyro pans to fry fish because the galley's two deep fat fryers took a long time to heat up and needed a lot of oil. A gyro pan is unsuitable for use as a deep fat fryer due to the risk of oil splashing or spilling out over the shallow sides. Always use equipment for its intended design purpose and in line with manufacturer's guidance.

2. **Monitor →** Safety devices such as thermostats can malfunction, leading to unsafe situations if solely relied on. It is crucial to check and maintain equipment and keep a close eye on high-risk activities to prevent escalation to an emergency event. If an appliance becomes hotter than expected, make sure it is reported to and tested by technical staff.

3. **Risk →** The activation of the fixed firefighting system installed above the pan caused the hot oil to spill out over the shallow sides when the wet chemical was deployed. Emergency systems and appliances might not function as expected on contact with incorrectly used equipment, which could have serious consequences.

13

Man down

tug | accident to person

A tug had finished assisting a large passenger cruise ship to berth and, with the skipper at the helm, was heading to a nearby jetty to take on food supplies. On approach to the jetty, the engineer stepped ashore to manage the mooring ropes, as they had done many times before.

The deckhand passed the two headropes ashore, but the bollard was busy with the passenger cruise ship's lines and the engineer had difficulty securing them. Believing the headropes were properly lashed, the engineer signalled to the skipper to lay back on the ropes (Figure 1) and bring the tug's stern alongside the jetty so it could be made fast.

As the weight came onto the headropes there was a sudden jolt as the port headrope slipped from the bollard and recoiled back. The soft eye hit the deckhand on the head and sent his safety helmet flying 10m down the jetty (Figure 2). The blow of the mooring rope further caused the deckhand to fall and hit his face on some of the tug's metal fittings and fixtures. Witnessing all this, the engineer called out to the skipper and immediately went to the deckhand's aid.

Figure 1: The tug laying back on the headrope

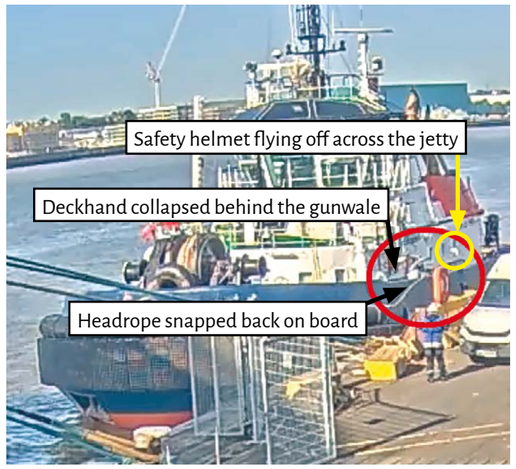

Figure 2: The headrope having snapped back and sent the deckhand's safety helmet flying

The initially unconscious deckhand had sustained head and facial injuries (Figure 3) and was bleeding heavily. On regaining consciousness, the deckhand did not recognise either his crewmates or surroundings due to the effects of concussion.

Following a delay brought about by confused reporting, an ambulance eventually arrived and transferred the deckhand to hospital for treatment. He was discharged 2 days later.

Figure 3: Some of the deckhand's facial injuries and damaged safety helmet

The Lessons

1. **Risk →** Mooring operations are hazardous, and each one can present its own challenges, such as the busy bollard in this case. Never apply weight to a mooring rope if in any doubt it will slip, or part. It is better to berth elsewhere, despite the inconvenience. Mooring crew should be familiar with the risk of snap-back and stand clear of ropes to avoid the tangible, and potentially fatal, consequences.

2. **Equipment →** Personal protective equipment can save your life. The deckhand's safety helmet bore the brunt of the force of the mooring line as it snapped back, absorbing much of the impact, and likely prevented more serious injury, permanent brain damage, or death (Figure 3).

3. **Communicate →** Raising the alarm is vital to getting help. The emergency services prioritise their response and so an accurate indication of the state of any casualty is crucial. Some confusion after the initial report by the skipper meant that the ambulance crew were unaware of the deckhand's head injury. Having left the bridge, the skipper could not monitor the radio, which meant that the emergency services found it difficult to keep in contact.

Knocked over

passenger vessel | accident to person

A roll-on/roll-off ferry arrived in port and started to unload from its vehicle deck. The next line of vehicles for discharge comprised several cars, followed by a motorbike then a large lorry. In line with usual practice the motorbike was parked athwartships to protect it from the effects of the wind and sea conditions, meaning the motorbike was in front of the lorry's cab and firmly in its blind spot.

As the vehicles were ushered forward, the motorbike rider rolled their motorbike forward slightly to stow its stand. The car ahead started to pull away and the rider readied themselves to get going. It was then that the lorry lurched forward, hitting the motorbike's rear wheel, knocking the motorbike over and trapping the rider's right leg. The lorry driver realised their vehicle had hit something and stamped on the brakes, coming to a rapid halt. The momentum of the original impact carried the rider and their motorbike about 0.5m further forward.

Some of the other vehicle drivers left their cars to help the rider as the ferry's crew leaped into action. A first aider was soon on scene and the motorbike was lifted clear of the rider's leg (see figure). The police and ambulance service arrived quickly and the rider was taken to a local hospital for assessment. Fortunately, although shocked and badly bruised by the collision, the rider was not seriously injured and eventually managed to continue their journey.

Figure: Casualty being medically assessed by crew

The Lessons

1. **Check →** The close proximity mirrors fitted to the lorry were working correctly, but the driver in this case used them ineffectively to check the blind spots before pulling away. Small checks performed properly can make a real difference.

2. **Revise →** The ferry company recognised the potentially tragic consequences of this accident. Following a post-accident review, motorbikes now park adjacent to high-sided vehicles to improve visibility. Learning from accidents and incidents is a proactive way to improve safety and prevent future accidents.

3. **Plan →** The well-intentioned passengers who left their vehicles following the accident presented additional risks for the ro-ro crew to manage on the busy deck. Fortunately, the crew asserted good control over the accident site without applying a heavy-handed approach. Introducing additional complications to emergency drills helps crew prepare for the unexpected and will pay dividends in a real event.

Do not keep watch on the small print

cargo vessel | grounding

A small coastal general cargo vessel was on passage in a constricted channel. The master had sent the lookout down to the mess for breakfast and was on watch alone, preparing for the ship's forthcoming arrival in port. The master became distracted by the need to change the bridge printer's ink cartridge, leading to an alter course waypoint being missed that allowed the vessel to head into shallow water and run aground at the bow shortly afterwards (Figure 1).

The vessel refloated on the next tide and was able to manoeuvre astern and then resume its journey to port, escorted by the RNLI. The ship's crew carried out a sounding of the vessel's compartments and discovered seawater flooding into the forepeak, which they were able to control using a salvage pump.

In dry dock it was found that the grounding had cracked the vessel's stem (Figure 2) and deformed the structural frames of its bow. Around 15 tonnes of steelwork had to be replaced before the cargo ship was fit to return to service.

Figure 1: The vessel aground

Figure 2: The cracked stem

The Lessons

1. **Check →** The master missed the alter course waypoint because they became distracted by the printer. The passage plan requires constant monitoring, especially when the slightest deviation is the difference between safe passage and grounding. It is crucial that the bridge team, including the master and lookout, remain vigilant to ensure safe navigation, especially in challenging areas such as constricted channels.

2. **Teamwork →** The master's decision to allow the lookout to leave the bridge for breakfast removed an important means by which to double-check the safe passage of the ship, especially while in constricted waters or areas with high-density traffic. It is important not to let routine get in the way of safety. Posting a lookout on the bridge, particularly in challenging navigation conditions, provides additional sight and hearing to assess any changes to the operating environment and identify potential safety hazards.

16

Push me, pull you

cruise ship | contact

An expedition cruise ship was arriving in port on a beautiful summer's morning. There was little wind and only a slight current. The ship had a portable propeller pitch indicator that was plugged in to whichever bridge wing control console the ship was going to be navigated from when it came alongside the berth. For this port arrival it had been plugged into the starboard bridge wing and tested as part of the arrival procedure.

As the cruise ship approached the berth, control was transferred to the starboard bridge wing console and the master, pilot and C/O went out to bring the ship alongside. The ship was moving at 2.5kts. When they arrived on the bridge wing the portable propeller pitch indicator was not working so the master returned to the centre control console, took control of the ship, and put the pitch setting to half astern before transferring control back to the bridge wing. Meanwhile, the C/O was inspecting the plug of the pitch indicator, trying to get it working again.

The ship was closing on the berth and the master tried to use the bow thruster to push the ship's bow away. However, when the control lever was moved it had the opposite effect and pushed the bow towards the berth, where it struck one of the hinged fenders. The fender rotated as it scraped along the ship's side, breaking its securing chain and puncturing the side of the ship, thankfully well above the waterline (Figure 1).

Figure 1: Damage to ship's hull

The ship was safely brought alongside, and an investigation began. The failure of the pitch indicator was due to a poor connection where it plugged into the console and although the indicator was not working the controls were. When the master first transferred control to the bridge wing, moving the pitch lever increased the pitch of the propeller, but there was no indication that the pitch had changed and the ship's speed increased, causing it to approach the berth quicker than intended.

The question now had to be why, when taking avoiding action, had the bow thruster pushed the bow into the berth and not away from it?

The ship had two thrusters, one in the bow and one in the stern. The controls for the two thrusters were separate: the stern thruster was a vertical lever sat in a graduated hub and movement of the lever to starboard would produce a thrust to starboard and vice versa; the control for the bow thruster was a horizontally-mounted lever that rotated a pointer on a dial (Figure 2). The upshot of the design of the controls was that to thrust to port using the stern thruster the master would move the lever to the port side, but to thrust to port on the bow thruster the lever on that control was moved to starboard.

The master was new to the ship and inexperienced with the controls and, in trying to avert the contact with the quay, had moved the lever in the wrong direction and thrust the bow into the berth rather than away from it. The C/O, distracted by trying to fix the pitch display, did not spot the master moving the control in the wrong direction. Fortunately, the only injury was to the bridge team's pride.

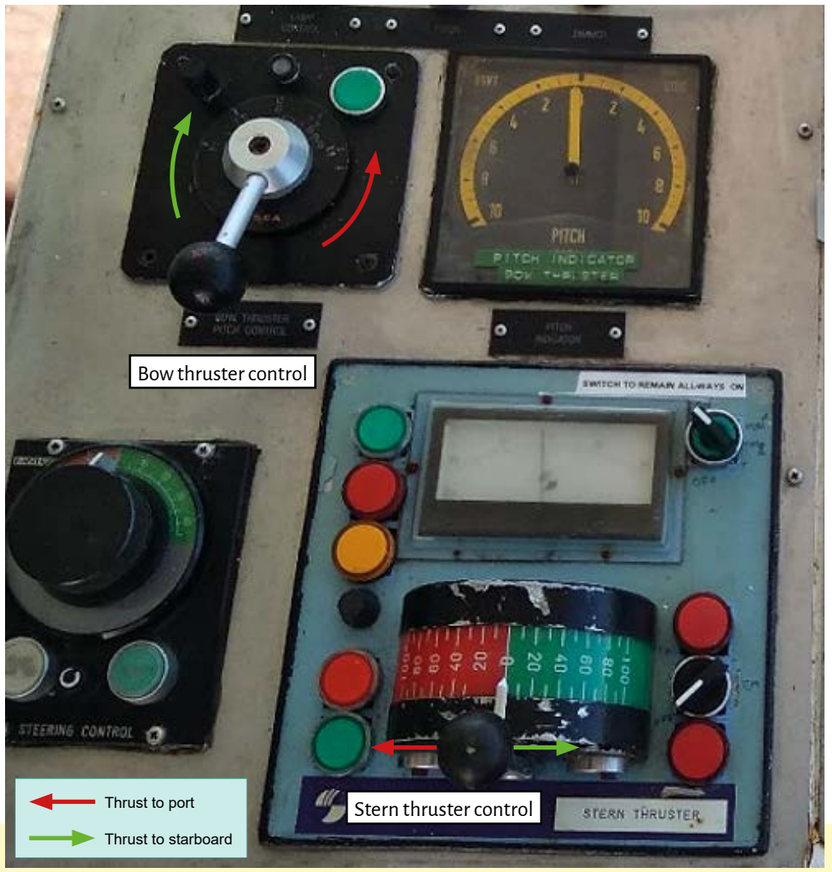

Figure 2: Bridge wing control station thruster controls

The Lessons

1. **Equipment →** The design of the two thruster controls differed and required different manual inputs to produce the same effect. To connect the user to the technology, the human-machine interfaces should be carefully considered when installing control systems into ships; the best solutions are intuitive and simple to use.

2. **Margin of safety →** By the time the failure in the portable propeller pitch indicator was identified it was too late to do anything about it. Always leave enough time to react to a discrepancy when changing the mode of operation, for example switching to a different control station.

3. **Monitor →** Both the master and C/O became focused on the task and were distracted by the failure of the portable propeller pitch indicator. Consequently, the ship's progress was not being effectively monitored and the impending contact with the berth was not avoided.

FISHING VESSELS

I have read the MAIB Safety Digest for many years and it is heartbreaking to read through this edition and see similar cases to the first editions I read in the mid-1990s. Where will the progress that the industry needs come from?
This question has driven me throughout my career and encouraged me to persevere and look at the systemic changes required to bring the industry out of its current position as one of the most dangerous industries in the world.

...businesses fail, and accidents increase if there are insufficient funds

Profit is an area that I think people shy away from talking about. Still, profit is necessary for a successful business and is a powerful motivator in the development of fishers' behaviour, vessel and equipment design. In simple terms, businesses fail, and accidents increase if there are insufficient funds to maintain the vessel, train the crew and provide safety equipment. Profit should, therefore, always be considered a factor in improving safety: can policy developers expect to enhance safety by reducing a vessel's profits?

The economic background is often overlooked in the technical review of why a vessel has an accident or is lost. I see a common theme of fishing vessels designed to protect the fish they catch, rather than the fishers on board. These same vessels might then be pushed further from their traditional fishing grounds than the vessel was designed for because the fish stock was being protected by a fishery closure or marine protected area. In all of these scenarios, we see increases in accidents occurring with these socioeconomic issues as contributing factors.

For me, the solution lies in a simple statement: *The fisher is no less important than the fish when it comes to sustainability*. If a fisheries management policy is being developed, every word used to protect the fish should have an equal number of words to protect the fisher. If a vessel's length is being used to reduce effort on a stock, then that decision should put equal effort into getting a vessel length that will protect the fisher and even improve their working conditions and health at sea. When closing a fishery to protect stocks, has an equal amount of work been put into protecting the fishers who will be displaced? These changes can reduce fatigue, increase professionalism, and restore pride in the industry.

Through my work with the Fishing Industry Safety & Health (FISH) Platform, a group of the world's leading experts on fishing safety, I have seen more than ever how the lack of representation on matters of health, safety and welfare is creating issues for countries worldwide. The development of international regulations for the safety of fishing vessels is almost entirely devoid of fishing industry representation. Still, when international regulations for merchant vessels are discussed, dozens of non-governmental representatives are involved. This becomes more shocking when the estimated number of international merchant marine seafarers is around 1.8 million, and the fishers are around 38 million. Indeed, there is room to improve decision-making at the top level of regulation development by involving the fishing industry.

Creating a level playing field is an essential part of the solution to improving safety

Creating a level playing field is an essential part of the solution to improving safety. We have seen a race to the bottom with many global products such as textiles, milk, meat, and technology; all have had supply chain pressures leading to accusations and investigations of exploitative practices. Additional global factors impact fishing vessel operators, placing them under increased pressure to protect the stock, care for the fish, avoid exploiting the crew, and listen to crew grievances. Solving these problems comes at a cost, and it is usually borne by the owners of vessels competing against imports that are often sourced from lower-quality fishing vessels and countries where safety and crew welfare are not high on the agenda.

Efforts to improve health, safety and wellbeing still need to be funded compared to the money being spent on other supply chain requirements such as stunning the fish before gutting or introducing lower-carbon vessels. However, positive changes are being made:

- The International Maritime Organisation published the FISH Platform Fishing Safety Management Code as an information paper and added it to its fishing safety website.
- The Nautical Institute accepts professional fishers as members on equal terms to their equivalent rank in the military and merchant navies, increasing opportunities for representation.
- The Lloyd's Register Foundation, The Seafarers' Charity, and the FISH Platform have collaborated to launch the International Fund for Fishing Safety, which supports initiatives that bring all vessels and fishing crews to the same international baseline, reducing disparity in the global supply chain.
- The FISH Platform has grown and now delivers representation at the highest international levels, ensuring that fishers' needs are not omitted from future international regulations.
- The International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (STCW-F) has been revised to include a syllabus for basic safety training in Chapter 3, which should improve the transition of fishers between vessels of different flags.
- The International Labour Organization Work in Fishing Convention (ILO 188) has the opportunity to give labour, health and safety protection to all fishers internationally.

The accidents in this report are preventable, but until the supply chain, socioeconomic and political factors are aligned to protect the fishers we will continue to see safety improvements that react to change as much as create it.

ROBERT GREENWOOD MNM AFNI | FISH Platform

Robert grew up in a fishing village, part of a multi-generational fishing family that catches crabs, lobsters, and the seasonal fish that pass through the area. His career has involved working as a safety instructor, safety officer, and auditor. As a director and member of the FISH Platform, a member of the Maritime Advisory Board at CHIRP Maritime, a trustee at The Seafarers' Charity, and the Chairman of the Fishing Safety Advisory Group at the Nautical Institute, Robert maintains an active role in improving fishing and mariner safety, nationally and internationally.

In 2012, Robert developed the SafetyFolder to help fishers improve their safety management. This tool is used by over 3,000 fishing vessels and is currently being adapted to fully support the FISH Platform Fishing Safety Management Code internationally as a free-to-use tool for fishing and commercial vessels.

In 2022, Robert was awarded the Merchant Navy Medal for Meritorious Service for services to safety in the fishing industry.

17

You spin me right round

fishing vessel | loss of control

A small fishing boat was a short distance off the coast on its way back to port in rough weather when it started having steering problems, losing all control of its rudder a few minutes later. The crew were well-practised in their emergency steering drill and set about putting the manual hydraulic system to use, but found this did not work either.

The boat was drifting towards the shore in the strong southerly wind so the skipper called the coastguard by VHF radio while trying to restore steering to the vessel. The local lifeboat was launched and another fishing vessel, which had been alerted to the unfolding events, started making its way to assist. The skipper and crew were not in immediate danger, but knew they would be unless they remedied the problem (Figure 1).

The fishing boat's crew looked to reduce their rate of drift towards shore and initially deployed one of the trawl doors while preparing the anchor for use. Once the anchor was laid, the drift was halted some 0.7 nautical miles (nm) from the rocky coast. The other fishing vessel arrived and a line was passed between the two vessels as the lifeboat stood by. The weather was poor, and the movement of the vessels in the rough seas caused the towline to part. The lifeboat took over the tow and was able to take the stricken fishing boat safely into port.

The steering gear actuator used hydraulic pressure acting on either side of a piston to drive a shaft that was connected to the tiller arm. When the steering gear was stripped down, it was found that the pin securing the piston to the shaft had sheared, allowing the piston to move up and down the shaft with the remnants of the sheared pin deeply scoring the shaft and damaging the piston sealing arrangement (Figure 2). The emergency steering actuator used the same piston, so the failure had also disabled the manual hydraulic system.

Following the incident the operator installed a mechanical emergency steering arrangement without any common components with the main steering. In future, a single fault will be unable to render both systems inoperative.

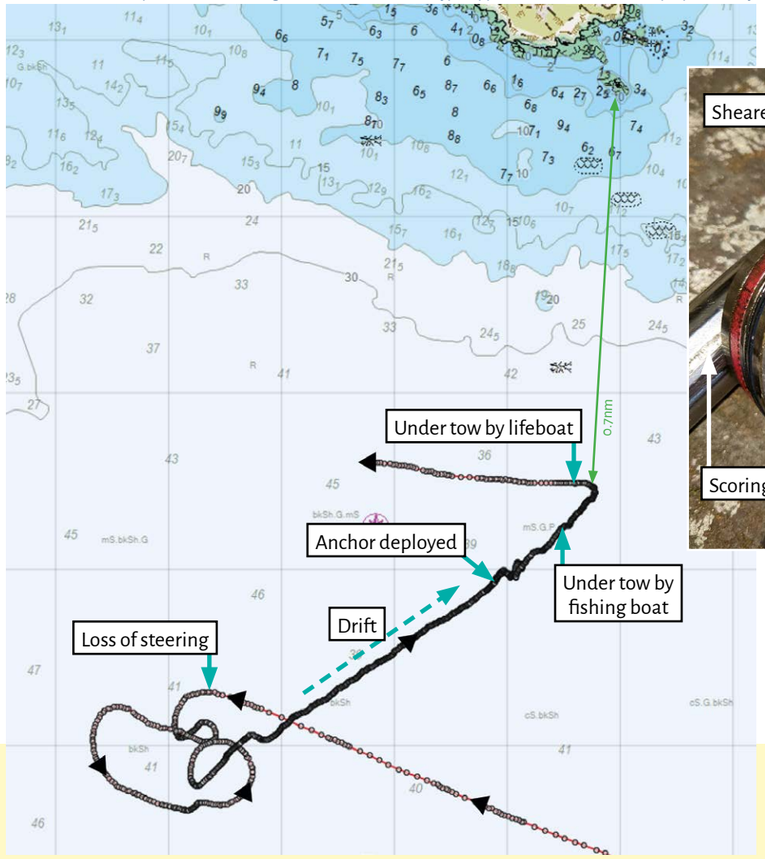

Figure 1: The fishing boat's track and proximity to land

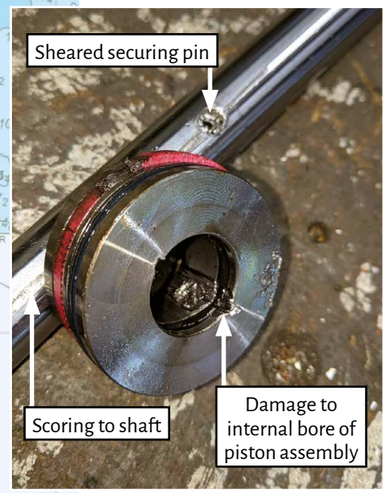

Figure 2: Failed steering gear actuator piston attachment

The Lessons

1. **Margin of safety →** It is easy to look back on an incident and dwell on what nearly happened. In this case, the fishing boat was making a passage in rough weather, with an onshore wind and only a mile offshore. During passage planning, consider what could happen and how much time might be available if something did go wrong.

2. **Maintain →** The security of critical components is vitally important when maintaining equipment, particularly something as important as the steering gear. It is worth checking that everything is correct when reassembling components.

3. **Revise →** The crew had practised using the emergency steering but were faced with a double failure due to the position of the fault. Following the incident the operator took positive action to make sure that the emergency steering system would work should a similar failure happen in the future.

4. **Action →** The skipper made an early the call to the coastguard, which was able to mobilise the lifeboat so it was on the scene when needed. It is always best to make the call early rather than wait for a situation to develop and find yourself in trouble without help at hand.

Diesel disaster

fishing vessel | fire

The skipper of an under 10m wooden fishing vessel purchased a diesel heater on the internet and fitted it in the vessel's cabin. Later, while fishing on a cold winter's day, the skipper left the diesel heater running and went aft on deck to work the net. While leaning over the transom, the skipper heard a loud explosion and turned around to see smoke and flames coming out of the wheelhouse.

Other fishing vessels operating nearby saw that the vessel was on fire (Figure 1) and alerted the coastguard and rescued the skipper. The fire could not be extinguished despite the attendance of a lifeboat, and the vessel sank.

While the cause of the fire was unknown, the skipper believed the most likely source to be the recently fitted diesel heater (Figure 2).

Figure 1: The fishing vessel on fire

Source: Adventure Wagon

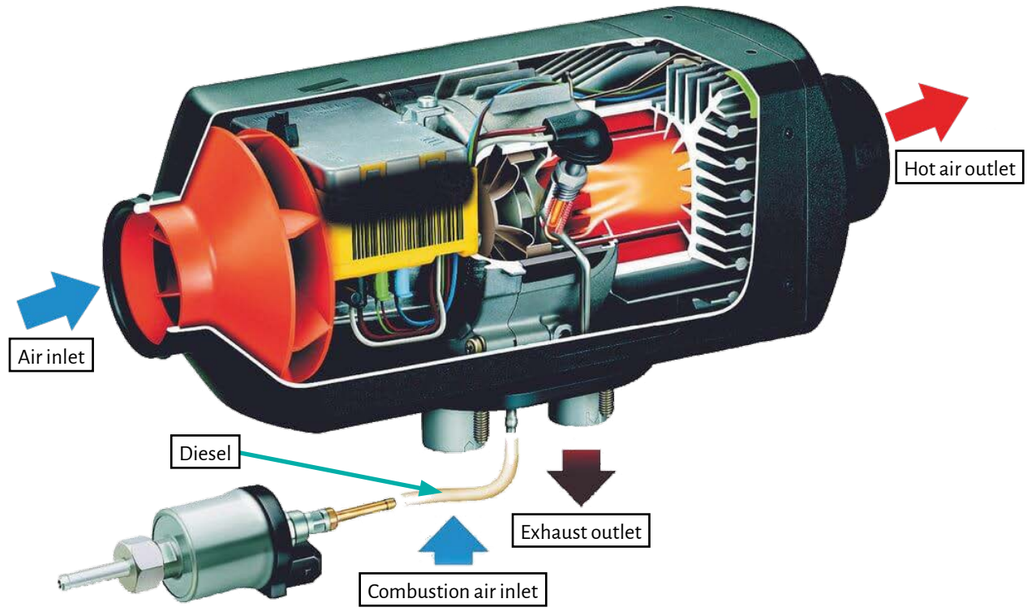

Figure 2: Illustrative diesel heater arrangement

The Lessons

1. **Risk →** A typical diesel heater relies on air being drawn in from outside the vessel and then, after combustion, the hot exhaust gases being safely removed overboard (Figure 2). One of the hazards therefore is that a poorly insulated or sited heater exhaust can cause a fire. This risk increases when the heater exhaust has been inappropriately sited close to a fuel source such as petrol fumes from a fuel tank; hydrogen gas from charging batteries; or the exhaust's proximity to the vessel's flammable fixtures and fittings. Often self-installed by owners as a cost-effective means of heating their vessels the risks associated with this type of equipment are frequently overlooked and poorly understood.

2. **Hazard →** Although not a factor in this accident, a further hazard of diesel heaters is carbon monoxide (CO) poisoning. The tragic outcome of CO poisoning is illustrated in two MAIB reports: *Emma Louise* (MAIB Report 1/2023[1]), where exhaust gas entered the vessel's covered cockpit and led to the loss of two lives; and *Diversion* (MAIB Report 4/2021[2]), where a CO leak from the vessel's diesel-fuelled cabin heater led to the deaths of the two crew.

3. **Mitigation →** The key mitigation to reduce the risk of operating a diesel heater is to purchase products with a UK Conformity Assessed or Conformité Européene marking[3] and have the equipment professionally installed.

1 https://www.gov.uk/maib-reports/carbon-monoxide-poisoning-on-board-the-sports-cruiser-emma-louise-with-loss-of-2-lives
2 https://www.gov.uk/maib-reports/carbon-monoxide-poisoning-on-motor-cruiser-diversion-with-loss-of-2-lives
3 https://www.gov.uk/guidance/using-the-ukca-marking

Worry about inaction, never action

fishing vessel | collision

On a fine summer's day, a stern trawler left port to head to its fishing grounds and a purse seine fishing vessel was returning to port to land its catch. The skipper of each vessel went on a break and left a deckhand in charge of the respective watches. Later that day, the deckhand on the stern trawler spotted the purse seine vessel about 3nm off the port bow. The stern trawler initially had the right of way so the deckhand maintained a north-easterly course and a speed of 7kts. When the distance between the two vessels dropped to less than 1.5nm the deckhand of the stern trawler became worried and tried twice to contact the purse seine vessel using the VHF radio, but received no response.

The vessels came within 1nm of each other and the purse seine vessel appeared to take no action, maintaining a southerly course and a speed of 10kts. The stern trawler's deckhand used the autopilot to make a slight course change to starboard but the risk of collision remained, and the deckhand began to slow the stern trawler's speed. Hearing the change in engine revolutions, the skipper rushed to the wheelhouse and saw through the window that the purse seine vessel was less than 100m away. The skipper quickly went full astern on the engines, reducing the trawler's speed to 3kts, but it was not enough to avoid a collision and the stern trawler's bow struck the purse seine vessel's starboard side (Figure 1).

The purse seine vessel's skipper was awoken by the impact and hurried to the wheelhouse, but was surprised along the way to find the watchkeeper eating in the galley. Both skippers took their vessels out of gear to assess the damage before escorting each other back into port. The stern trawler damaged its bow, while the purse seine vessel sustained damage to its hull and bilge keel (Figure 2).

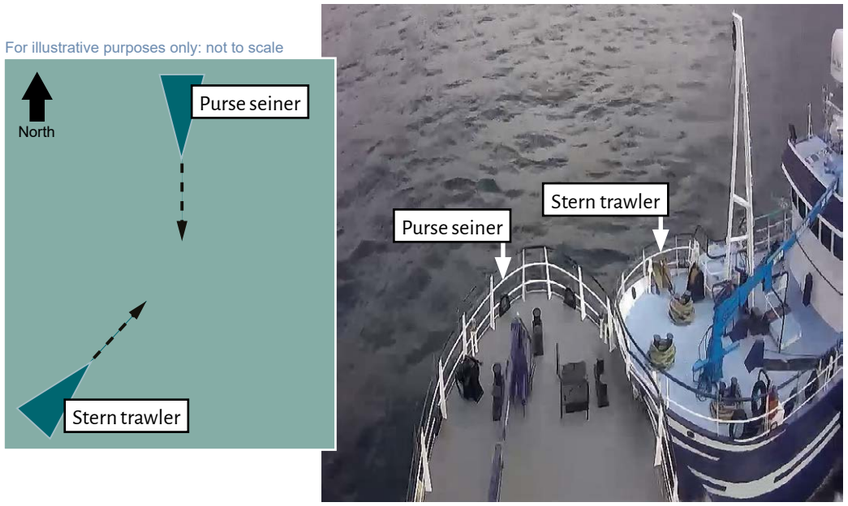

Figure 1: CCTV still of the collision and (inset) the relative positions of the vessels before it

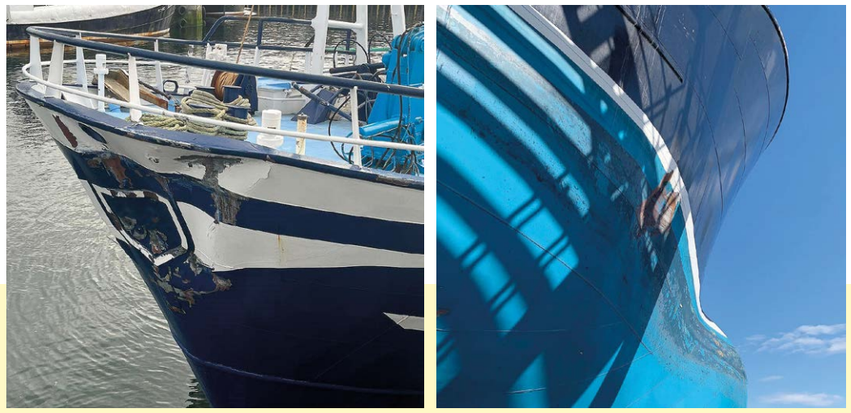

Figure 2: Damage to the stern trawler (left) and purse seiner (right)

The Lessons

1. **Aware →** Any crew member assigned to take a navigational watch on a fishing vessel should be familiar with the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) or, preferably, have completed an approved 5-day Navigation and Bridge Watchkeeping course in line with MGN 411 – Training and Certification Requirements for the Crew of Fishing Vessels and their Applicability to Small Commercial Vessels and Large Yachts. Safe watchkeeping involves more than just maintaining a proper lookout; watchkeepers should have the authority and ability to take decisive action to avoid a collision and know when to call the skipper for help before a close-quarters situation develops.

2. **Action →** When presented with a crossing situation where the give-way vessel is not acting according to Rules 15 and 16 of the COLREGs, a stand-on vessel's watchkeeper **may** take action to avoid a collision *as soon as it becomes apparent that the vessel required to keep out of the way is not taking appropriate action*. However, when taking action in these circumstances, the stand-on vessel should avoid altering course to port for a vessel on the port side if possible. Further, when a collision cannot be avoided by the give-way vessel alone, the stand-on vessel **must** take *such action as will best aid to avoid collision*.

3. **Hazard →** The precious time wasted by the stern trawler's deckhand trying to use VHF could have been better utilised by taking more appropriate collision avoidance action in line with the COLREGs. MGN 324 (M+F) Amendment 2, Navigation: Watchkeeping Safety – Use of VHF Radio and AIS cautions that the use of VHF radio in an attempt to avoid collision *is not always helpful and may even prove to be dangerous…Valuable time can be wasted whilst mariners on vessels approaching each other try to make contact on VHF radio instead of complying with the COLREG* [sic]. Rule 8 of the COLREGs, covering actions to avoid a collision, requires that any action taken to avoid a collision *be positive, made in ample time and with due regard to the observance of good seamanship*. Adhering to the rules of the road removes the need for unnecessary radio communication, which can, even when successful, be misunderstood or misinterpreted. Remember, the 'wake up' signal under Rule 34(d) can always be used.

4. **Equipment →** The use of autopilot instead of hand steering can be ineffective in close-quarters situations as it usually results in a smaller rudder angle being applied and so a slower rate of turn to avoid a collision. Action must be readily apparent to another vessel observing visually or by radar and result in vessels passing at a safe distance.

5. **Risk →** Unattended wheelhouses remain prevalent in the fishing industry, as highlighted in this case and the *Unprepared and asleep* article that follows. Leaving the wheelhouse unattended, even for short periods, can have catastrophic consequences. MGN 313 (F) – Keeping a Safe Navigational Watch on Fishing Vessels – requires watchkeepers to stay in the wheelhouse to maintain a safe navigational watch and avoid distractions. If a watchkeeper needs to leave, then suitable relief should be arranged.

20

Unprepared and asleep

fishing vessel and chemical tanker | collision

In the early hours of a drizzly morning, a fishing boat collided with an anchored chemical tanker that was waiting to enter port and unload its cargo of crude rapeseed oil. The tanker had its anchor lights on in line with the COLREGs, and its working deck was illuminated. The second officer was on watch and at the back of the bridge, preparing the passage plan for the subsequent voyage. The vessel's deck cadet was assigned as the lookout and was using the Electronic Chart Display and Information System for training purposes.

Meanwhile, a fishing boat was returning to port to unload its catch after spending several days engaged in intensive seine fishing. The vessel was proceeding at 10kts, and the planned route went through a designated anchorage area. The skipper left the wheelhouse and went to the galley for refreshments, returning to the wheelhouse just as the vessel was approaching the anchorage area. The skipper had been on watch for 4 hours and awake for most of the day and fell asleep almost immediately when they sat down.

A few minutes later, the skipper was thrown forward from their chair onto the navigation screens. The fishing vessel's bow struck the chemical tanker's hull, recoiled, and struck it again before the skipper stopped the propulsion (Figure 1). The chemical tanker sustained a significant indentation on its starboard side, including damage below the waterline, which required dry dock repair. The fishing vessel suffered a crack in its bow and fishing activities were suspended for several weeks (Figure 2).

Figure 1: CCTV still of the fishing vessel colliding with the chemical tanker

Figure 2: Damage sustained to chemical tanker (left) and fishing vessel (right)

The Lessons

1. **Fatigue →** Watchkeepers must consider the quantity and quality of their rest before taking the watch to be fit for duty. Merchant Shipping Notice 1884 (F) Amendment 1 – ILO Work in Fishing Convention, Working Time – requires that *every fisherman shall have minimum rest of 10 hours in any 24-hour period*. It also warns that without at least 8 hours of sleep 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 risk of harm from fatigued watchkeepers is further increased when watchkeepers are in the wheelhouse alone or navigating during a circadian low, which is typically from 0200 to 0600. MGN 313 (F) advises *watchkeepers to ensure they remain alert by moving around frequently and ensuring good ventilation*; however, a better option is for the skipper to consider proceeding to anchor for 7 to 9 hours so that the crew can rest properly.

3. **Risk →** Unattended wheelhouses increase the risk of adverse consequences. MGN 313 (F) underlines the importance of maintaining a proper continuous lookout that requires the person in charge of the watch to *keep watch in the wheelhouse, which should never be left unmanned*. It might be necessary to reschedule other duties or arrange a relief to take the watch.

4. **Lookout →** Merchant vessels are required to maintain a proper lookout while at anchor. MGN 315 (M) – Keeping a Safe Navigational Watch on Merchant Vessels – states that *the officer in charge of the navigational watch may visit the chartroom, when essential, for a short period for the necessary performance of navigational duties, but shall first ensure that it is safe to do so and that a proper look-out is maintained* [sic]. This did not happen on the chemical tanker, where both watchkeepers were preoccupied with other duties for an extended period of time.

Bouldered over

stern trawler | flooding

The two crew of a wooden stern trawler were attempting to recover their fishing gear from the seabed. The crew initially believed that the trawl had become fast on the seabed, but it became evident that the trawl was very heavy rather than fast, making it difficult to recover. As the trawl was winched up it became clear that the towing wires and trawl doors were crossed, complicating the situation further (see figure). Over several hours, the crew manipulated the towing wires with the winch in an attempt to untangle the gear. During this time, the trawl doors were heard hitting the hull several times, which was a familiar noise to the crew in such situations.

The vessel was noticeably sitting very low in the water when the trawl was eventually untangled and the net was slowly being recovered onto the net drum. Assuming that this was due to a heavy boulder in the fishing net the crew continued their efforts to free it; however, the vessel listed heavily to starboard as they transferred the weight of the net to the starboard gallows.

Realising something was amiss, the skipper investigated below deck and discovered that both the engine room and fish room were flooded. The situation did not improve when the fishing net was cut away and the crew had just enough time to launch their liferaft and gather an Emergency Position Indicating Radio Beacon, several flares, a handheld VHF and essential medication before the vessel capsized and sank. The crew used their emergency equipment to raise the alarm and were rescued about an hour later by a RNLI lifeboat and taken ashore.

For illustrative purposes only: not to scale

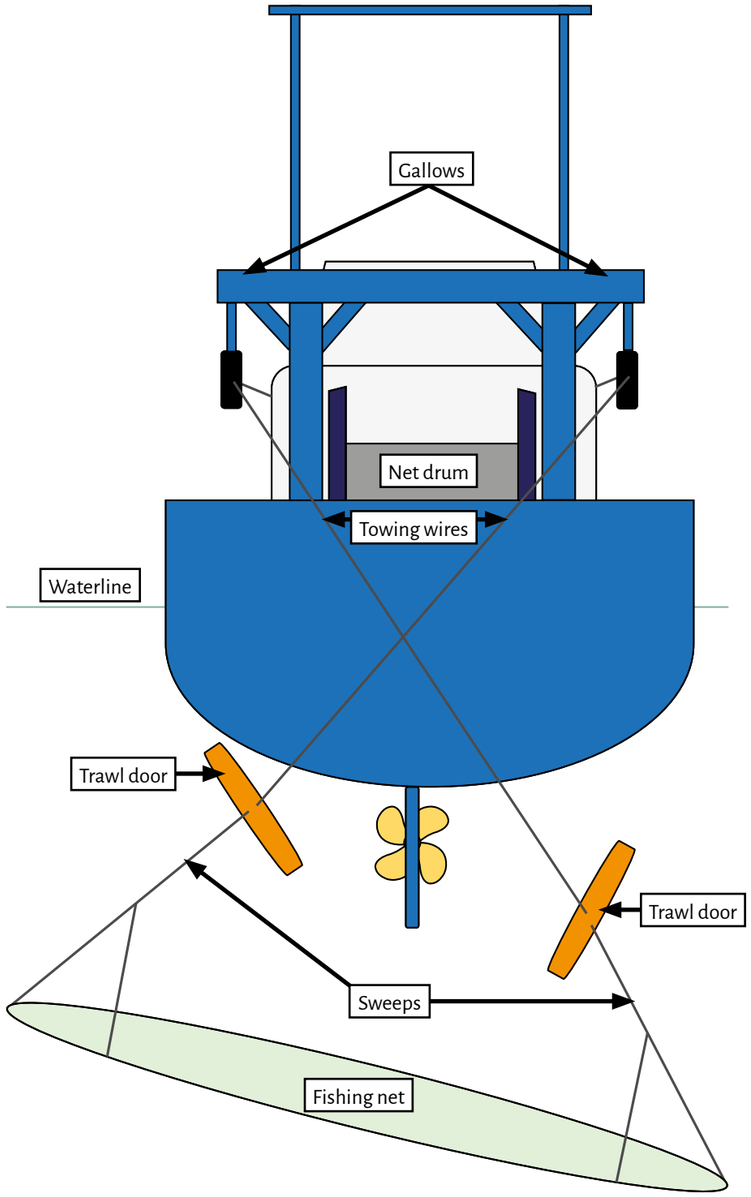

Figure: Representation of the vessel at the time of the accident

The Lessons

1. **Check →** It is all too easy to forget to monitor the entire situation when attending to the task in hand. The crew of this vessel heard a trawl door hitting the hull but did not check the below spaces for water ingress until it was too late because their focus was to remove a heavy weight from the fishing net.

2. **Monitor →** The crew could have taken much earlier action to save the vessel had a bilge alarm been heard. The two crew on board the vessel were working at the stern for several hours, which meant no one was available to monitor alarms or keep a mandatory good lookout in the wheelhouse.

3. **Plan →** Be prepared for unforeseen circumstances. Consider what could happen, identify the risks involved, assess how to mitigate them and document your plan. Make sure you also incorporate these scenarios into emergency drills to help prevent the loss of your vessel and crew.

Stay in lane

beam trawler | grounding, flooding, foundering

On a clear spring evening, a beam trawler was on its annual passage to a fishing ground when the journey took an unexpected turn. The skipper was roughly following a plotted course they had used before. The route took them through the inshore traffic zone and the skipper turned off the AIS.

The crew had gathered in the wheelhouse to look at a local landmark as their vessel passed the wrong side of a navigational mark. There was a sudden crunching noise as the fishing vessel grounded briefly on a charted rock before lurching on. The skipper took charge, switching the AIS back on and directing the crew to check around the vessel for damage. They quickly discovered that the fish room was flooding. The skipper made a "Mayday" call to the coastguard and requested immediate assistance and additional pumps.

The crew used both fixed and portable pumps to try and control the flood while waiting for help to arrive. They quickly realised their efforts were futile and secured the fish room hatch, hoping that the water would fill the compartment but go no further.

The situation became perilous as the vessel began to sink by its bows when the RNLI lifeboat and coastguard helicopter arrived on scene. The skipper gave the order to abandon ship and the crew boarded the prepared liferaft. All were rescued unharmed by the lifeboat (Figure 1) as their vessel sank and settled on the seabed (Figure 2).

Figure 1: The beam trawler sinking by the bow with its derrick arms on the waterline

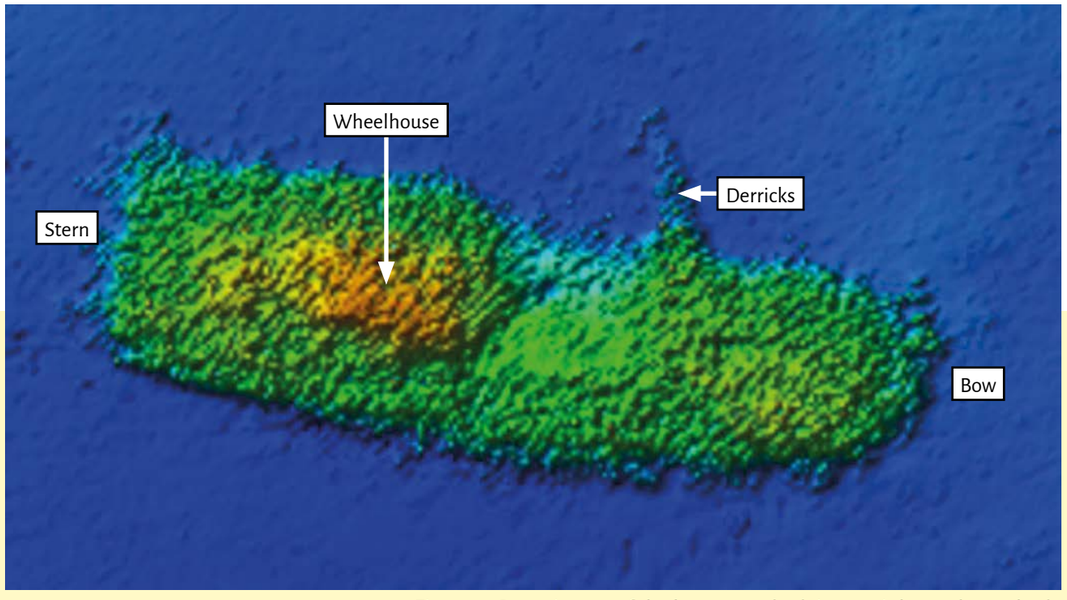

Figure 2: Sonar image of the beam trawler lying upright on the seabed

The Lessons

1. **Procedure →** Good outcomes arise from well-thought-out procedures. The crew believed they were following a safe passage plan because it had been used every year without incident. In fact, they had been perilously close to danger on all their previous journeys. Fortunately, those involved in this case survived to learn the lessons.

2. **Monitor →** The purpose of AIS is to provide a vessel and shore stations with a vessel's identification and positioning information. Turning it off prevents other vessels and coastal authorities from monitoring your position. Thankfully, the fishing vessel's AIS transmitted when it was switched back on immediately after the grounding so that rescue services could locate the crew.

3. **Plan →** Emergency preparedness makes a huge difference when things start to go wrong. The crew were well-directed once the flooding had occurred and were able to prepare a liferaft and evacuate safely. Make sure you have a clear plan of action with a systematic checklist to help you respond effectively in a real situation; your life could depend on it.

RECREATIONAL VESSELS

It is true to say that I did not enter the world of paddlesport as someone who was natural around water. From being scared to capsize my kayak in my local river to paddling some incredible alpine water, I have learnt many lessons along the way. Throughout my paddlesport journey safety has been presented as paramount. For me, it is not just the memories made on the water but the debriefs and reflections afterwards that have had an impact on my paddling. Right from the beginning, it became clear that many of the lessons learnt through these discussions were also relevant in daily life. Similarly, the safety lessons shared in the following articles echo those from paddlesport incidents, in particular the importance of planning and preparation; assessing and managing risk; and carrying the right equipment.

...it is essential to carry out physical and mental preparation for activities on the water...

Planning and preparation

On or off the water we know that the key to success for any task is planning and preparation. Whether it's a gentle bimble down the river or an extreme ocean challenge, planning and preparation will help to ensure everything goes as smoothly as possible. It is important to have a plan for both the activity and in case something goes wrong. Knowing what to do to resolve a range of possible scenarios can go a long way in the event of a real emergency event. Additionally, it is essential to carry out physical and mental preparation for activities on the water, as well as document your decision-making processes where relevant, keeping in mind that these can be evidenced and will be subject to scrutiny should an incident occur. Planning also requires a degree of flexibility and adaptability should conditions for 'plan A' be unfavourable on the day. Alternative plans could include a different location or activity with more suitable conditions for the group's experience and skill; however, in some cases they might be to explore the local area and try a local delicacy to avoid entering a situation unprepared. A range of elements contribute to planning and preparation, all of which can help ensure a successful time on the water.

Assessing and managing risk

Written and dynamic risk assessments are crucial for identifying hazards and putting measures in place to reduce the risk. Recent coroner's reports relating to paddlesport and other adventure activities have highlighted that there is insufficient understanding of what a risk assessment is, which can lead to a lack of or incomplete risk assessment and result in injury. The reports have also emphasised that if plans change an updated written risk assessment must be completed to reflect the new plans, the hazards, and how risk will be managed.
The continuous process of identifying an activity's hazards, known as dynamic risk assessments, must also be conducted and is especially important in changing conditions such as those on and around the water. It is human nature to overlook the risk and hazards involved in an activity and we are probably all familiar with choosing a date, travelling a long way, and going ahead with an activity in unsuitable conditions because it was what we had planned to do. This is often when things will go wrong. Beyond risk assessment and management, adhering to the principle that it is possible to go back another day in suitable conditions can also help to prevent incidents. And so, assessing and managing risk also forms part of an enjoyable time on the water.

Carrying the right equipment

Articles, news stories, and incident reports illustrate the importance of carrying, wearing and checking appropriate equipment that meets requisite good practice and recognised guidance. It is crucial that safety equipment such as buoyancy aids, lifejackets and helmets fulfils compliance requirements. It is deeply concerning that the past year has seen a significant increase in the number of recalls by the Office for Product Safety and Standards for buoyancy aids and lifejackets that do not comply with legislation and pose a serious risk of drowning. Although the general attitude towards wearing a PFD appears to have improved, it remains a noticeable theme when observing people on the water regardless of the vessel. For this reason, *Always wear a buoyancy aid* remains one of Paddle UK's basic key safety messages. Another piece of equipment often not carried is any kind of mobile phone or communication device. It is reported that some people do not want to risk damaging their phone around the water, and others leave their phone behind to take a break and enjoy the positive mental benefits of being out on the water.

However, having a means of calling for help and letting someone know your plans on the water can make all the difference should things not go to plan. The carriage of essential safety items such as a PFD and means of calling for help are vital to a safe, and relaxing, time on the water.

These elements are all parts of, not barriers to, getting out on the water safely...

These elements are all parts of, not barriers to, getting out on the water safely and go hand in hand with enjoyment. Taking time to share experiences and discuss what went well and what could be improved enables lessons to be learnt for next time. I have been fortunate enough to learn from many inspiring paddlers over the years who evoke as much admiration for their mindset, ability to make fast decisions, and commitment to putting safety first as for their technical skills.

Sward

SAMANTHA WARD | Safety lead, Paddle UK

Samantha began paddling at Royal Leamington Spa Canoe Club before heading off to Cardiff University to undertake a law degree as well as further kayaking opportunities. Joining the university kayaking club sparked a passion for white water kayaking and Samantha spent many hours at Cardiff International White Water centre, and many weekends away paddling. During her second year at university, she took on the role of secretary for the kayaking club, supporting the organisation of trips and events. Always keen to take on a new challenge, Samantha developed an interest in different paddlesport craft, and began paddling a white water canoe to gain a new perspective on the water.

Samantha's role as safety lead at Paddle UK, formerly known as British Canoeing, combines her interests in paddlesport and safety. She is keen to work with others to help raise awareness of safety among new and experienced paddlers and, over the past 2 years, has driven a range of strategic safety work for the organisation. Samantha has recently passed the NEBOSH National General Certificate in Occupational Health and Safety.

Hip hop crew

motor cruiser | accident to person

A family group with limited boating experience had chartered a 12m commercial motor cruiser for a week-long journey along inland waterways. It was a bright spring afternoon and their excitement and enthusiasm filled the air as they anticipated exploring the picturesque countryside by bicycle during their evening stops. In preparation, the group had donned their cycling attire while en route to their mooring at a floating pontoon near a lock.

The motor cruiser was brought alongside and one of the group prepared to disembark onto the pontoon to secure the mooring lines. Rather than use the swim platform at the stern, which was level with the pontoon, the family member opted to descend from the vessel's side steps, which were just over a metre above the pontoon (see figure). Unfortunately, the cycling shoes the family member was wearing hindered their descent and they fell from the steps, fracturing their hip as they landed awkwardly on the pontoon.

The rest of the group rushed to help their relative and sought assistance from the local lockkeeper, who promptly called for an ambulance. However, due to the lock's remote location, the injured family member waited a considerable time and endured excruciating pain before medical assistance arrived on scene. The injured family member was subsequently transferred to the nearest hospital, where they underwent surgery for their fractured hip. The remaining members of the group cut short their holiday to look after their injured relative.

For illustrative purposes only: not to scale

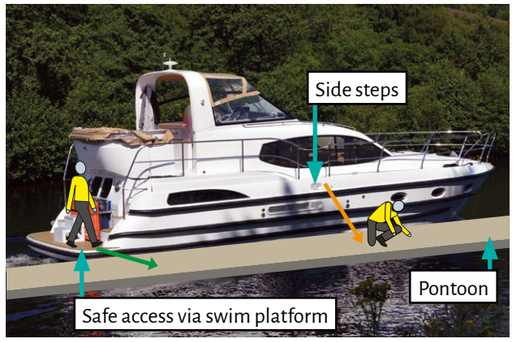

Figure: The fall location and safe alternative disembarkation route

The Lessons

1. **Risk →** The shortest route is not always the safest. Assessment of the surroundings is essential to evaluate the safest option when embarking and disembarking a vessel alongside a floating platform. Clear communication between the helm and other crew members of potential hazards or obstructions and assigning individual responsibility for tasks such as handling lines and fenders helps everyone on board maintain a safety-focused approach.

2. **Action →** Suitable footwear can markedly decrease the risk of accidents and injuries during boating activities. It is essential that footwear is waterproof and comfortable, fits well, has non-slip soles, provides all-round protection for your feet and is appropriate for the tasks and conditions on board. The cycling shoes worn in this case provided insufficient grip; the accident, injury, and abrupt end to the family's holiday could have been prevented had the risks of walking or jumping while wearing them been fully considered.

3. **Aware →** Pontoons and walkways can be slippery when wet, covered with algae or moss, and in cold weather. Look out for uneven or irregular surfaces and be especially careful when using them at night or in low light conditions, when potential hazards might be harder to spot.

That wreck is there all right

motor cruiser | flooding

It was a clear and sunny day when five friends departed the marina for a fun day at sea in their 50ft motor cruiser. Their plan was to explore the area and give the boat a good run at high speed. The trip was going well so the skipper decided to head closer inshore to look at a wreck that was marked on the chart. The tide was flooding so there was little time to get there before the wreck would be submerged in the high water.

The group could not see anything of note as they approached the position of the wreck at high speed, so decided to head home. There was a loud bang just as the motor cruiser passed over the charted position of the wreck, and the skipper noted a loss of propulsion. The motor cruiser continued on its previous heading as the crew responded to engine and flood alarms. The boat was quickly taking on water, so the skipper steered towards the shore and ordered everyone to put on lifejackets. Having grounded by the stern in shallow water just under half a mile from the beach (see figure), the skipper sent a distress message via VHF radio.

All five crew members were rescued by a nearby fishing boat. When the RNLI arrived its crew boarded the motor cruiser, deployed the anchor, then removed some flotsam from the water. They informed the coastguard of this new wreck on returning to base. The five friends were uninjured, though a little shaken by the event.

Figure: The part-flooded motor crruiser aground by the stern

The Lessons

1. **Margin of safety →** The UK Hydrographic Office produces trustworthy data to support safe navigation for mariners in areas of charted underwater objects. The skipper's plan to travel over the wreck position at high speed did not introduce a large enough margin of safety and the inevitable happened.

2. **Action →** The decision to beach the vessel was sound as it maximised the time available for a safe evacuation and simplified the eventual salvage of the motor cruiser. The skipper's further actions to issue a distress message and order the crew to don lifejackets meant the group returned home safe and well.

3. **Communicate →** The purpose of MAIB is to provide safety learning to mariners and prevent future accidents and it is a legal requirement that any marine casualty or marine incident is reported. Obtaining information about this accident was frustrated by poor communications and jeopardised the opportunity to share the lessons to be learned for the benefit of all.

Houseboat tragedy

dinghy | man overboard

It was a crisp, calm winter's morning and a houseboat owner, who had just been shopping, was using a dinghy to paddle back to their houseboat across a fast-flowing river (Figure 1). Once alongside, the owner put down the oar and was standing up to hold the dinghy alongside the houseboat (Figure 2) when they lost their balance and fell into the river. A member of the public saw the owner fall and raised the alarm.

An RNLI inshore lifeboat arrived about 10 minutes later and found the owner floating face down in the water between two moored vessels; sadly, they could not be resuscitated.

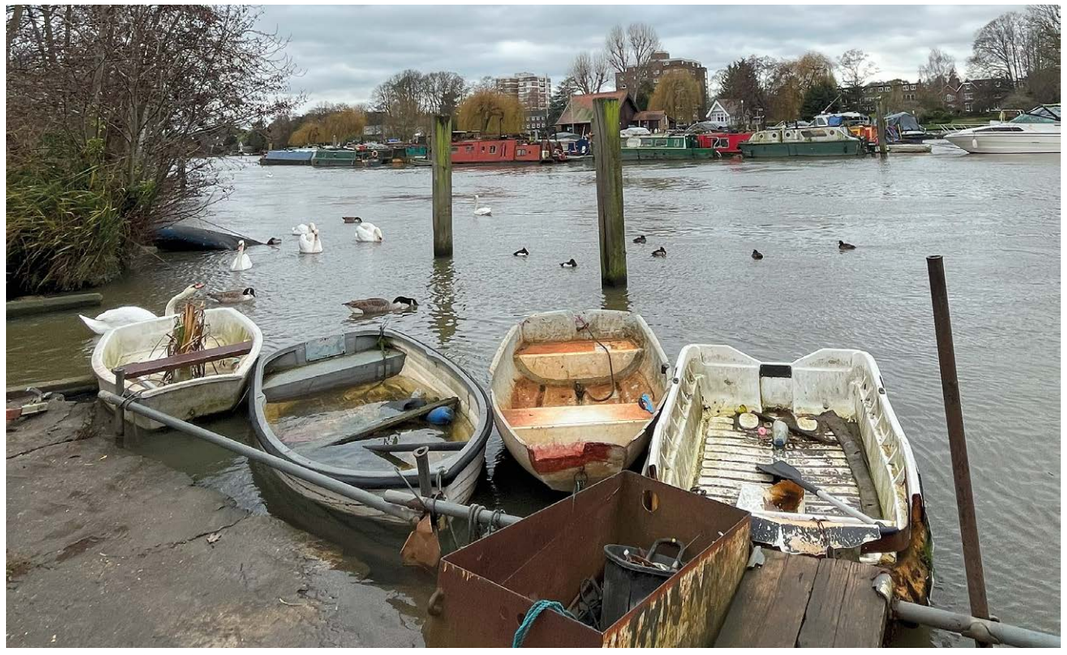

Figure 1: A typical dinghy

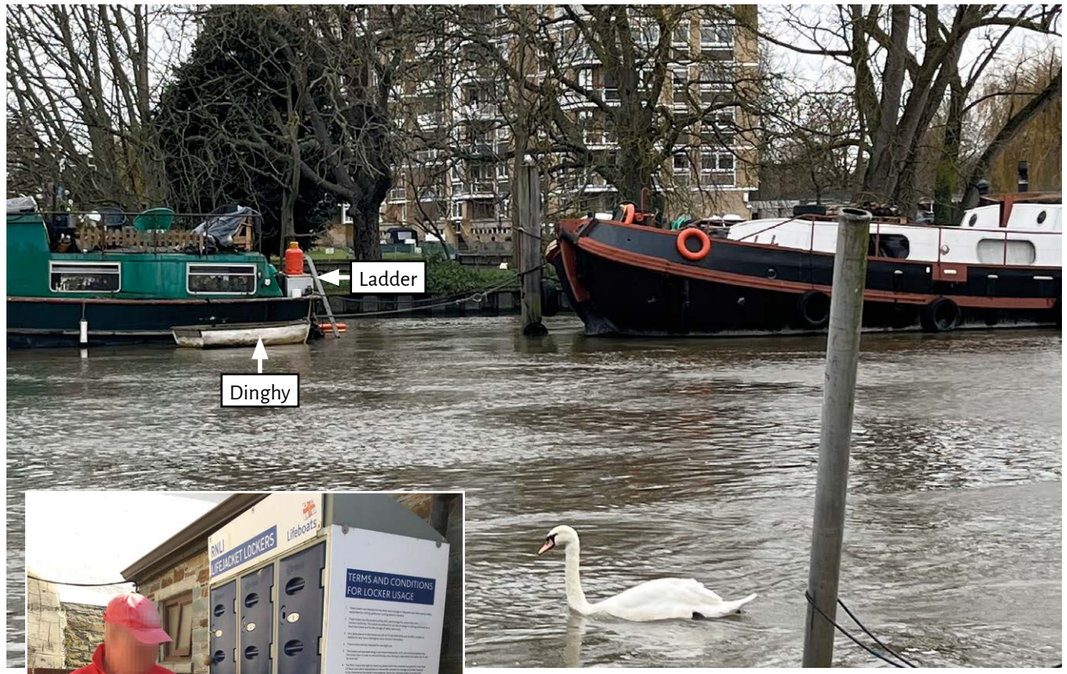

Figure 2: A similar houseboat

Figure 3: Lifejacket lockers

The Lessons

1. **Equipment →** Even a strong swimmer is at high risk of drowning if they fall into cold, fast-moving water without a PFD to keep them afloat. To encourage boat owners to wear a PFD on even the most familiar journey organisations such as the RNLI, local authorities and marina operators sometimes provide lockers (Figure 3) in which to store lifejackets while ashore.

2. **Hazard →** If you fall into water that is less than 15°C you are vulnerable to cold water shock, potentially ingesting water into your lungs as you suffer an initial gasp reflex. If you survive this, the next phase is cold incapacitation, limiting your ability to use your limbs and making it difficult for you to remain afloat without the aid of a PFD.

3. **Plan →** It can be difficult to climb back on board after a fall into the water. If you are living afloat make sure you have suitable means of self-recovery, such as a ladder that extends a metre below the surface. The one shown on the back of the green boat in Figure 2 looks ideal, but in a fast-flowing stream you will need to ensure there is some form of grab line with which to pull yourself towards it.

4. **Communicate →** The owner was ill-equipped to raise the alarm when they fell into the water and it is fortunate that a witness was able to call for help. Carry a PLB or waterproof mobile phone whenever you are on the water; it could save your life.

INVESTIGATIONS

started during the period 1 March 2024 to 31 August 2024

Date	Occurrence
23 February*	Fatality of the chief engineer on board the Isle of Man registered yacht ***Baton Rouge*** while alongside Falmouth Harbour, Antigua.
24 March	Foundering of the UK registered stern trawler ***Opportune*** approximately 36nm east of Lerwick, the Shetland Islands, Scotland. The crew were rescued uninjured from the vessel's liferaft.
25 April	Collision between the Greece registered oil tanker ***Apache*** and the UK registered fishing vessel ***Serinah*** approximately 6nm south-west of Ardrossan, Firth of Clyde, Scotland, resulting in the sinking and loss of ***Serinah***.
22 May	Fatal man overboard from the UK registered fishing vessel ***Weston Bay*** approximately 11nm east of Spurn Head, Humber Estuary, England.
12 July	Fatal man overboard from the UK registered fishing vessel ***Kingfisher*** approximately 30nm east-north-east of Wick, Scotland.
13 July	Fatal injury to a crew member on the Malta registered cargo vessel ***Laureline*** while loading freight in Purfleet, England.
22 July	Grounding of the UK registered dive support vessel ***Jean Elaine*** in Deer Sound, Orkney, Scotland.
23 July	Foundering of the Saint Helena registered fishing vessel ***Argos Georgia*** in heavy seas approximately 200nm east of Port Stanley, Falkland Islands, resulting in 13 fatalities. Under investigation on behalf of the St Helena Government.
19 August	Foundering of the UK registered sailing vessel ***Bayesian*** 0.5nm south-east of the entrance to Porticello harbour, Sicily. Of the 22 people on board, 15 were able to escape from the vessel and were recovered ashore.

* This investigation was started after MAIB Safety Digest 1/2024 went to print.

Correct up to 31 August 2024. Go to www.gov.uk/maib for the very latest MAIB news

Preliminary Assessments

Scot Explorer/Happy Falcon
Collision between a general cargo vessel and a gas carrier about 12 nautical miles north-west of Thyborøn, Denmark on 24 October 2023.
PA3/2024 Published 5 March

Indian Partnership
Grounding of a bulk carrier in the Indonesian archipelago on 23 April 2023.
PA4/2024 Published 23 August

REPORTS

issued in 2024

Eder Sands
Person overboard from a UK registered fishing vessel in the Atlantic Ocean, approximately 150 nautical miles west of Ireland on 7 October 2022, with loss of 1 life.
1/2024 Published 8 February

Awesome
Loss of control of a powerboat near Little Thatch Island, British Virgin Islands on 2 October 2022, with loss of 2 lives.
2/2024 Published 25 April

Alfred
Grounding of a roll-on/roll-off passenger ferry east of Swona Island, Pentland Firth, Scotland on 5 July 2022.
3/2024 Published 22 May

Kirkella/Shovette
Collision between a fishing vessel and a harbour tug at King George Dock, Hull, England on 24 June 2022.
4/2024 Published 13 June

Piedras
Flooding, capsize and sinking of a fishing vessel south-west of Mizen Head, Ireland on 1 June 2022.
5/2024 Published 20 June

Ali Ka
Contact with Oikos Jetty 2 by a chemical tanker on the River Thames at Canvey Island, England on 25 October 2022.
6/2024 Published 18 July

Channel Queen
Grounding and loss of a motor vessel near the Needles, Isle of Wight, England on 20 July 2023.
7/2024 Published 25 July

Angelena
Capsize and foundering of a fishing vessel south-east of Exmouth, England on 18 June 2021.
8/2024 Published 1 August

Inflatable migrant boat
Flooding and partial sinking of an inflatable migrant boat in the Dover Strait on 14 December 2022, resulting in the loss of at least 8 lives.
9/2024 Published 15 August

Piedras (MAIB report 5/2024)

Channel Queen (MAIB report 7/2024)

SAFETY BULLETINS

issued during the period 1 March 2024 to 31 August 2024

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY BULLETIN

SB2/2024 JUNE 2024

Extracts from The United Kingdom Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 Regulation 5:
"The sole objective of a safety investigation into an accident under these Regulations shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of such an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

Regulation 16(1):
"The Chief Inspector may at any time make recommendations as to how future accidents may be prevented."

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Fatal injury to a recreational diver after contact with the recreational diving support boat *Karin* in Scapa Flow, Orkney Islands, Scotland on 28 September 2023

Representative image of a diver surfacing near a dive boat

MAIB SAFETY BULLETIN 2/2024

This document, containing safety lessons, has been produced for marine safety purposes only, on the basis of information available to date.

The Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 provide for the Chief Inspector of Marine Accidents to make recommendations at any time during the course of an investigation if, in his opinion, it is necessary or desirable to do so.

The Marine Accident Investigation Branch is carrying out an investigation into the fatal injury to a recreational diver after contact with the recreational diving support boat *Karin*.

The MAIB will publish a full report on completion of the investigation.

Captain Andrew Moll OBE
Chief Inspector of Marine Accidents

NOTE
This bulletin is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall not be admissible in any judicial proceedings whose purpose, or one of whose purposes, is to apportion liability or blame.

This bulletin is also available on our website: www.gov.uk/maib
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BACKGROUND

On the morning of 28 September 2023, a recreational diver carrying out decompression stops died, almost certainly as a result of being struck by the rotating propeller of the UK registered diving support boat *Karin*. The diver was diving from a second dive boat that was also supporting divers exploring the wreck of the German battleship SMS *Markgraf* **(Figure 1)**, which was lying at a depth of 45m in Scapa Flow, Orkney Islands, Scotland.

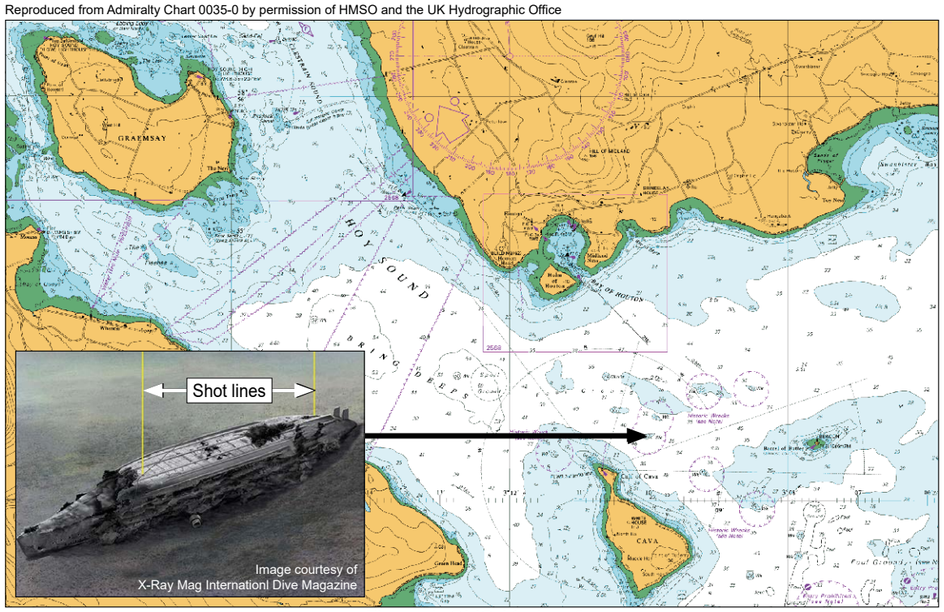


Figure 1: SMS *Markgraf*

The diver and their dive buddy had ascended to their final scheduled decompression stop 3m below the surface. The divers were conducting a drift decompression away from the available shot line[1] but their presence was indicated by their delayed surface marker buoy (DSMB)[2], the line of which was clipped to the casualty's dive vest **(Figure 2)**. The DSMB was visible to the second dive boat waiting on the other side of the wreck site, but it was not sighted by *Karin*'s crew before *Karin* motored over it.

The crew of the second dive boat saw the DSMB disappear under *Karin*. Subsequently, one of the two divers failed to resurface. The coastguard was notified and an extensive 2-day air and sea search of the area was conducted, but without success.

The missing diver's body was found 3 weeks later following a seabed search conducted by a local survey vessel using side-scan sonar. A specialist team recovered the diver's body from the seabed.

1 A type of downline or descending line comprising a line and a buoy and used as a surface and underwater datum point to mark the position of entry and exit while diving and during decompression stops. The line is weighted or attached to the seabed or dive site wreck and held at the surface by the buoy.

2 The launch of a DSMB by a submerged diver just before ascent marks their position to surface craft. A DSMB could also be used by divers while completing a safety stop, particularly in a current or where other visual references were absent.

Figure 2: DSMB line attached to harness

Karin was a 24m converted fishing boat with a draught of 2.8m, certified by Mecal Ltd under the Maritime and Coastguard Agency's (MCA) Small Commercial Vessel and Pilot Boat Code of Practice (SCV2), annexed to Marine Guidance Note (MGN) 280 (M). The two crew of *Karin* comprised a skipper, who was suitably qualified and had extensive experience both as a diver and dive boat skipper engaged in this type of operation, and a crew member whose principal role was that of cook.

INITIAL FINDINGS

The accident occurred during daylight in favourable environmental conditions with good visibility, calm seas, no rain, and a tidal stream of less than 1 knot (kt). *Karin* was manoeuvring at a speed of 4kts slightly to the east of the shot line marking the stern of the wreck. The tidal streams in the area were not strong, although it was not uncommon for divers to carry out drift decompression stops before surfacing. The DSMB marking the casualty and their buddy had been on the surface for 11 minutes before the accident, but had not been seen by *Karin*'s skipper who was operating the boat from the wheelhouse during this time.

SAFETY LESSONS

- The requirement to maintain an effective lookout at all times when a vessel is underway is clearly articulated in the COLREGs[3] and it is vital when operating in close proximity to people in the water, such as with dive boats. A dedicated lookout posted in a suitable location is essential to make sure the helm/skipper is given sufficient warning of a surfacing diver to take effective avoiding action.
- Manoeuvring a boat in areas where divers are known to be below the surface introduces unnecessary risk to a diver surfacing close by. Unless drifting or anchored, the support boat should keep a safe standoff distance from submerged divers and only move over the dive site when recovering divers from the water.
- Where multiple boats intend to operate in the same area, detailed and frequent communication between the operators is essential to ensure deconfliction and prevent accidents. Boat operators should coordinate and plan their movements before arrival at dive sites to minimise the event of multiple boats operating in the same area at once.
- Divers using a DSMB should hold the line in their hand, as recommended by the British Sub-Aqua Club, rather than attach it to their person. In the event that the DSMB becomes snagged by a passing craft, the diver can then release the line to avoid entanglement and potentially being drawn to the surface or into contact with the craft.
- The nature of static shot lines in well-known positions supports their use during decompression stops. Although the strength of the current might prevent their use, divers decompressing or surfacing away from shot lines have increased vulnerability to hazards such as boat traffic, entanglement in marine debris or becoming caught in underwater structures.

RECOMMENDATIONS

The **British Diving Safety Group** is recommended to:

S2024/114 Disseminate this safety bulletin to all organisations and agencies within its membership drawing attention to the safety issues raised, in particular:

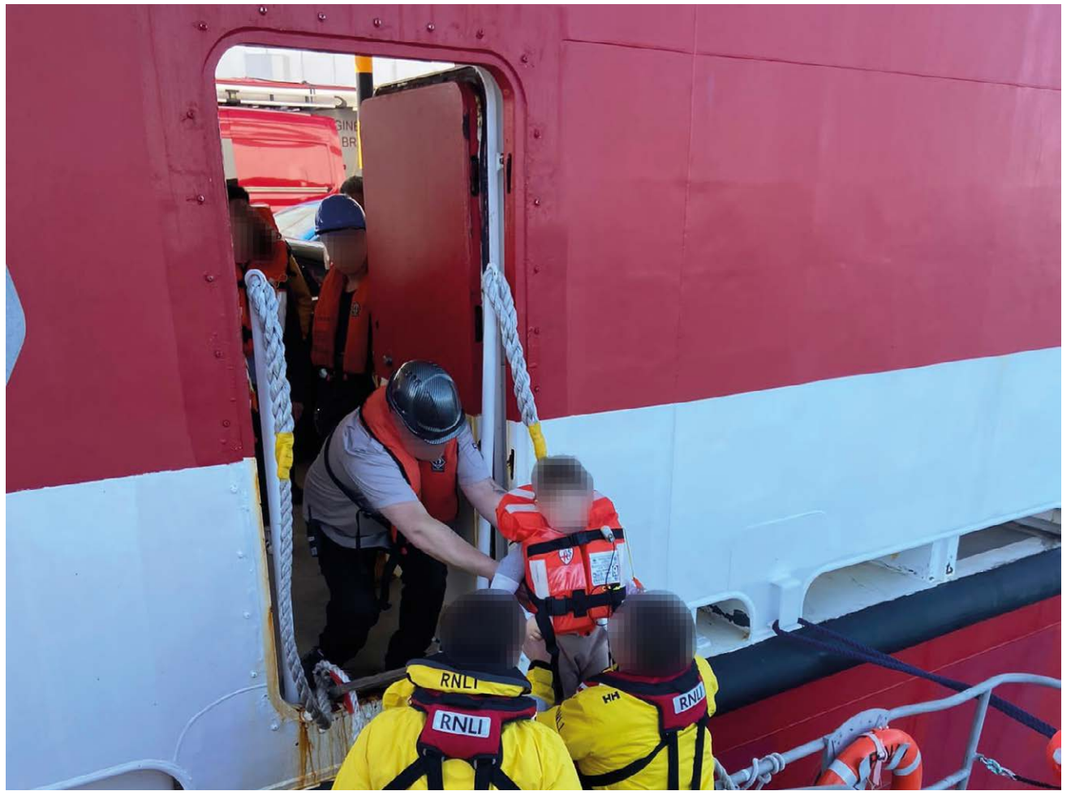
- that owners, operators and skippers of diving support boats should ensure compliance with COLREGs Rule 5 concerning provision of a lookout, especially when operating in proximity to divers in the water.
- to raise awareness among its members of the hazards to divers of attaching a DSMB to their person while submerged, and that the recognised good practice is for the reel to be held in their hand.

Safety recommendations shall in no case create a presumption of blame or liability

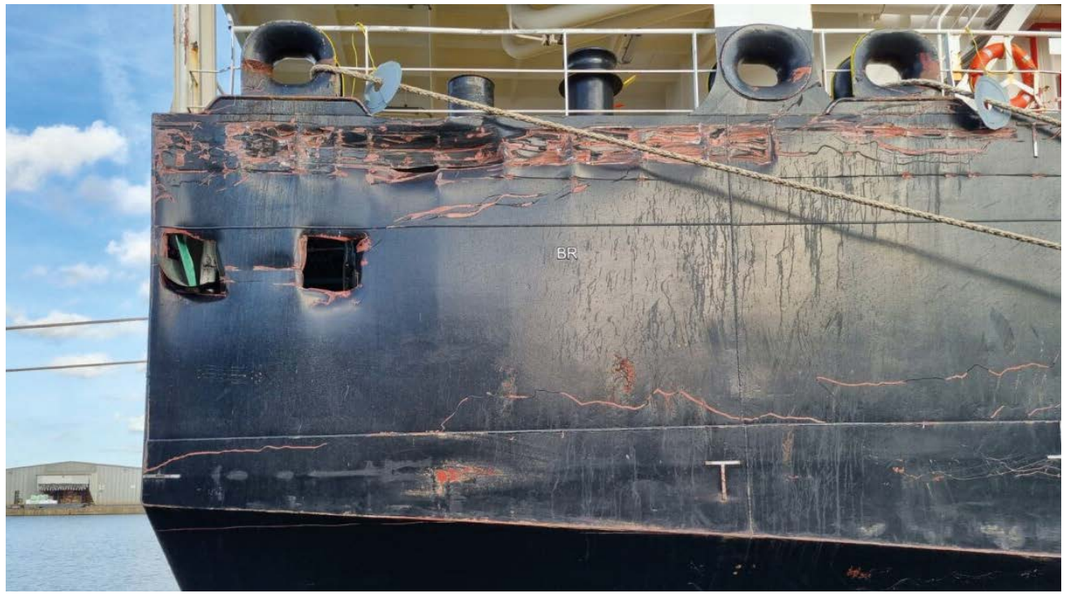
Issued June 2024

3 The Convention on the International Regulations for Preventing Collisions at Sea, 1972 as amended.

Alfred (MAIB report 3/2024)



Ali Ka (MAIB report 6/2024)



SAFETY FLYERS

issued during the period 1 March 2024 to 31 August 2024

GOVERNMENT OF THE VIRGIN ISLANDS

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO PLEASURE CRAFT USERS

Loss of control of the powerboat *Awesome* near Little Thatch Island, British Virgin Islands on 2 October 2022, resulting in two fatalities

Image courtesy of *Awesome*'s owner

Awesome

Narrative

In the early evening of 2 October 2022, the mono-hulled offshore powerboat *Awesome* was returning to East End dock from Jost Van Dyke, British Virgin Islands (BVI) with a second boat close behind. As *Awesome* passed between Frenchman's Cay and Little Thatch Island it suddenly veered to starboard (right), then rolled violently to port (left), which immediately ejected ten of the eleven occupants. *Awesome* reared up in the air bow first and landed back in the water on its transom, immediately partially sinking. The air trapped in the forward cabin held the boat briefly afloat vertically, before it slowly sank over the next 5 to 10 minutes.

The boat that was in convoy with *Awesome*, a passing fishing vessel and a local charter boat were quickly on scene and ten of the eleven people in the water were rapidly located and transferred ashore to West End ferry terminal. Five-year-old Brianna Graham was rushed to hospital, where she was declared deceased shortly afterwards. Despite an extensive coordinated search, 32-year-old Kristal Black was not found at that time of the accident. Her body was located in the forward cabin of *Awesome*'s wreck during a seabed search.

The investigation found that *Awesome* suddenly altered course due to a loss of steering control. A universal joint on the port drive shaft failed while the boat was travelling at around 60 miles per hour and the flailing drive shaft severed a steering system hydraulic hose, resulting in a complete loss of pressure. The coupling failure was due to excessive wear caused by lack of lubrication over a prolonged period of time that probably extended to the boat's previous ownership.

Awesome's occupants included young children; no one was wearing a lifejacket or personal flotation device (PFD), and many of the group could not swim well. It is very fortunate that other craft quickly arrived on scene to rescue them from the water. *Awesome* was equipped with PFDs, which were found in the forward cabin during a post-accident inspection of the wreck. *Awesome*'s engines were fitted with kill switches, designed to stop the boat's engines when activated by a kill cord, which were found to be still in place and tied back.

Safety lessons

1. Maintenance is important, especially tasks involving the upkeep of less visible drivetrain elements such as greasing drive shaft universal joints; making sure control cables are in good order and not corroded internally; and checking water pumps on outboard motors. Consult the maintenance schedule for each component to preserve functionality and reduce its risk of failure.

2. Lifejackets and PFDs are useless unless worn. Correctly fitted PFDs are proven to save lives, and an inflated lifejacket will keep a person afloat with their face up and their head above water even if they are unconscious.

3. Safety devices are designed to prevent serious injury and save lives. Many boats are fitted with a kill cord, which should be clipped to the driver and will activate a kill switch that stops the engine if they are thrown overboard or away from the driving position.

4. Training raises awareness. There are thousands of boaters in the British Virgin Islands, and many more that visit to annually to enjoy the islands from the water. The training available and provided locally in the BVI will equip captains with the local knowledge required to safely operate their boats and build the confidence and experience of those already familiar with BVI waters.

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

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Publication date: April 2024

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE SHIPPING INDUSTRY

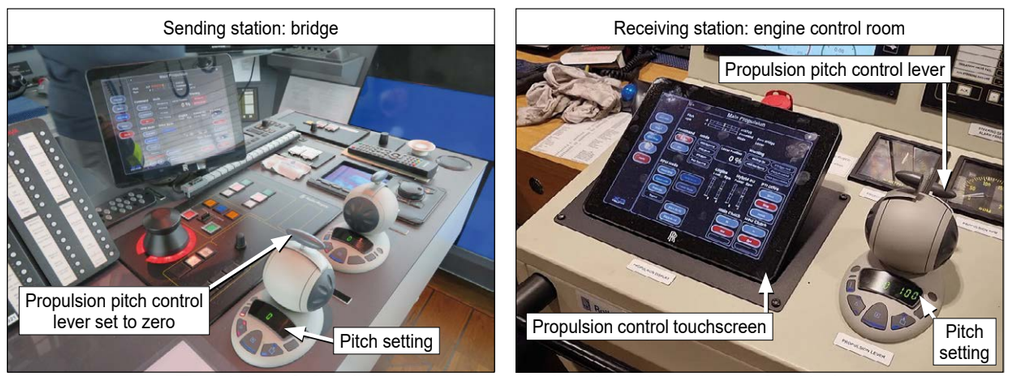
Loss of propulsion control identified following the collision between the fishing vessel *Kirkella* and harbour tug *Shovette* at King George Dock, Hull, England on 24 June 2022

Narrative

On 24 June 2022, the UK registered fishing vessel *Kirkella* lost control of its propulsion system while berthing and collided with the harbour tug *Shovette* in King George Dock, Hull, England. *Kirkella*'s bulbous bow breached *Shovette*'s hull and starboard fuel tank during the collision, causing the tug to partially sink and resulting in approximately 7,000 litres of marine diesel oil spilling into the dock. *Kirkella* was not damaged during the accident.

Kirkella and *Shovette*

Kirkella's propulsion system comprised a single main engine driving a controllable pitch propeller via a clutch and gearbox. The vessel's propulsion was controlled by a Rolls-Royce Helicon-X3 integrated propulsion control system, supported by Kongsberg Maritime. The propulsion system could be operated from several stations located in the wheelhouse and from the engine control room (ECR). The loss of control occurred when the propulsion control was passed from the bridge to the ECR with the clutch engaged. At the time of the handover, the bridge propeller pitch lever was set at zero, while the ECR's propeller pitch lever was set at 100% ahead (see figure). The propeller pitch automatically advanced when control was accepted in the ECR, causing *Kirkella* to move forward on the berth.



The status of *Kirkella*'s propulsion control system at handover of control

Safety lessons

1. The propulsion control system on *Kirkella* was not fitted with interlocks to prevent a mismatched propeller pitch lever position when control was transferred. Over 4,000 Rolls-Royce Helicon-X3 systems have been supplied to the industry, most of which were not fitted with optional interlocks, which were not required. Retrofitting can be undertaken by Kongsberg Maritime, as customer support provider.

2. Robust shipboard practices are essential to maintain propulsion control during handover, regardless of whether system interlocks are fitted. Documented procedures should contain a requirement for the operator of the sending station and the receiving station to check that propulsion systems pitch settings are aligned at the time of transfer.

3. To reduce the risk of propulsion thrust being applied inadvertently while alongside it is advisable to declutch engines before transfer of control.

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Publication date: June 2024

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE FISHING INDUSTRY

Flooding, capsize and foundering of the stern trawler *Piedras* (FD528), 78 nautical miles south-west of Mizen Head, Ireland on 1 June 2022

Image courtesy of Irish Air Corps

Piedras

Narrative

At 1234 on 1 June 2022, the UK registered stern trawler *Piedras* capsized and sank about 78 nautical miles south-west of Mizen Head, Ireland, following an uncontrolled ingress of seawater into the engine room that started during fishing operations. The crew first became aware of the flood at about 0600, but the source of the flooding was not determined and their attempts to pump out the floodwater were unsuccessful.

The skipper of *Piedras* had contacted a nearby fishing vessel *Armaven Uno* and, over 2 hours into the flood, sent an undesignated distress message via the Global Marine Distress and Safety System (GMDSS). Deciding that the vessel was lost, the skipper of *Piedras* gave the order to abandon ship. The abandonment was hampered as one of its two liferafts failed to function correctly. Fortunately, the second liferaft was successfully deployed and used by the 11 crew members. By 0949, the crew of *Armaven Uno* had rescued the entire crew of *Piedras* from the liferaft. *Piedras* eventually capsized and sank to the seabed.

Safety lessons

1. The crew of *Piedras* were alerted to the flood by the engine room bilge alarm but recovered their trawl before fully investigating the flood source. Floods are dangerous and should be dealt with immediately; early identification of a flood source provides the best opportunity to stop the leak and pump out floodwater. Securing watertight doors and hatches in the closed position can help to keep a vessel afloat, even if one compartment is flooded. The Fishermen's Safety Guide[1], published by the Maritime and Coastguard Agency, details what actions to take in the event of a flood.

2. The skipper of *Piedras* sent the initial requests for help using WhatsApp, which limited the options for assistance and rescue to just one vessel. Sending an early distress message via GMDSS gives the best opportunity to alert rescue teams and receive external help and resources such as salvage pumps. Very high frequency radio calls and the use of handheld, parachute, and smoke flares can be an efficient way of indicating distress to nearby vessels that might have missed the original GMDSS messages.

3. The multinational crew of *Piedras* crew were unable to understand the vessel's safety documents, including risk assessments, which were not available in their native language. It is essential that safety critical information can be understood by everyone on board.

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Publication date: June 2024

1 https://www.gov.uk/government/publications/fishermens-safety-guide

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE FISHING INDUSTRY

Capsize and foundering of the stern trawler *Angelena* (BM271) on 18 June 2021

Image courtesy of Alan Letcher (https://fishandships.org)

Angelena

Narrative

At 1156 on 18 June 2021, the 11.82m stern trawler *Angelena* capsized and sank while its skipper was recovering the first catch of the day. A nearby vessel responded to the call between the coastguard and the Royal National Lifeboat Institution, and the unharmed skipper was rescued from *Angelena*'s liferaft around 40 minutes later. The skipper had been operating *Angelena* single-handedly for the second consecutive day due to crewing challenges. The fishing net's cod end was full of sand, mud, starfish and fish and the excessive weight caused it to slew to starboard when it was lifted clear of the water.

Angelena was unable to recover from the starboard list and started to take water on deck, resulting in the vessel's rapid capsize to starboard. The skipper, who had no time to raise the alarm before entering the water, was wearing a personal flotation device (PFD) fitted with a personal locator beacon and managed to both swim to and inflate *Angelena*'s liferaft, which had floated free. At 1206, and without a portable radio to hand, the skipper used their mobile telephone to raise the alarm. Unbeknown to the skipper, *Angelena*'s Emergency Position Indicating Radio Beacon (EPIRB) had also floated clear of the vessel and started to transmit.

Safety lessons

1. *Angelena* had undergone several modifications since build and the weights removed and added changed the vessel's margins of stability. The skipper was unaware of the vessel's potential stability issues as no stability assessments had been carried out.

2. Wolfson Guidance Freeboard Mark calculations and roll or heel tests can warn fishers of stability hazards. However, a full stability assessment is the only real means by which to quantify the limits of a vessel's stability. Seek advice from local fishing vessel surveyors to understand what characteristics can affect stability.

3. *Angelena* capsized because it did not have sufficient reserves of stability to lift the contents of its net on board. The vessel was carrying insufficient fuel to counterbalance the destabilising forces created by lifting the excessive weight in the cod end from the high point over the stern.

4. Risk assessments reduce the severity and likelihood of a hazard and should consider factors such as the number of crew on board. The lone skipper was unable to simultaneously maintain a safe navigational watch and lift the catch efficiently; their options to recover from the foreseeable emergence of a difficult situation were limited.

5. It can sometimes be too dangerous to lift a catch on board. Ensure plans are in place to reduce hazards, including letting the catch go; no catch is worth the loss of someone's life or livelihood.

6. Wearing a PFD and maintaining regular servicing of lifesaving equipment improves the chances of survival in the event of an accident. When a vessel starts to capsize it is too late to find out that lifesaving equipment is neither fit for purpose nor accessible.

7. Liferafts must be able to float free, inflate and break free automatically without human intervention. The effects of cold water shock or injury sustained during an accident can hinder completion of the simplest tasks and reduce survivability.

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NOTES


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