MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY DIGEST

Lessons from Marine Accident Reports

2/2023

Featuring introductions by Simon Graves | Duncan Murt | Andy Murray

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

°	degrees
2/O	second officer
AB	able seaman
AIS	automatic identification system
BWTS	ballast water treatment system
C/E	chief engineer
CCTV	closed-circuit television
CPR	cardiopulmonary resuscitation
DC	direct current
DfT	Department for Transport
ECDIS	Electronic Chart Display and Information System
GMDSS	Global Marine Distress and Safety System
GPS	global positioning system
kts	knots
Li-ion	lithium-ion
LOTO	lock-out/tag-out
m	metre
“Mayday”	the international distress signal
MRCC	Maritime Rescue Coordination Centre
OOW	officer of the watch
PFD	personal flotation device
PLB	personal locator beacon
PPE	personal protective equipment
ro-ro	roll-on/roll-off
t	tonnes
V	volt
VHF	very high frequency
VTS	vessel traffic services

CHIEF INSPECTOR’S INTRODUCTION

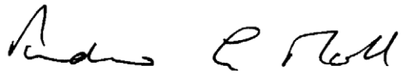
Welcome to the second MAIB Safety Digest of 2023. I will start by thanking Simon Graves, Duncan Murt and Andy Murray for their respective introductions to the merchant, fishing and recreational sections of this edition; their expertise is self-evident, and their industry insights to safety help bring 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 so others can benefit too.

In his introduction, Simon Graves makes the point that technical solutions to remove or control hazards are reaching their limits, and that the solutions often lie with the individuals carrying out the tasks. In my introduction to one of last year’s safety digests I wrote about precautionary thought, and Andy Murray continues that theme with his APEM acronym (appraise, plan, execute and monitor). Good precautionary thought helps avoid that sinking feeling of, *I wish I had…before we left*; we have all been there. However, Duncan Murt’s article about his fall overboard demonstrates how even the most safety conscious individual can allow themselves to drift into bad habits or unsafe practices when what they are doing becomes routine and they forget to be afraid.

The near miss incidents in case 1 and case 6 are good examples where nothing could go wrong, until it did. Simple miscommunications or misunderstandings turned routine passings into near collisions because the safety margins had reduced to the point they were almost nonexistent. Next time you are considering taking a risk in an approach or narrow channel, remember the container vessel *Ever Given* blocking the Suez Canal and think again.

The fishing section of this edition contains four instances where a member of the crew was dragged overboard (cases 17, 19 and 20) or nearly overboard (case 21). Some of these had good outcomes, others did not, but all show that the hazard of being dragged overboard during fishing operations remains ever present. There can be little doubt that wearing a lifejacket significantly improves your chances of living to tell the tale; again, read Duncan’s introduction. However, if you are operating single-handed, carrying a personal locator beacon so you can raise the alarm will help ensure that others come to your rescue. And, to take this introduction back to where I started, a bit of precautionary thought and avoiding a drift into unsafe practices could help prevent the accident in the first place.

Be safe.



Andrew Moll OBE
Chief Inspector of Marine Accidents

MERCHANT VESSELS

No one could ever say that a maritime career lacks variety. When my mother put me on a train at the tender age of 16 years old to embark on mine (something she has never quite forgiven herself for), I never thought I would end up here. I will forever be a seafarer first and foremost, but experience in ship management and regulation provides different perspectives of safety when looking into the accidents I now investigate.

Attitude to safety is often in the eye of the beholder. As a seafarer, you are very much engaged in the here and now; the doing of the task. Every inspector in the branch has at one time or another looked at the circumstances of an accident through gritted teeth, knowing they were lucky to get away with doing something very similar. Equally, there is not one inspector in the branch who views risk in the same way they did before they joined.

Risk mitigation needs to focus on human rather than technical factors

As a regulator you are primarily concerned with compliance. During MCA surveys I often recounted the anecdote that, after years of training and study, I spent a large proportion of my time measuring things with a tape measure, watching doors open and close and counting lifejackets. Regulation drives safety and is vital for the industry – *Titanic* would certainly have carried more lifeboats had the regulations required them – but safety is multifaceted and while regulation tends to define the *What*?, it is the human elements that tend to define the *Why*? and the *How*?, which have a tendency to be the more difficult questions an investigator has to answer to determine why an accident has happened.

We read in the media about the rapid technological advancement underway in the industry as it looks for greener solutions. The speed and variety of the technical solutions being implemented for the decarbonisation of shipping is producing new, and sometimes unidentified, risks that our seafarers will be exposed to. Increasingly, risk mitigation needs to focus on human rather than technical factors: many see the development of on board automation as a potential solution, but the interface between the systems and the people will need careful assessment from design through regulation to operation to ensure that the management of one risk does not introduce another.

The recurrence of similar incidents continues again and again

There is an expectation that accidents involving new technology will eventually begin to cross our desks. For the moment, the cases in the pages that follow mirror those from the past. We see how times, people and equipment may change but many of the themes of the accidents call to mind those of years ago: navigational collisions and near misses, falls from height, pilot ladders and mooring and lifting accidents all feature in this edition, as they have done almost continuously over the years. I have certainly seen attitudes to safety evolve during my time in the industry, and we observe increased maturity in the systems and working practices intended to prevent marine accidents from happening, but the recurrence of similar incidents continues again and again.

Many of the cases you are about to read have reached the limit of a practicable technical solution to completely remove the hazard – a mooring rope still has to be placed over a bollard and I think chips will always form part of the menu on most ships. The solutions therefore lie with the people: to look at how they do things; why they do things; why they do not do things; how they interact with the things around them; and how they communicate. The latter comes to the fore when reading the two near misses between passenger ships.

...the best accident to learn from is one that someone else had

None of the articles in this section resulted in a fatality, but each of them had the capability to cause one. We should never forget the effect that a serious injury has on a person, sometimes for the rest of their lives.

It has often been said that the best accident to learn from is one that someone else has had and, writing as someone who works for an organisation with the sole purpose of removing the need for its own existence, I fully agree with the sentiment. I urge the readership of this safety digest to take the lessons from this crop of cases, those from the past and, sadly, the ones still to come and think about how to apply them on a personal level to use the hard-won hindsight for your own benefit.

I briefly served on the *Herald of Free Enterprise* during the early stages of my career so maybe I can say that I have come full circle. The terrible losses on board this cross-channel ferry in 1987 resulted in fundamental change to the industry and the establishment of the MAIB. Hopefully, the safety lessons among these pages will contribute to the achievement of something similar.

SIMON GRAVES CEng CMarEng BEng(Hons) PGCert MIMarEST | MAIB Inspector of Marine Accidents

Simon joined the MAIB as an inspector in 2021, transferring from an assistant director role at the Maritime and Coastguard Agency (MCA) where he was responsible for technical services (operations). Simon holds an honours degree in engineering from Newcastle University, which he studied for after qualifying as a chief engineer.

After a long career at sea serving on a wide variety of ships, ultimately as chief engineer on cruise ships, Simon joined the MCA as a surveyor. He moved with his family to New Zealand for a position in ship management before joining Maritime New Zealand, dealing with the operational port and flag state aspects of the organisation. Simon returned to the UK, and the MCA, in 2010, where he progressed to a principal surveyor role before promotion to assistant director.

With the arrival of COVID-19 Simon was faced with managing risk while developing and implementing a regulatory framework to keep UK ships trading under the most trying circumstances. He was also part of the multiagency team that developed the roadmap for returning the cruise industry to service after the dark days of the pandemic.

A stone's throw

passenger ferry | near miss

A passenger ferry completed loading and was preparing for departure. Harbour control gave approval for the ferry to depart and advised there was no traffic to affect the outward passage. With all departure checks completed, the master instructed the crew to let go of the mooring lines.

At the same time, an inbound ferry was in the channel destined for the berth being vacated. Harbour control directed the inbound ferry to wait in the vicinity of the last starboard lateral buoy, east of the breakwater (Figure 1). The inbound ferry's bridge team misinterpreted the message and continued their approach, thinking they had just been asked to slow down. The ferry passed the lateral mark and turned towards the harbour entrance.

Unaware of any conflicting traffic, the outbound ferry cleared the berth and started making way; however, as it approached the breakwater the inbound ferry was spotted and the risk of collision immediately identified. The outbound ferry's master urgently attempted to agree a suitable passing arrangement with the inbound ferry's master over very high frequency (VHF) radio, but the situation remained unclear.

The outbound ferry's master put the helm hard to starboard and applied full bow thruster power to starboard. The outbound ferry's bow swung clear, but the stern was swinging to port towards the inbound ferry so the master stopped the bow thruster and applied port rudder to avoid collision. The ferries passed one another at about 50m (Figure 2).

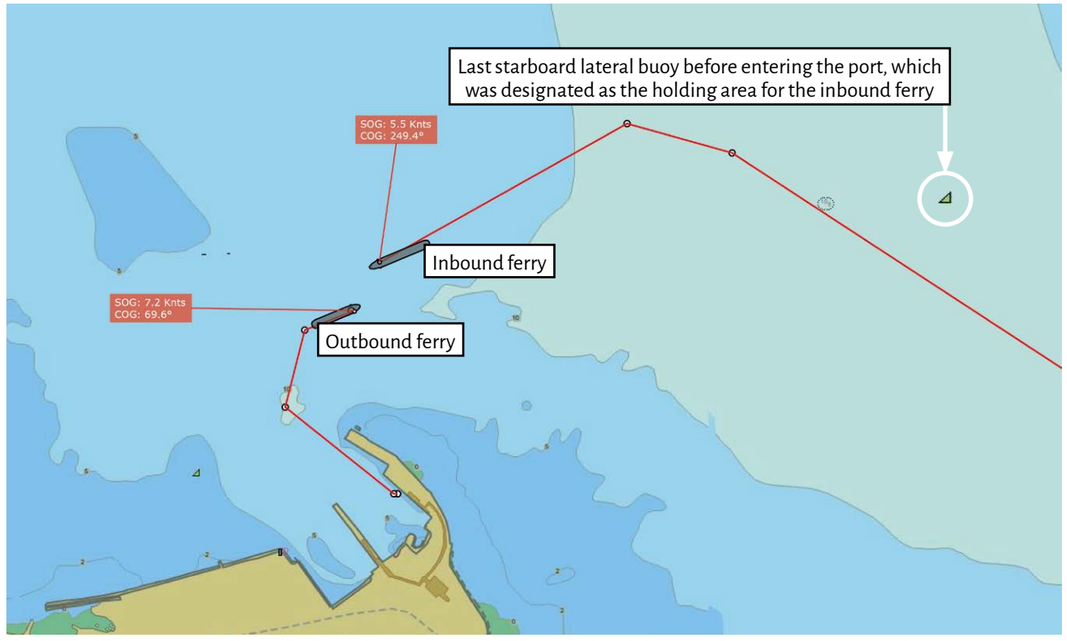


Figure 1: Chart reproduction, showing the tracks of the ferries and the position of the lateral buoy

Figure 2: The close-quarters situation

The Lessons

1. **Communicate →** Navigational and safety communications from ship-to-ship and ship-to-shore must be precise and clear to avoid confusion and error; the use of standard marine communication phrases can avoid ambiguity. In circumstances such as this, where there was a lack of clarity among both the ferries and harbour control, closed-loop communications can ensure that messages are received and, more importantly, understood. Having a receiver repeat back the relayed information allows the sender to confirm the understanding of the message and, if necessary, relay it again. In this case, it might have prompted the port controller to reassess the intentions of the inbound ferry.

2. **Equipment →** The use of VHF radio for collision avoidance can be unhelpful and may even prove dangerous. In this instance, the radio communication delayed the manoeuvre and led to confusion between the bridge teams. Although it is useful in limited circumstances, VHF is not a collision-avoidance tool and must only be considered a navigation aid when it is appropriate to do so.

3. **Monitor →** Maintaining a safe watch starts before the lines are let go. Monitoring the automatic identification system (AIS) and listening to VHF messages can provide an early indication of potentially conflicting traffic. It was established after the incident that both ferries were transmitting on AIS and it would therefore have been straightforward for the outbound ferry's bridge team to plot the inbound ferry before getting underway.

4. **Action →** The inbound ferry did not communicate to harbour control that they needed to maintain headway for steerage and the strong breeze would have made waiting or loitering at the lateral buoy difficult. Maintaining a higher speed to reduce drift is sometimes necessary; however, actions contrary to harbour control's instructions should be communicated immediately to assess the impact on other traffic and maintain a shared mental model.

You nearly had your chips!

naval auxiliary vessel | fire

The crew on board a tanker had a lucky escape after switching on the galley equipment electrical isolators to start preparing for lunch. The supply breaker to the deep fat fryers (see figure) tripped while the equipment was heating up and the engineers were called to reset it.

Two of the deep fat fryers had no oil in them and their heating elements quickly overheated when the power supply was restored after the breaker was reset. The ship's alarm and monitoring system detected the excessive temperatures and the thermal protection tripped the deep fat fryers' power supply, but not before a fire had started.

The crew raised the alarm and used a fire blanket to quickly smother the flames. The ship's emergency team mustered, isolated the galley's power and ventilation supplies and confirmed the fire was successfully extinguished. No one was injured in the incident and there was no damage to the ship. The two deep fat fryers had been drained of oil for cleaning and the cause of the fire was found to be residual food scraps saturated with fat that had ignited when the fryers were switched on.

Figure: A clean deep fat fryer (top) and the deep fat fryers with residual food scraps (bottom)

The Lessons

1. **Isolate →** Turn off equipment and follow lock-out/tag-out (LOTO) procedures during maintenance and cleaning tasks. Make sure equipment is ready to go back into service when work has been completed.
2. **Signage →** Displaying a simple *do not use* notice on out of service equipment can improve safety and prevent careless mistakes.
3. **Check →** Circuit breakers, trip switches and fuses prevent electrical systems becoming overloaded or causing harm. Always check equipment before resetting its electrical supply to ensure all is well.
4. **Procedure →** Robust safety procedures and well-practised drills prepare crew to deal with the unexpected. In this case the rapid organised response to a small fire prevented injury to crew and serious damage to the ship.

Unforeseen fall

bulk carrier | accident to person

A bulk carrier was alongside in port late one afternoon. The cargo discharge had been completed and the second officer (2/O) and able seaman (AB) were standing on the midship port side catwalk, preparing for the loading of the next cargo by lowering the upper rails around the hold hatches (Figure 1). Once the rail was released, the rail would hang vertically downwards and allow the cargo to be loaded without interference from the rail.

The 2/O was leaning towards the unsecured rail when it suddenly started to fall outboard. The 2/O, who was not wearing a safety harness fixed to the catwalk, lost their balance (Figure 2) and fell about 3.5m to the concrete quay below. The 2/O was in hospital for more than 10 days, having broken both legs in an attempt to land on their feet.

Figure 1: Bolts being removed from a section of upper rail

For illustrative purposes only: not to scale

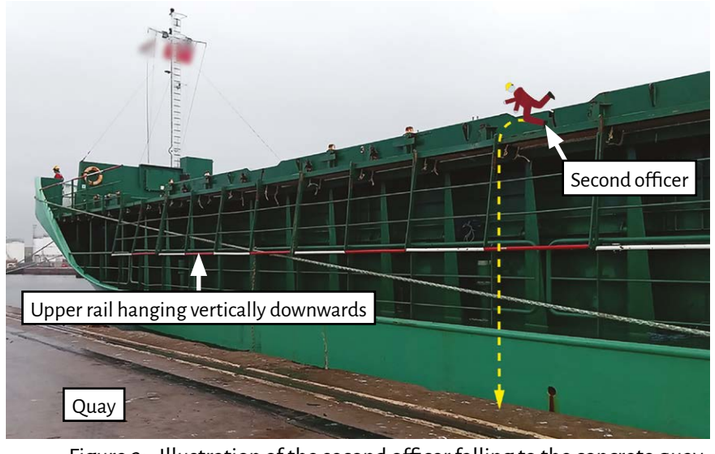


Figure 2: Illustration of the second officer falling to the concrete quay

The Lessons

1. **Procedure →** The shipboard risk assessment for this task required anyone working aloft or over the ship's side to wear a fall arrester. Following safety procedures increases the opportunity to identify hazards and determine what equipment or control measures are needed to mitigate them and keep people safe.
2. **Equipment →** A safety harness and appropriate restraint tether would have prevented the fall. Personal protective equipment (PPE) may be deemed uncomfortable to wear and will likely require adjusting to allow you to work effectively, but it is essential when carrying out high-risk tasks such as working at height.

Flash, bang, wallop!

container ship | explosion

A container ship was on passage. In the engine room, the electrician was pondering how to repair a fault with the ship's ballast water treatment system (BWTS), which needed to operate on arrival into port the next day. The power supply to the BWTS could not be reset, leading the electrician to believe the fault might lie with the circuit breaker. The defect only emerged after that morning's work planning meeting. The electrician started their investigation anyway, opening the panel on the main switchboard to gain access to the circuit breaker. The chief engineer (C/E) observed this and instructed the electrician to close the panel and refer to the electrical drawings to try to identify the source of the problem. A short time later the C/E found the electrician still working in the switchboard. Repeating the instruction to the electrician not to work inside the panel, the C/E went to eat lunch.

The circuit breaker was designed to be removed without the need to isolate the base unit (Figure 1); however, the electrician was unfamiliar with this arrangement and had loosened one of the live connections on the input to the base unit (Figure 2). The electrician used rubber gloves to insulate themself from the live 440 volt (V) alternating current terminals when working on the connections.

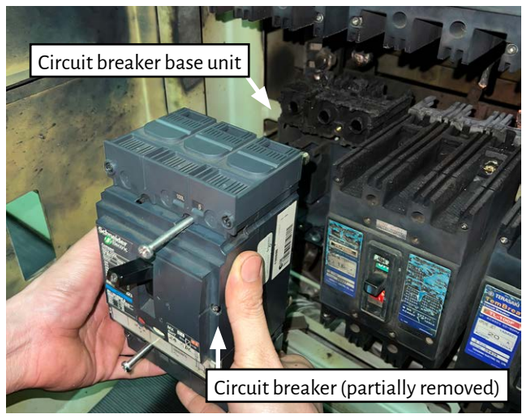


Figure 1: The circuit breaker arrangement

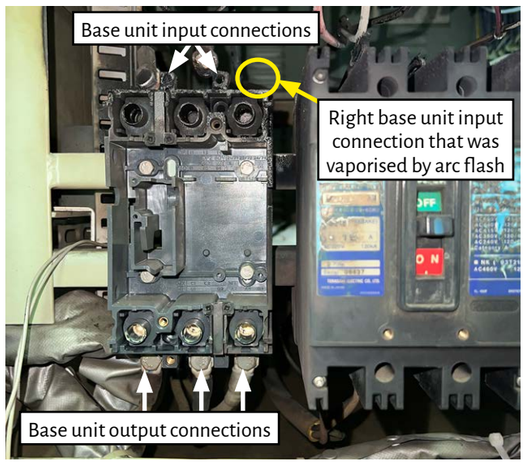


Figure 2: The base unit connections

After the C/E left the engine room, the electrician tried to reconnect the cables to the base unit using a socket extension on the head of the bolt and a spanner to hold the nut in position at the rear of the connections. As the electrician tightened the bolt on the live input connection, the nut rotated and the steel spanner touched an uninsulated copper conductor on the adjacent circuit breaker base unit. This caused a short-circuit between two phases of the switchboard (Figure 3).

The short-circuit caused a high current to flow, vaporising the copper conductor and part of the spanner in an arc flash creating extreme heat and blinding light. A burst of hot gas and molten metal exploded from the panel onto the electrician's face and chest (Figure 4).

The ship's engineers were alerted to a problem with the switchboard when the remote machinery alarm system sounded in the mess room. As the engineers headed to the engine room, the electrician arrived on the ship's bridge with serious burns to their face and chest. The following day, the electrician was transferred to hospital for medical treatment and later repatriated to recuperate at home. There was significant damage to the ship's main switchboard.

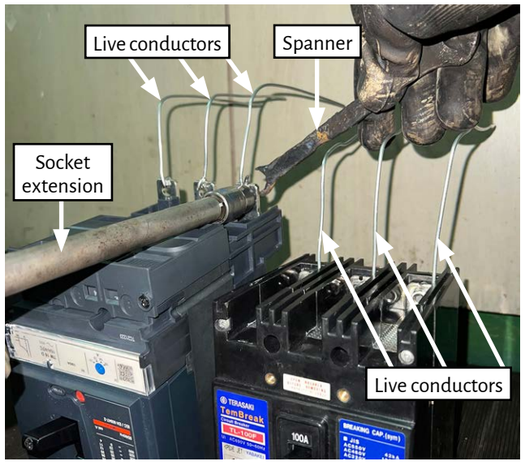


Figure 3: Reconstruction of the accident

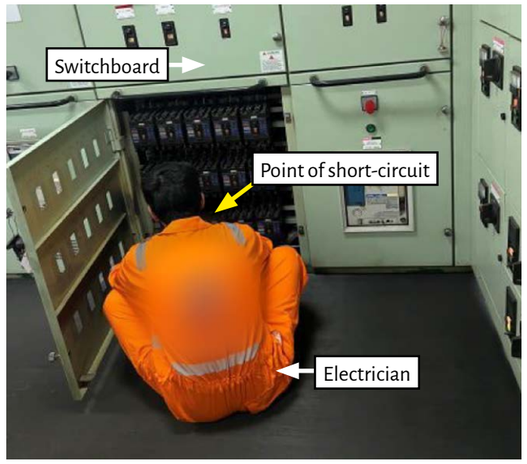


Figure 4: Position of the electrician

The Lessons

1. **Risk →** Taking the time to fully understand the arrangement of the circuit breaker and base unit assembly would have enabled the electrician to safely remove the circuit breaker and reduce the risk of injury or death to an acceptable level. The safest equipment to work on is that which is not live; in this case, the arrangement of the circuit breaker and base unit meant that it was unnecessary to disconnect the cables.

2. **Plan →** Working alone without a permit to work, LOTO procedure or agreed safe system of work increases the risk of an accident. The work was unexpected and therefore not included in the day's planning meeting. New work requires a new plan, regardless of time pressures. Maintenance or repairs to live equipment must undergo thorough risk assessment before starting work and, in all cases, should only be completed in exceptional circumstances and under the strictest control.

3. **Observe →** This accident was avoidable because there were opportunities to stop the work and reassess the risks. Everyone has a responsibility to be alert to what is happening around them and should feel empowered to intervene and stop any work that raises safety concerns.

4. **Equipment →** Working near live electrical equipment requires specific tools and PPE. The use of uninsulated tools while working in a live switchboard invited a short-circuit and the electrician, who was not wearing face protection, was lucky not to lose their eyesight in the accident.

Let down by the ladder

bunker tanker | pilot ladder

A pilot was embarking a moored bunker tanker via its pilot ladder in calm conditions. Once alongside the tanker, the pilot tested the ladder and then stepped onto it. As the pilot began to climb, the ladder suddenly dropped by over a metre and the pilot fell from it into the water (Figure 1).

Seeing the pilot fall, the pilot vessel's coxswain instinctively manoeuvred the vessel clear to avoid crushing the pilot between the two vessels. In the water, the pilot's auto-inflate lifejacket kept them afloat until they were safely recovered uninjured by the crew of the pilot vessel.

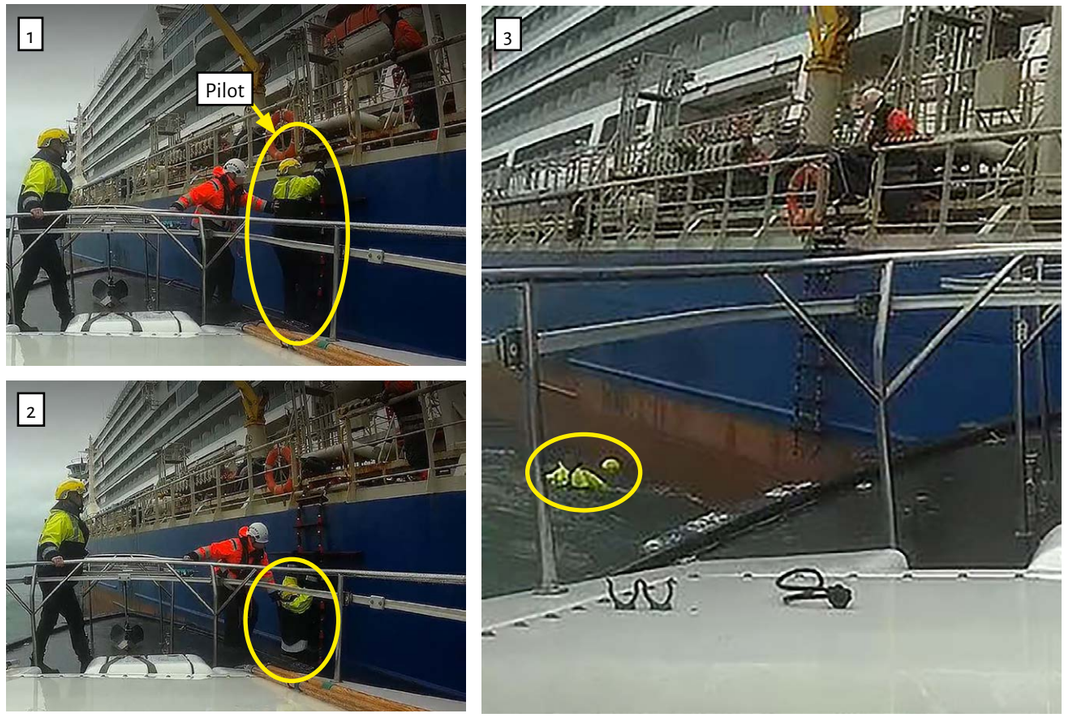


Figure 1: The fall sequence

The Lessons

1. **Check →** A responsible officer must check that the pilot ladder is correctly rigged and ready for use before the pilot boards. In this case a rung of the pilot ladder had become caught on a deck fitting and when the pilot put their weight on the ladder it unexpectedly dropped, causing them to lose their handhold and fall into the water.

2. **Equipment →** A post-accident inspection of the tanker's pilot boarding arrangements found that the tanker's guard rail handholds were more than 80cm apart and its boarding arrangements were therefore assessed as noncompliant with SOLAS[1] regulations. Figure 2 shows the arrangements at the time of the accident and after the owner's modifications to provide compliant handholds.

1 International Convention for the Safety of Life at Sea, 1974.

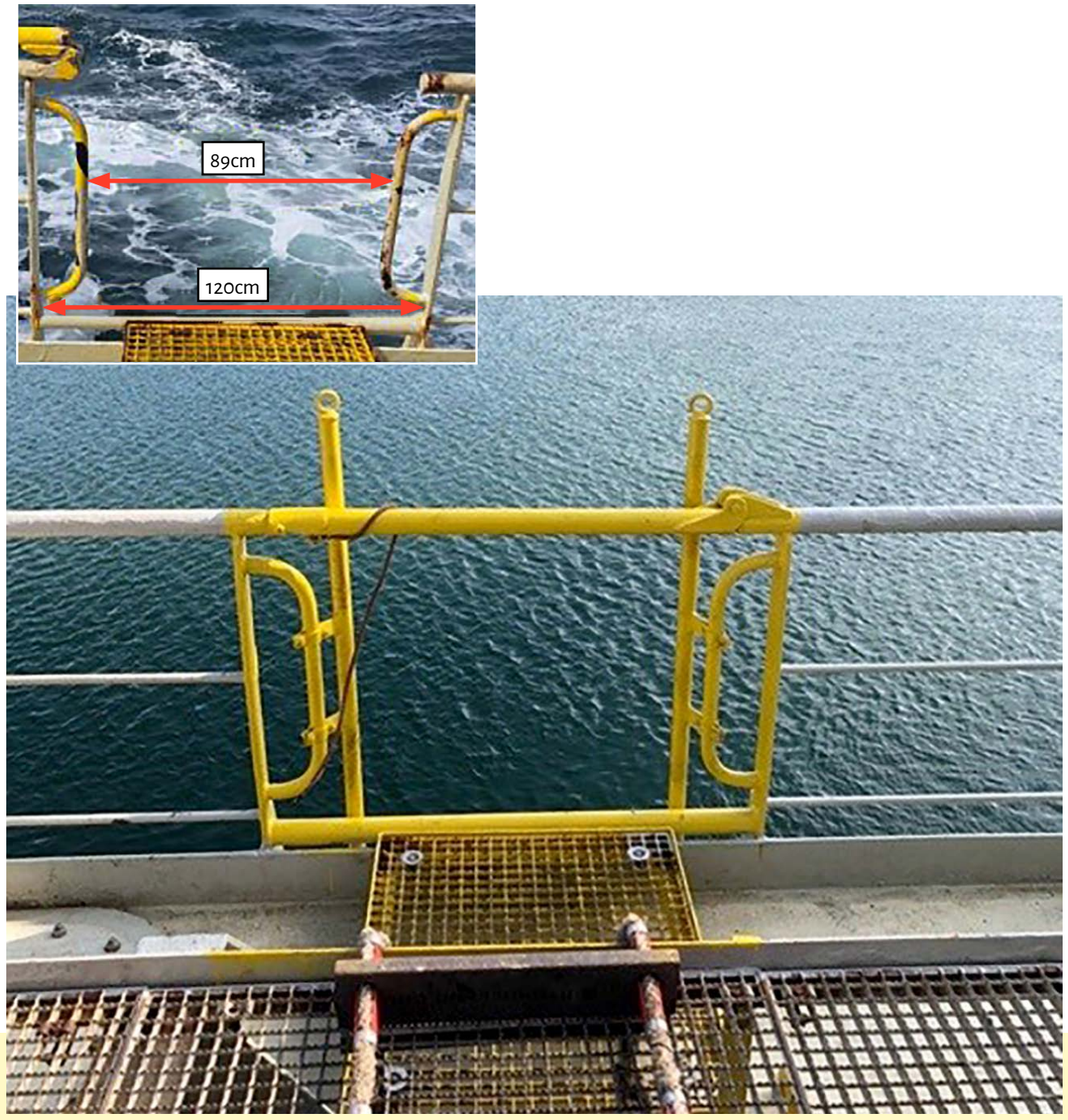


Figure 2: Guard rail gate at the top of the pilot ladder before (inset) and after modification to make it compliant

3. **Prepare →** Practice makes perfect. As soon as the coxswain of the pilot vessel saw the pilot fall, they manoeuvred the vessel clear of the tanker to allow the pilot to enter the water uninjured. Thereafter, the crew's well-drilled procedures ensured the pilot's safe recovery.

Close encounters

cruise ship and passenger ferry | near miss

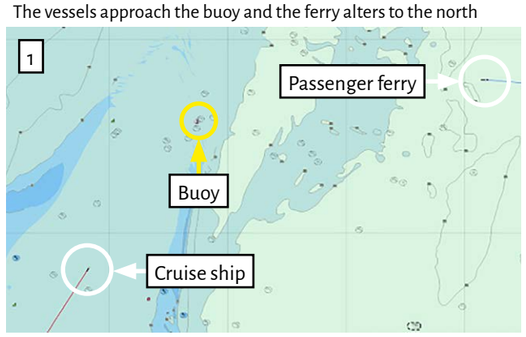
At just after midnight on a calm autumn night with excellent visibility, an outbound cruise ship and an inbound roll-on/roll-off (ro-ro) ferry passed 100m apart with a relative closing speed of 35 knots (kts), the equivalent of 5 seconds to a collision (see figures).

The cruise ship had disembarked its pilot and was heading north out of the harbour limits when vessel traffic services (VTS) contacted the officer of the watch (OOW) on VHF radio to make them aware of an inbound ro-ro ferry from the east. Both vessels were due to converge on the same north cardinal buoy at around the same time and the cruise ship's OOW announced their intentions to VTS to pass *port to port* with the ferry. This was heard by the ferry's OOW, who then made an alteration of course to the north to create more space for the cruise ship at the buoy.

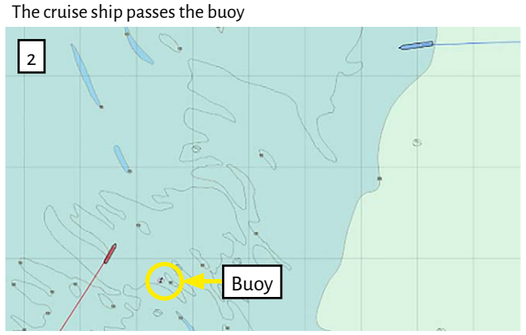
Expecting the cruise ship to alter course to starboard as it passed the north cardinal buoy, the ferry's OOW altered their own course to port to approach the channel. Confused by this, the cruise ship's OOW attempted to call VTS several times on VHF radio to request them to ask the ferry to come further to port and pass the cruise ship's stern. However, the first three VHF radio calls did not transmit due to a faulty call button on the radio handset.

The cruise ship's OOW eventually transmitted the message to VTS as the two vessels moved ever closer to each other. VTS passed the cruise ship's message to the ferry, which altered further to port in response. The cruise ship's OOW also made an alteration of course to port and passed closely ahead of the ferry.

The vessels approach the buoy and the ferry alters to the north

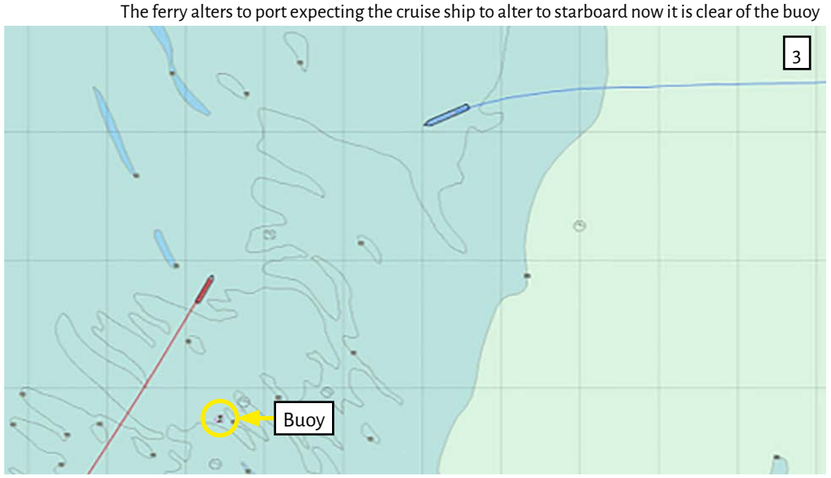


The cruise ship passes the buoy



Figures: The near miss sequence

The ferry alters to port expecting the cruise ship to alter to starboard now it is clear of the buoy



The vessels pass each other at approximately 100m apart

The Lessons

1. **Action →** Apply the COLREGs[1]. The ferry's OOW decided to alter course to port towards the channel based on an assumption that the cruise ship was going to alter to starboard. On seeing the ro-ro ferry altering to port, and the closest point of approach between the vessels start reducing, the cruise ship OOW's immediate action was to contact VTS for an intervention. While useful for increasing awareness of the movements and intentions of other vessels, the overreliance on VTS and VHF radio by the OOW led to a near miss with potentially devastating consequences. Avoid making assumptions on scant information, and remember that any action should be positive and taken in ample time.

2. **Plan →** Supplement bridge manning. The north cardinal mark was well-known as being navigationally difficult due to convergent traffic streams, but both bridge teams comprised only an OOW and a lookout. Voyage planning does not stop at lines on a chart; critical areas should be identified and, if necessary, arrangements made to supplement the bridge team with the master or another officer.

3. **Maintain →** Look after your equipment. The fault on the VHF radio handset was a known issue that the bridge team had not taken steps to rectify, rendering them unable to contact either VTS or the ro-ro ferry at a critical time.

1 Convention on the International Regulations for Preventing Collisions at Sea, 1972.

Cardinal sins

pilot boat | collision

On a fine summer evening, in slight sea conditions and good visibility, a pilot vessel headed out through the breakwaters. Once clear of the harbour, the coxswain set a course on the autopilot for the pilot station to disembark a local pilot and brought the pilot vessel up to its full service speed of 18kts. This was the first job of the night shift, a different pilot vessel having been used during the day. The two crew had conducted engine room checks before departure; however, no checks were completed in the wheelhouse and the chart plotter, radar and global positioning system (GPS) were switched off. Any equipment that had been switched on remained in dimmed night mode from the previous night shift.

COVID-19 social distancing measures meant that the deckhand was sitting further back in the wheelhouse rather than in their usual position next to the coxswain, by the conning position. As a result, the coxswain needed to turn and look aft to talk to the deckhand. The crew were engaged in conversation, and therefore distracted from their lookout duties, so they failed to see a cardinal buoy directly ahead; the pilot vessel made contact with it at full speed (see figure). Fortunately, there were no injuries.

Despite the significant collision the crew decided to carry on with their task and disembark the pilot. No damage assessment was carried out until after the pilot had disembarked the outbound vessel, and no radio contact was made with either local VTS or the pilot due to be disembarked.

The pilot vessel struggled to maintain 12kts at full throttle on its passage back to the pilot station, which was later found to be due to an issue with the starboard fuel pump that occurred during the collision.

Figure: The pilot vessel colliding with the cardinal mark

The Lessons

1. **Procedure →** The pilot vessel was unprepared to go to sea and the pre-departure checklist had not been followed. The radar, chart plotter and GPS units were turned off, and the equipment that had been switched on was still in night mode. Although checklists can be perceived as a nuisance, they exist for very good reason. Without navigation aids, the coxswain and deckhand were completely reliant on a visual lookout.

2. **Aware →** The visual lookout was ineffective. The weather conditions and visibility were very good and the pilot vessel was on a steady course, convergent with the buoy, for a considerable amount of time before the collision. Unfortunately, both crew were distracted by their conversation and did not see the buoy.

3. **Check →** The decision not to check for damage after the collision and proceed undeterred put the crew, vessel and disembarking pilot at risk. It is natural to feel embarrassed after an accident and perhaps want to sweep it under the carpet, but early communication can prevent escalation of the situation. The crew of the pilot vessel were very lucky to avoid a more serious outcome.

It dragged on and on

cargo vessel | near grouding

A general cargo vessel was preparing to depart port to allow another vessel to berth. The cargo vessel's master, having noted violent storms were forecast, sought advice about two local anchorages: one was nearby and free to use, the other offered better protection but was further away and incurred a cost. The nearby anchorage was selected and the cargo vessel proceeded to sea and dropped anchor close inshore. By the time the storm hit later that evening, three other vessels had also anchored close to the cargo vessel.

As the storm winds veered to the north-east the cargo vessel lost all shelter; it started to drag anchor and, 25 minutes later, was dangerously close to land on a lee shore. The master and crew fought hard for 2 hours to recover their anchor and proceed out to sea, during which the ship dragged southwards along the coast (see figure) and was within a few metres of grounding on several occasions.

The master managed to manoeuvre the cargo vessel into deeper water as the wind decreased slightly. With lifeboats in attendance, and at a safe distance from land, the crew eventually managed to recover the anchor and make passage to their next port. After an exceptionally tiring and perilous few hours, it was extremely fortunate that the vessel emerged unscathed and avoided being wrecked on the coast.

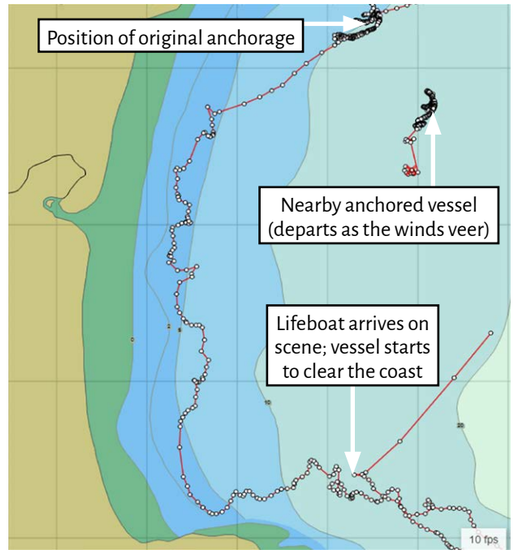


Figure: Plot showing the track of the cargo vessel as it dragged anchor along the shoreline

The Lessons

1. **Check →** Consider the weather forecast when selecting a safe anchorage. A change of wind direction can make a dramatic difference. The anchorage in this case initially afforded excellent protection from the storm winds, but left the vessel exposed as the winds veered around to the north-east as forecast. A lee shore is a dangerous place for a vessel to find itself caught.

2. **Plan →** Determine what alternative courses of action are available if it is not possible to remain at anchor during heavy weather. Potential solutions include veering more cable, deploying a second anchor or releasing the anchor entirely and proceeding to sea.

3. **Action →** It is sometimes better to stay at sea and heave to in the worst of the weather. The master and crew made an early call for help, worked the engines hard to prevent the ship grounding and were able to continue safely on passage when the weather subsided, but it had been a very close call.

The cost of administration

workboat | collision

It was another busy day of operations for a workboat at an offshore wind farm. Sailing early, the workboat was due to transfer two teams to carry out maintenance tasks on two different wind turbines. Equipped to push onto a wind turbine tower platform with its protected bow section, this catamaran workboat was well designed and allowed easy transfer of the maintenance crew to and from the wind turbine towers. The workboat's crew of master, mate and crewman were relatively new to the wind farm and still adjusting to local practices and their new contract. Having delivered the two work teams, the master found themself with some time to spare before the next scheduled job and decided to crack on with some paperwork.

The company's standing orders did not permit workboats to secure to wind turbine platforms during standby, nor to use autopilot while navigating through wind farms. Hoping that they would have time to complete the administration task, the master decided to set minimum power ahead and steam on a course between the wind turbines. Meanwhile, the mate was on the aft deck completing some familiarisation training and the crewman busied themself organising the on board stores. The master was working at the aft-facing chart table on the bridge, but had become engrossed in paperwork and lost track of time. The workboat was travelling at 5kts and, without the autopilot switched on, started turning slowly to starboard (Figure 1).

The master was shocked to see one of the wind turbine towers looming ahead when they looked up and turned to face forward. The collision happened before there was chance to react.

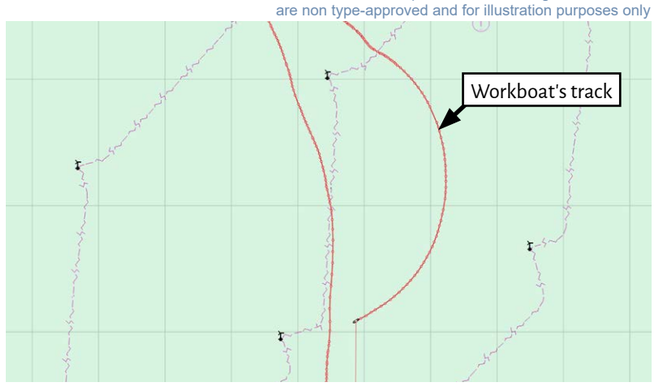


Figure 1: The navigational track of the workboat, showing its slow turn to starboard

Figure 2: The moment the workboat bow collided with the wind turbine tower platform

The workboat took the brunt of the impact on its off-centre protected bow section (Figure 2) and unsecured items were thrown forward across the deck as the vessel came to a jolting standstill. The crewman was thrown against a shelf and sustained two broken ribs. The master assessed the crewman's injury and the damage to the workboat and returned to harbour to evacuate the crewman for treatment at the local hospital. Fortunately, there was little damage to the workboat other than small dents and abrasions.

The master was left with a much larger paperwork mountain to climb.

The Lessons

1. **Procedure →** It is important to keep administrative tasks up-to-date, but crew and vessel safety remains the priority. Where paperwork must be completed, for example updating the bridge logbook while on watch, ask someone else to keep watch or post a lookout to maintain proper and effective visual navigation.

2. **Monitor →** The slow turn to starboard may not have been evident from the bridge windows alone and watchkeepers should monitor all available sensors and equipment to establish an accurate navigational overview. Regular checks of data from an Electronic Chart Display and Information System (ECDIS), rate of turn indicator, and directional gyro, etc. allows the watchkeeper to identify hazards and take preventative action to avoid an accident.

3. **Communciate →** Raise concerns if paperwork becomes unmanageable or imposed procedures interfere with best practice. Communication is a two-way process and constructive feedback about what works well and what could be improved helps people and organisations understand the impact of their decisions. It is important that vessel reports are submitted in a timely fashion; talking about the challenges faced at sea reduces the opportunity for conflict between compliance and safety.

10

A bit of a shambles

workboat | risk assessment

One bright spring morning, just before high water, a workboat berthed in a lock on its way to support diving operations in the adjacent dock. A small pulse of water entered the lock when the lock gates were opened; as a result, the workboat shifted on its slack moorings and the shore gangway started to twist (Figure 1). The master lost control while using the engines to reposition alongside and the workboat ended up at 90° to the lock walls. The gangway fell to the lock bottom (Figure 2). The workboat was eventually secured alongside and the gangway was recovered.

When the workboat went to lock out of the dock at the end of the day, the master was advised that the lock operator planned to substantially drop the water level in the lock (Figure 3). Language difficulties hindered the communication but, after several attempts, the lock operator received a positive acknowledgement from the master that they understood these intentions. However, the workboat's mooring lines were not adjusted as the water levels in the lock started to reduce and the workboat momentarily listed to starboard as some of the mooring lines became rigid (Figure 4). A deckhand used a knife to cut one of the breast lines to release the tension, causing the line to whip out and the vessel to jolt back onto an even keel (Figure 5). Luckily no one was hurt, either on the lock or on board.

The workboat returned to its home port without further incident.

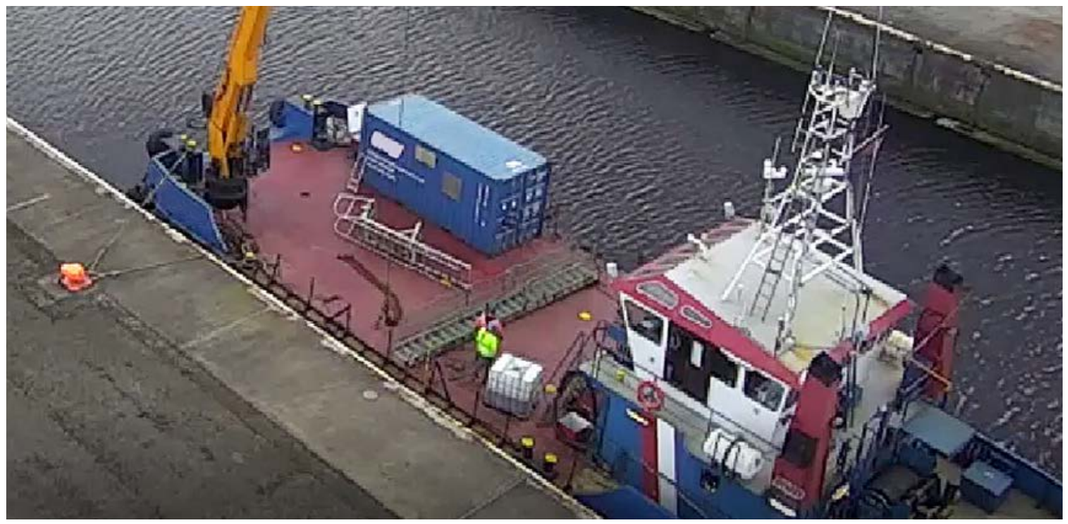


Figure 3: Locking out at the end of the day's work

Figure 1: The workboat loses control of the gangway

Figure 2: The workboat loses its gangway overboard

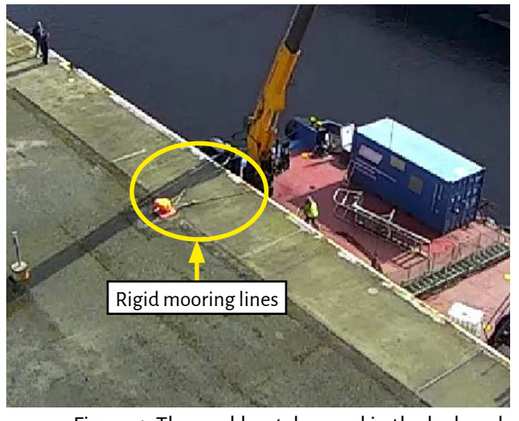


Figure 4: The workboat dropped in the lock and heeling over by 10°

Figure 5: A deckhand cuts the forward mooring line, returning the vessel upright

The Lessons

1. **Plan →** The rise and fall of water in a lock can be significant and pulses of water can occur when the lock gates are opened. This is a foreseeable event and those involved should plan ahead to assign individuals to manage the mooring lines and equipment to the shore. Untended lines can part with the risk of snapping back, which could easily result in serious injuries or damage to the vessel.

2. **Communicate →** The lock operator tried several times to communicate with the workboat master about water level changes in the lock. However, the master did not understand the message despite their positive acknowledgement. Effective two-way communication prevents accidents.

3. **Observe →** Vessel crews need to be alert to emerging problems. The mooring lines did not suddenly become rigid and the issues at the gangway happened over time. Crew vigilance is vital to maintain safety and prompt actions reduce the risk of significant problems. At times, personnel ashore were watching what was happening and closed-circuit television (CCTV) captured the events. Active bystanders and security staff monitoring CCTV can also make positive contributions to safety and warn of developing situations.

4. **Risk →** The risk to people takes priority over damage to equipment. The crew struggled valiantly to save the gangway before it fell to the bottom of the lock, risking their own personal safety when it may have been better just to let the gangway go and stay safe.

Getting in contact

tug | fire

A tug was being prepared for the day's operation when it lost all electrical power as the master pressed the main engine start button from the wheelhouse. An engineer went to the engine room and reset the main 24V direct current (DC) circuit breaker and alarms to restore power. The engineer attempted to start the engine locally and the tug once again lost all electrical power.

The engineer opened the 24V DC control panel and found that a small fire had ignited around one of the interior insulated brackets. The engineer isolated the panel and used a carbon dioxide fire extinguisher to put the fire out. The damage to the equipment was limited, but another tug needed to be mobilised to undertake the day's planned work while repairs were carried out.

The cause of the fire was traced to an unsecured wire inside the 24V DC control panel, which was touching the copper busbar that supplied starting power to the main engine. Over time, vibration had caused the insulation surrounding the unsecured wire to wear through until the wire's conductor made contact with the busbar. The powering up of the circuit caused a short-circuit and conducted a massive current. The circuit breaker protecting the system opened and interrupted the circuit when the master pressed the start button, and this was repeated when the engineer reset it and tried to start the engine again. The unsecured wire was not designed to withstand such a high current even for a short time and rapidly heated up, burning away its remaining insulation and starting a small fire (Figure 1).

An inspection of the 24V DC control panel found several other unsecured wires (Figure 2), demonstrating that the risk remained for a similar event to happen again.

The tug owners arranged a check of all control cabinets and any identified loose wires were properly secured.

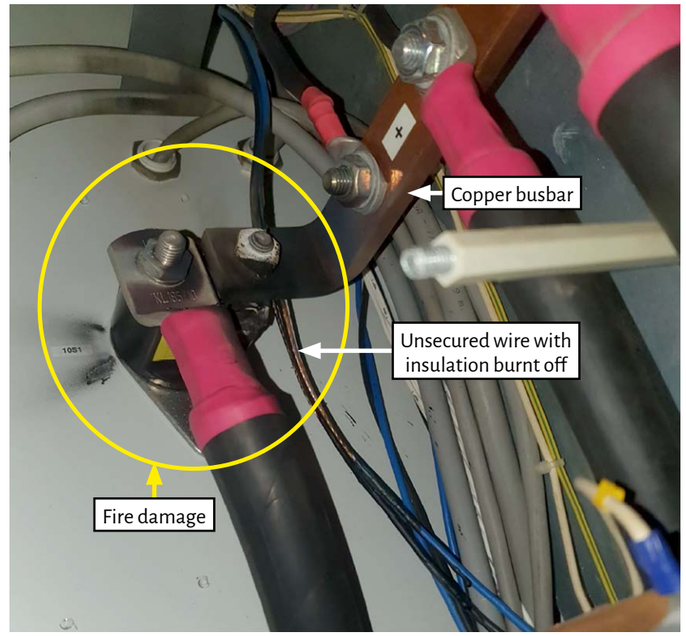


Figure 1: The burnt wire

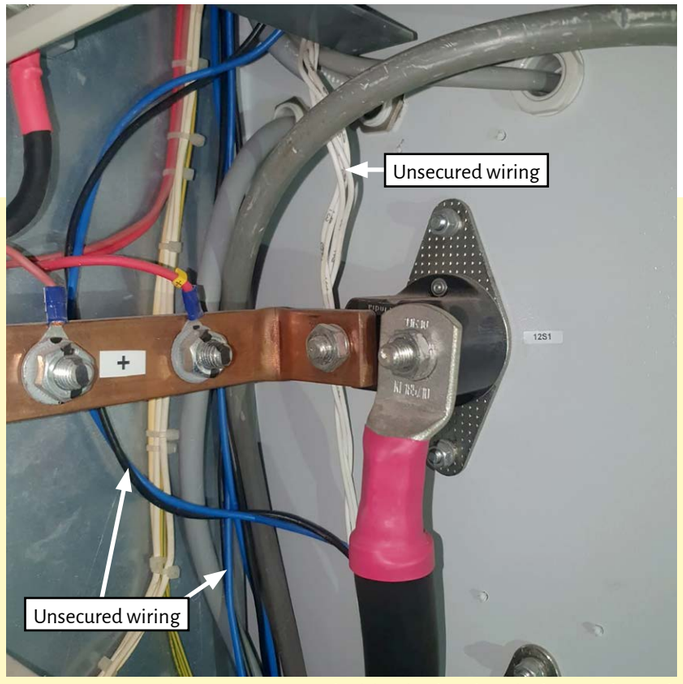


Figure 2: Unsecured wiring in the electrical control panel

The Lessons

1. **Check →** Circuit breakers and fuses generally trip for a reason. A quick check of equipment and wiring before resetting breakers can help avoid problems.

2. **Maintain →** Electrical wiring is more than just a means to transfer power from A to B. Wires must be securely fastened to prevent them rubbing against anything that could damage the protective insulation covering the inner conductor. Make sure new wiring is routed correctly, secured to cable trays and clear of any hard edges.

3. **Action →** During inspections of electrical panels engineers should be aware of the risk posed by poorly supported wiring and loose connections and take appropriate action to reduce it to a safe level: find it, isolate it, secure it.

4. **Risk →** An electrical system does not require high voltage to be dangerous; this case demonstrates that a short-circuit in a 24V DC power supply is able to start a fire and serves as a cautionary tale for all vessel operators, commercial or otherwise.

Bump and grind

passenger ferry | collision

A ro-ro ferry was attempting to berth in a small northern European port at night in high winds. The three operational linkspans at the ferry port required vessels to moor stern to and another ferry occupied the middle linkspan (Figure 1). As the ferry entered the harbour the wind was blowing from the west at about 35kts, which met the company's upper wind limit for permissible berthing. The ferry had to perform a 180° turn within the harbour to enable it to back onto its intended linkspan.

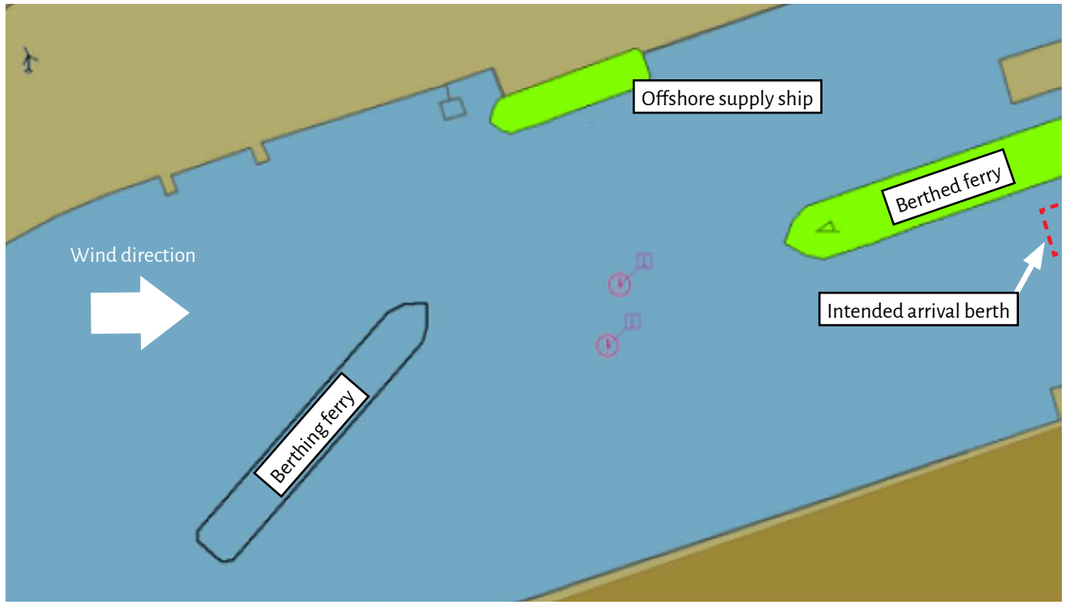


Figure 1: The ferry on approach to its intended linkspan

The wind increased to around 60kts as the ferry began to turn, pushing it very close to an offshore supply ship berthed on the northern breakwater inside the harbour. The crew of the ferry used the bow thruster and main engines to hold the vessel up into the wind, but the force was too strong for the vessel to hold position while positioned fully beam on to it. The ferry was blown eastward toward the ferry already berthed in the middle linkspan and the two vessels collided, the moving ferry hitting the bow of the stationary ferry with its starboard shoulder (Figure 2).

The damage to both vessels was assessed and the incoming ferry departed the harbour and anchored until the wind abated; it berthed later that evening without further incident.

Figure 2: The two ferries just before the collision

The Lessons

1. **Margin of safety →** This case highlights the delicate balance between maintaining schedules and ensuring the safety of vessel operations. While it may be necessary to make timely decisions to enter a harbour or berth in challenging weather conditions, it is crucial to carefully assess the risks and take appropriate precautions. It is important for masters and operators to closely monitor weather forecasts, adhere to established company limits for vessel operations and exercise prudent judgment when making decisions that could affect the safety of the vessel and its crew and passengers.

2. **Communicate →** Effective communication between the master, crew and shore personnel is essential: crew members should be vigilant and ready to respond to changing weather conditions; the master should be prepared to alter plans or delay entry into a harbour to ensure the safety of the vessel and its occupants.

3. **Action →** It would have been foolhardy to attempt to berth the vessel in the increasingly strong winds and the master of the incoming ferry made the right decision to go to anchor following the collision. This allowed both crews to undertake a full assessment of the damage to their vessels and provided essential thinking time to appraise the situation and take appropriate action to berth safely in harbour when the winds subsided.

13

Cry wolf

passenger ferry | fire

The master and crew of a high-speed passenger ferry had prepared for the day's scheduled runs. Shortly after starting the ferry's engines, and on the first run of the morning, the starboard engine space fire detection system alarm activated. The master slowed the ferry and checked the engine space CCTV but could see no signs of smoke or flames. The detection system was reset and the master increased the speed of the ferry and continued on passage.

A while later, the starboard engine space fire detection system alarm activated again. The master again slowed the ferry, checked the CCTV and could see no indication that anything was wrong. The fire alarm system was reset, and the ferry continued on passage. After a third occurrence, the master requested an engineer to check the fire detection system. The engineer found nothing wrong with the system and reported there must be an intermittent fault with the starboard engine space fire detection system. In response, the master isolated the starboard engine space fire detection system and resumed the day's scheduled runs.

Later, the master observed smoke and flames in the starboard engine space on the CCTV and immediately shut the starboard engine down and instructed crew to close the ventilation flaps for the area (Figure 1). The master then activated the fixed fire-extinguishing system, raised the alarm with the port's harbour master and brought the ferry alongside the nearest berth, manoeuvring on one engine. Once alongside, the passengers were disembarked and the master was met by the local fire brigade. There was no sign that the fire in the starboard engine space had escalated and the engine space remained sealed. After some time, the engine space's CCTV indicated that the smoke had cleared and the external temperature of the space had returned to ambient. One of the hatches to the space was carefully opened and it was confirmed that the fire had been extinguished.

The ferry's engineers found scorched lagging around the main engine turbocharger, along with signs that paint and oily debris had ignited on the engine (Figure 2). This happened because the exhaust inlet casing to the turbocharger had fractured, allowing hot exhaust gases to encroach the lagging and the engine.

The turbocharger inlet had become fractured by excessive movement of the engine on its mounts. This had happened over time because the engine's fixed stays and some support brackets had sheared off through vibration and stress (Figure 3).

Figure 1: CCTV still showing smoke in engine space

Figure 2: The seat of the fire (glowing orange)

Figure 3: Fractured engine support

Figure 4: Fractured bracket and missing bolt

The Lessons

1. **Check →** Fire detector alarms activate for a reason – never assume it is a fault. Fire detection systems are designed to be reliable and fault-free and most will have a self-diagnosis and fault alert built into the system to differentiate between a fire detector head alarm and a system fault. In this case, the fire detector head had activated due to the release of hot exhaust gases from the engine and initial scorching of the lagging. This happened before the signs of the fire were visible on CCTV and after the system had been isolated. It was fortunate that the master spotted the fire on the CCTV in good time and took correct action to extinguish it and keep crew and passengers safe.

2. **Maintain →** A thorough inspection of an engine during routine maintenance is essential for its safe operation. Check fittings are secure and fit for purpose, replace missing components and report, repair or replace fractured engine supports or brackets before further damage occurs (Figures 3 and 4).

3. **Action →** The swift and measured response by the master prevented the fire escalating and causing serious damage to the starboard engine space. The risk of the fire being reignited was also removed by the master's prompt actions to activate the fixed firefighting system after closing the ventilation flaps and keep the space secured until the fire had been extinguished and the boundary temperature reduced to a safe level.

See and be seen?

passenger ferry | accident to person

A stevedore was fortunate to escape with a fractured leg after being run over by a forklift truck on the stern ramp of a ro-ro ferry.

The ferry's staff were responsible for simultaneously supervising the offloading of cars and palletised cargo, which was undertaken using forklift trucks driven by stevedores. After the cars had been offloaded the crew prepared to back load excavators onto the ro-ro's deck, a process that required the positioning of lengths of heavy rope on the stern ramp. At the same time as two stevedores lifted the first length of rope and were moving it across the centre of the stern ramp, a forklift truck with a pallet of slate was being driven off the ferry (see figure).

The forklift truck driver did not see the stevedores on the stern ramp and the stevedore nearest to the approaching forklift truck was standing with their back to the ferry and did not see the oncoming forklift truck. The forklift truck driver was wearing ear defenders and did not hear a shouted warning from the crew in time to prevent the forklift truck striking the stevedore on the leg, causing multiple fractures.

Figure: Forklift truck and stevedores on ramp

All cargo operations were halted and immediate first aid was administered to the injured stevedore. The emergency services were called, and the stevedore received hospital treatment for their injuries.

This accident was both foreseeable and preventable given the frequency of accidents involving pedestrians and vehicles on vessel stern ramps.

The Lessons

1. **Hazard →** The accident happened because the stevedores moving the ropes were standing on the stern ramp at the same time as vehicles were being driven across the ramp. The forklift truck driver did not see the stevedores as the direct line of vision ahead was obscured by the palletised slate loaded onto the forklift truck and the driver expected that pedestrians would keep clear of moving vehicles. The stevedores were oblivious to the approaching forklift truck as they had become accustomed to working near moving vehicles. The strategy of *see and be seen*, with the onus on pedestrians to keep out of the way, was flawed as it did not account for a driver's restricted visibility or stevedores becoming distracted by the task. Industry codes of practice require that pedestrians and vehicles remain segregated by appropriate means.

2. **Procedure →** A system of control should have been established in the absence of a physical barrier to segregate pedestrians and vehicles and to prevent the requirement for people to be working on the stern ramp during loading and discharge operations. Such measures could include the safe positioning of a dedicated person near the stern ramp to control pedestrian and vehicle movements, or the introduction of a more complex system using technology to separate vehicles and pedestrians.

3. **Communicate →** Crew and shore staff must understand the risks involved in cargo loading and discharging operations. It is essential that those who supervise and manage these activities also work together to identify conflicts between each other's documented safety management system and reduce these to a safe level for all involved.

Learning the ropes

passenger ferry | accident to person

On a dark, blustery winter's morning a harbour ferry was leaving its overnight berth, where it had been secured using fixed length, double-eyed mooring ropes.

In preparation for getting underway, the ferry's master used the engines to move the vessel ahead to release the tension on the forward mooring rope. The master assessed that there was sufficient slack in the mooring rope and, once satisfied, gave the order for the trainee crew member to let go the on board end of the rope (see figure). The vessel surged astern as the crew member was lifting the eye clear and their hand was trapped between the rope and the bollard, crushing one of their fingers.

The ferry's crew quickly raised the alarm and the master regained control of the vessel, which allowed the crew member to release their hand. The casualty was taken to hospital for treatment and subsequently was signed off work for several weeks.

For illustrative purposes only: not to scale

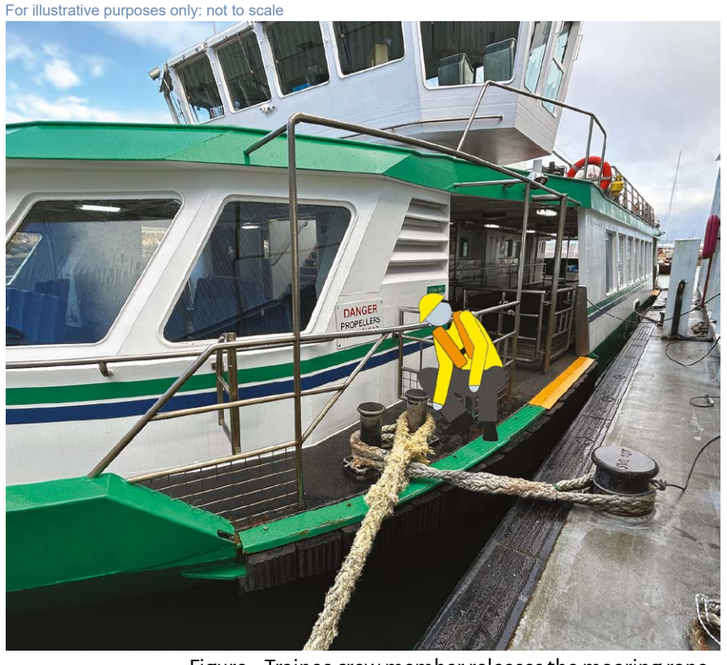


Figure: Trainee crew member releases the mooring rope

The Lessons

1. **Plan →** Plenty of slack must be applied to the mooring rope before crew attempt to remove it from the bollard. Unfortunately, the weather conditions in this case caused the vessel to surge astern, tightening the rope and trapping the crew member's fingers between the rope and the bollard. A rope pennant fitted to the mooring eye would have removed the need for the crew member to place their hand in danger during this routine, but high-risk, evolution.

2. **Communicate →** The injured crew member was able to quickly release their hand and received prompt medical treatment thanks to the ferry crew's efficient response to the emergency and their effective actions.

16

The gravity of the situation

research ship | accident to person

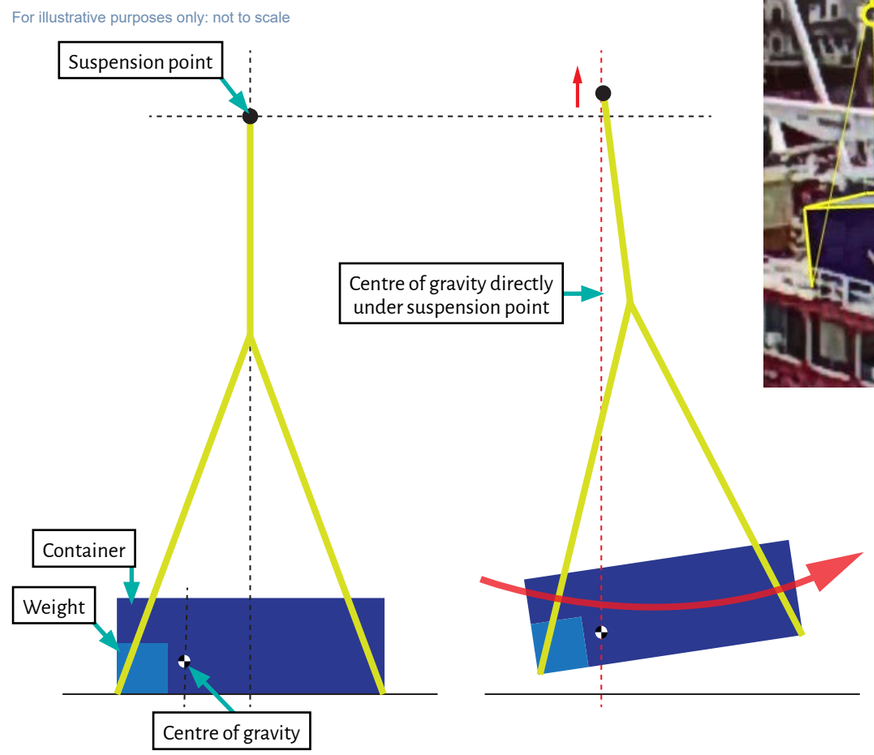
A research ship was unloading in port following its arrival from overseas and its crew had made a plan to offload a 20ft open-top container, which was filled with various pieces of equipment. A mobile crane on the jetty was being used to unload the ship; the crew prepared the lifting gear and attached four chains to the crane hook from the lifting lugs at each corner of the base of the container.

Three crew members were involved in the lift: the lift supervisor and banksman were positioned at the aft end of the container and the slinger was standing at the forward end. As the container was lifted it came clear of the twist locks that were securing it to the deck and rapidly swung aft and inboard. The lift supervisor was able to move out of the way, but the banksman suffered crush injuries when they were pinned between the container and the ship's handrails.

Nearly 8 tonnes (t) of weights had been stacked in the back corner of the container when the equipment was originally loaded into the container (Figure 1).

When an unbalanced load is lifted, it will naturally swing to put its centre of gravity directly under the suspension point. Such a load will also alter the share of the weight that each part of the lifting gear bears. In this case, the imbalance from the stowed weights caused the container, which weighed more than 16t in total, to swing towards the banksman. There was nothing the crew could do to stop its movement (Figure 2).

Figure 1: Weights loaded in container



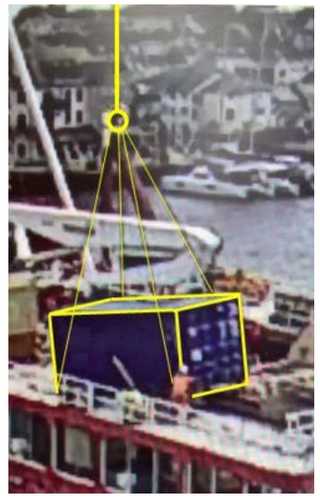


Figure 2: Effect of unbalanced load on lifting operation and (inset) CCTV still, showing container position following lift

The Lessons

1. **Plan →** The distribution of load is as important as the total weight when preparing a lift and its effect on the lifting operation should be carefully considered in the total lifting plan. In this case, neither the crew on board nor the crane driver were prepared for the swing that the unbalanced load caused when the container was lifted.

2. **Risk →** Always have an escape route. While it goes without saying that a 16t swinging weight presents a huge hazard, make sure you stay alert and keep well clear of any suspended load just in case something goes wrong.

3. **Equipment →** There are occasions when an unbalanced load will need to be lifted. To facilitate this, you can either use slings of different lengths to lift the load directly above its centre of gravity or a spreader beam to evenly distribute the weight and make sure the load is lifted vertically.

FISHING VESSELS

Accepting responsibility for your actions can sometimes become painful in more ways than one.

Having served for 25 years in the Royal Air Force Fire and Rescue Service and a further 7 years in Afghanistan training and mentoring local firefighters on behalf of NATO, I decided I needed a new challenge. My career had been interesting to say the least, but the time had come to retrain myself and take on a new skill to stay motivated. Some of my family had been fishermen in Cornwall all their lives so I bought a small commercial fishing boat and set about learning how to fish from Porthleven Harbour.

I completed the mandatory STCW[1] Basic Safety Training courses in sea survival, first aid, health and safety, firefighting and safety awareness and accident prevention. I then decided to undertake further training to gain my Seafish Under 16.5m Skipper's Certificate. My military service furnished me with a risk v. benefit approach to many situations that, combined with constant training, good quality safety equipment and PPE, had enabled me to manage risks and make safe decisions in hostile and austere environments. However, working at sea as a solo operator was a steep learning curve and I made many mistakes along the way.

A couple of years on, and having so far avoided putting myself in any danger, I was becoming more confident in my abilities at sea, all my actions now routine and well-practised. Unloading my fish in Porthleven Harbour was a bit of a rigmarole; the landing crane had been unserviceable for many years so I would tie up on the slipway to unload my catch and then steam back to my mooring, shut the boat down, drive around to the slipway, load my catch into the van, bring the fish back to the ice room, ice it up and then take it to Newlyn fish market.

I was running a bit late at sea one evening and came back to Porthleven on a high tide with a few 20kg boxes of mackerel. To save a bit of time and effort I put the boat on the mooring and, by standing on the bow, was able to offload the mackerel straight onto the quayside about 2ft above me. This slightly risky behaviour became normal practice for me on quite a few occasions when the tide was high, so much so that after a while I stopped seeing the risk.

The outcomes could have been much worse had I not been wearing a lifejacket

A few months on, I was carrying out the same routine when it all went wrong. While lifting a box of fish onto the quayside and overreaching to push it onto the quayside, the inevitable happened and the boat moved away from under my feet and I fell headfirst off the bow and into the water: I was wearing heavy clothing, oilskins and boots and went straight down beneath the surface. The saving grace for my stupidity was that I always wear a lifejacket, which automatically inflated and brought me back up to the surface before I even realised what was happening. My chest was in agony, my boat was floating around in the harbour and my box of fish was back in the sea. I managed to get the boat back and tie it up properly on the mooring, after which I had to climb the vertical ladder to get myself onto dry land. As I lay on the quayside my chest pains were getting worse and I could hardly move. This all happened as the light was fading and I am surprised that no one in the village heard or witnessed my drama.

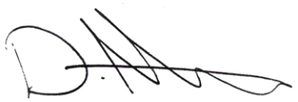
Thinking I was having a heart episode I got myself into my van and drove 11 miles to the nearest accident and emergency department, where the hospital staff hooked me up to an electrocardiogram that measured my heart's currents and showed there were no issues. A subsequent chest X-ray determined that my chest pains were caused by a severely bruised sternum, which is when I realised that I must have fallen onto the bow roller as I went overboard.

On reflection, my actions to save a bit of time and effort had: wasted the time and money of the National Health Service and its staff; cost me a day's income when my catch fell from the quayside; incurred expense associated with having my lifejacket serviced and replacing its inflation cylinder; and required me to take 5 days' sick leave from work. The outcomes could have been much worse had I not been wearing a lifejacket.

No one witnessed my accident; however, I felt the right thing to do was report it as a man overboard incident via the SafetyFolder so that, in becoming a statistic, the consequences of my behaviour will, I hope, encourage others to review the risks involved in their own processes and prevent future occurrences.

Alongside my commercial fishing activities I now teach STCW Personal Survival Techniques, Fire Fighting and Fire Prevention and Proficiency in Security Awareness courses. As you will read in the pages that follow, it is often the human behaviour leading up to an emergency situation that influences the severity of the event and its outcome, which is why I use my story to reinforce the importance of a safety-minded culture among students from the start of their seafaring career.

On a daily basis, I hear the coastguard coordinating daily rescues and maritime events on VHF and when I read through the cases published in the MAIB Safety Digest it is apparent that fishing fleet incidents regularly happen due to the nature of the job. However, I would encourage you all to share individual experiences and drive improvements in safety so that a consistently downward trend in accidents can be achieved across the maritime sector.



DUNCAN MURT | Owner/skipper of the *Tudor Rose* and STCW Marine Instructor

Duncan was brought up in St Ives, Cornwall, where he was surrounded by fishing boats, one of which – *Castle Wraith* – was his grandfather's, but he never went fishing and instead joined the Royal Air Force (RAF) as an aviation firefighter. On leaving the RAF, and while serving as a fire officer on behalf of The North Atlantic Treaty Organization (NATO), Duncan bought a small commercial fishing boat and started to learn to fish on a part-time basis. To further develop his knowledge and skills, he worked as an ad hoc deckhand on board the larger vessels operating out of Newlyn, Cornwall, and has adopted a sustainable approach, with 90% of his activity dedicated to potting and line-caught methods.

Duncan has been a part-time STCW course instructor for the past 2 years, mainly teaching superyacht crews. His fishing vessel is moored in Porthleven, Cornwall and operates within local inshore waters from St Michael's Mount to the Lizard Peninsula. To date, Duncan has rescued a boat with two people on board that was about to be washed onto a reef and towed four boats back to port due to breakdowns.

1 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978.

Say hello, wave goodbye

catamaran | man overboard

Early one grey and blustery spring morning, a small catamaran fishing vessel issued a distress alert after one of its three crew was washed over the stern in 2m swells as the vessel arrived at local fishing grounds.

The two deckhands had waved to the skipper as they passed by from the wheelhouse and went out onto the deck. One positioned themself forward and the other aft, by the shooting hatch (see figure). Suddenly, the deckhand stationed aft was overcome by a large wave and pulled under the safety rail and through the shooting hatch into the open sea. The deckhand quickly surfaced following the activation of their inflatable lifejacket.

The vessel's skipper did not see the deckhand go overboard; however, the crew of the fishing vessel operated a buddy system and the second deckhand had witnessed their crewmate go overboard and had swiftly thrown a life ring to them and raised the alarm. The skipper promptly initiated the emergency response plan and manoeuvred the vessel astern towards the deckhand in the water. The skipper then assisted the second deckhand to recover their crewmate back on board through the shooting hatch opening. The casualty spent 2 minutes in the water and fortunately suffered no ill effects.

For illustrative purposes only: not to scale

Figure: Deckhand's position at the shooting hatch

The Lessons

1. **Practice →** The crew regularly practised drills and so acted calmly and followed the vessel's manoverboard procedure. Drills help crew members become familiar with emergency procedures and equipment to assist a quick and effective response in the event of a real situation, improving the safety of everyone on board.

2. **Teamwork →** The use of a buddy check system to keep an eye out for each other meant that the crew were able to react quickly and prevent escalation of the emergency. The ability to identify potential hazards or risks and take steps to prevent accidents helps ensure that everyone stays safe and encourages a culture of effective teamwork on board.

3. **Hazard →** Prevention is better than cure. Consider alternative preventative safety measures when working on open and wet decks near openings or railings, such as positioning on deck and the use of safety harnesses and lanyards where possible. MGN[1] 571 (F) *Fishing Vessels: Prevention of Man Overboard* provides guidance on the importance and benefits of conducting dynamic risk assessments to mitigate hazards.

1 Marine Guidance Note.

From the ashes rise the roses of success

fishing vessel | fire

A fishing vessel was on a routine day trip when the peace was shattered by the sounding of the engine room smoke alarm. The crew went to investigate and found smoke emanating from a new alternator they had recently fitted to the engine. Despite their attempts to tackle it with portable extinguishers, the fire raged on and the crew were unable to reach the fuel supply shut-off valve (see figure) to stop the engine.

Thick smoke filled the engine room and the crew evacuated, closing the door as they left. From the safety of the upper deck the crew activated the fixed firefighting system and sent a distress message via the vessel's Global Marine Distress and Safety System (GMDSS). The engine was stopped and, with the fire appearing to be extinguished, the crew checked their lifesaving equipment and prepared for the vessel to be taken under tow. They continued to monitor the temperature of the engine room boundaries but, fearing the risk of reignition, did not re-enter the engine room.

The vessel lost all power but was towed back to harbour. Aside from some coughing due to the effects of smoke inhalation the crew were uninjured by the accident. The engine sustained minor smoke damage and the alternator was destroyed, but it was not long before the fishing vessel was repaired and returned to service.

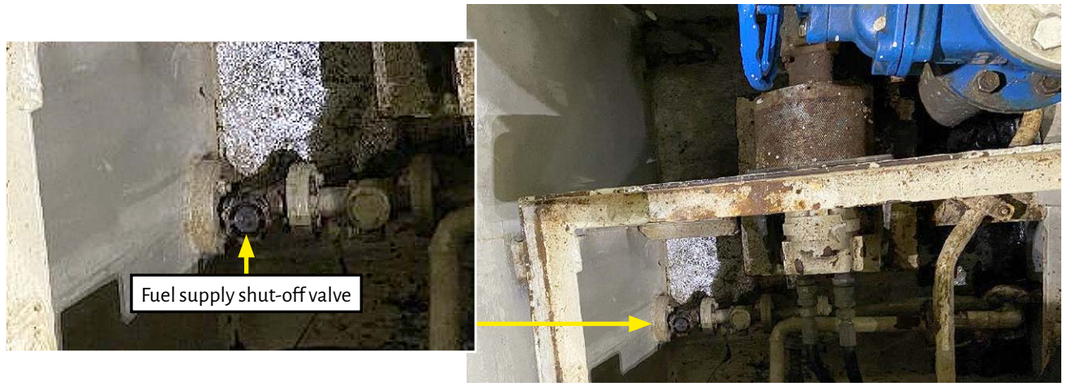


Figure: Fuel supply shut-off valve

The Lessons

1. **Action →** Accidents can and do happen. The crew were aware of the risks of an engine room fire, smoke inhalation and reignition; consequently, they withdrew quickly to assess the situation. Their prompt actions to activate the fixed firefighting system, relay the distress message and keep the engine room locked down afforded the crew and the vessel the best chance of survival.

2. **Equipment →** In an attempt to save money the owner had fitted a poor-quality alternator, which was replaced with a genuine spare part following the accident. Never be tempted to cut corners when repairing a vessel; the consequences can be expensive and could prove to be fatal.

3. **Revise →** The vessel's owner realised that, although compliant, the location of the remote fuel shut-off valve had made it difficult for the crew to manage the fire. A remote engine fuel shut-off valve was subsequently installed in the wheelhouse on advice from a surveyor. The safety of the vessel was improved by the owner's proactive approach to reviewing and learning from the accident.

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Cold water? Shock!

single-handed creel | fatal accident

In the early hours of a cold and clear morning, the skipper of a single-handed creel vessel (Figure 1) set off for a day's fishing. They spent the next few hours recovering and shooting strings of creels a couple of miles offshore, in their regular fishing grounds.

A fleet of creels became tangled during the shooting operation and the skipper moved aft on the vessel's working deck to attempt to unsnag them. As they did so, their boot became caught in the fishing gear and they were pulled overside as the fleet of creels entered the water through the shooting door (Figure 2). The skipper's personal flotation device (PFD) automatically inflated on contact with the water, keeping them afloat and their face clear of the water. However, the skipper did not have an easy means by which to reboard their vessel and no method to raise the alarm while in the water and they succumbed to cold water immersion.

The unresponsive skipper was later recovered by the Royal National Lifeboat Institution and declared deceased.

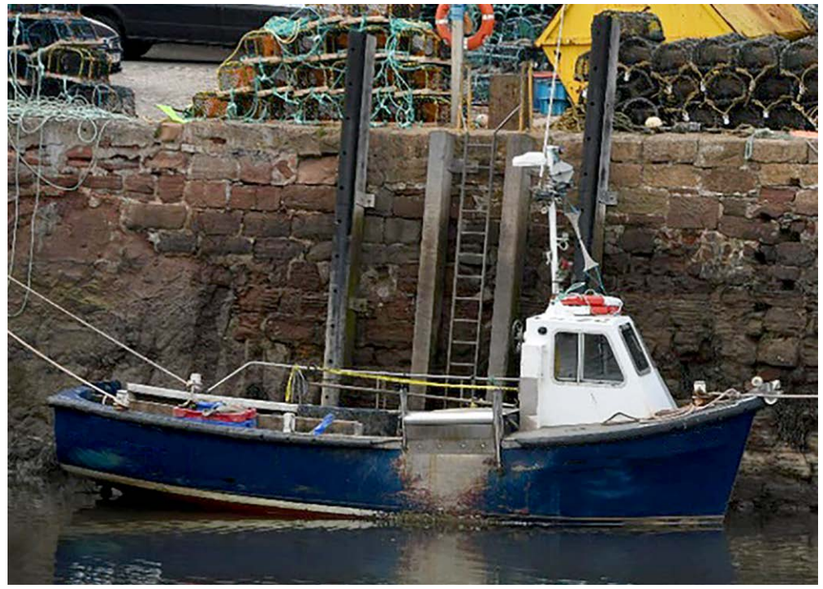

Figure 1: The single-handed creel vessel

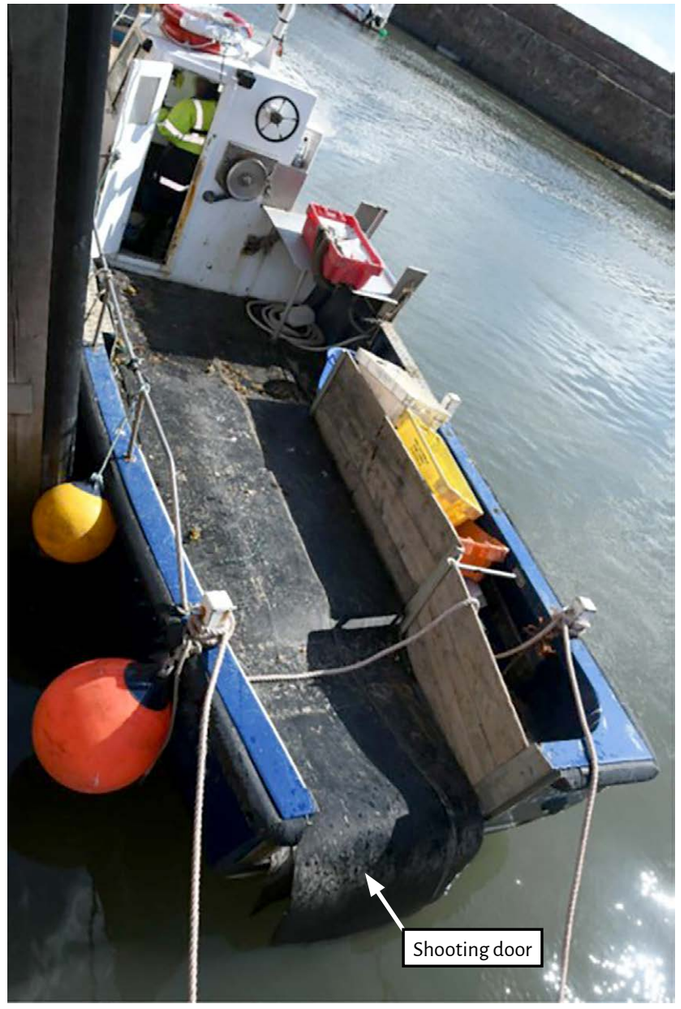

Figure 2: The shooting door (drop-in closing board removed)

The Lessons

1. **Procedure →** Fishers are advised to follow industry guidelines to minimise the likelihood of being pulled or falling overboard; a barrier between the fisher and the fishing gear during every phase of the fishing process and the wearing of a tethered safety harness offers the best protection against unexpected events.

2. **Plan →** It is important to consider what methods of reboarding the vessel from the water are available. Emergency measures, such as rigging a man overboard ladder or having an overside tyre arrangement in place, can improve the chances of survival.

3. **Equipment →** Fishers should always wear a PFD to help keep them afloat should they fall overboard. As this case demonstrates, cold water immersion can be fatal and it is vital to reboard as soon as possible. Wearing a personal locator beacon (PLB) that can be operated while in the water also improves the chances of rescue and survival.

4. **Risk →** Single-handed fishing is a risky profession; the preparation of realistic safety procedures and risk assessments provides the best protection against the unexpected to return fishers home safe and dry.

Always look on the bight side of life

potter | man overboard

On a clear spring morning in smooth seas and with light winds, the three crew of a potting vessel were starting to shoot the gear after rebaiting the pots. The usual practice on board was for the crew to stand at the side of the working deck as the back rope and pots payed out through the coverless shooting hatch in the stern (Figure 1). However, on this occasion, one crew member was standing in the fish bay area (Figure 2) where the float line was coiled (Figure 3). As the line payed out, the crew member's leg became entangled in a bight of float line and they were pulled overboard after the last pot.

The skipper was in the wheelhouse and, seeing the crew member enter the water, went full astern on the engine to counteract the vessel's forward movement. The skipper and other crew member kept hold of the float line and used the hauling winch to recover their unconscious colleague, whose foot was still entangled in the line. The skipper estimated that the crew member was under the water for about 5 minutes. The crew member was wearing a lifejacket, wellington boots and oilskins but was not buoyant enough to break the surface due to being entangled in the float line of a fleet of pots.

The skipper and other crew member recovered their crewmate back on board and the crew member immediately began cardiopulmonary resuscitation (CPR) while the skipper hailed the coastguard for emergency assistance. A few minutes later, the casualty coughed up water and regained consciousness. The crew continued to keep their crewmate warm and dry until the coastguard helicopter arrived on scene to transfer the casualty from the fishing vessel to hospital.

The crew member made a full recovery and later returned to working at sea.

Figure 1: The coverless shooting hatch

Figure 2: The fish bay area where the crew member was standing

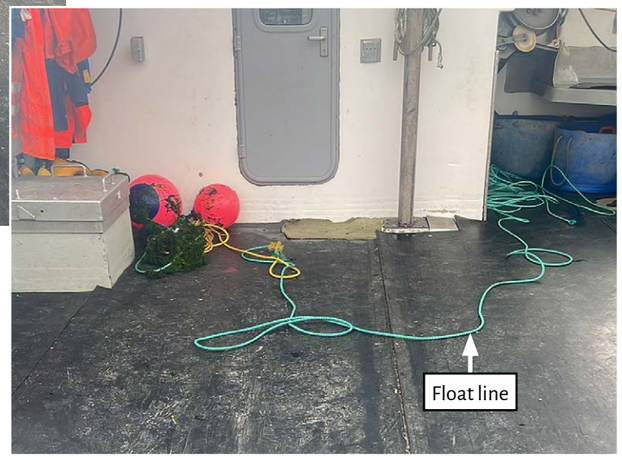

Figure 3: The float line coiled on the working deck

The Lessons

1. **Procedure →** The usual working procedure on board the vessel was for the crew to stand aside when the vessel was shooting pots, to avoid becoming entangled in any lines or being struck by moving equipment. In this case, the crew member deviated from the usual procedure and was standing in an area where coiled lines were attached to the fleet of pots that were being shot.

2. **Observe →** The crew member did not observe their surroundings and therefore failed to identify the risk of standing near the coiled lines. Conversely, the skipper was observing the shooting operation closely from their position inside the wheelhouse, which meant that the skipper and other crew member were able to react quickly when they saw their crewmate being dragged overboard.

3. **Action →** The skipper and other crew member took quick and effective action in this emergency. Their timely recovery and immediate application of CPR directly contributed to their crewmate regaining consciousness, while prompt summoning of the coastguard enabled the casualty's swift extraction from the vessel to hospital for further lifesaving treatment.

4. **Teamwork →** The crew were able to apply their first aid skills, follow the coastguard's advice to maintain the casualty's airways once they regained consciousness and keep their crewmate warm and dry until the helicopter arrived.

Hauled on board

stern trawler | man overboard

Early into the afternoon shift on a late autumn day, a coastguard Maritime Rescue Coordination Centre (MRCC) was alerted to an undesignated medium frequency Digital Selective Calling transmission, indicating a person overboard from a fishing vessel about 90 nautical miles off the coast. This was swiftly followed by calls from the MRCC's European counterparts, which had also received the alert. Initial investigations established that the GMDSS register had not been updated with the fishing vessel's current name. While this did not delay the rescue operation, it required additional work for the coastguard team to identify the vessel.

The alert was transmitted because a deckhand had been partially dragged over the side of the fishing vessel during net hauling operations. They had been tending the starboard guide pole during the haul and were standing between the net and the starboard bulwark of the vessel when, during the net's recovery, they had switched the guide pole from one position to another at the same time as the fishing vessel rolled to starboard. The effect of this was to drag the unconstrained net to starboard across the stern roller, trapping the deckhand's legs against the bulwark before pushing the deckhand bodily over the side. The skipper, who was controlling operations from the upper deck, quickly recognised what was happening and descended to the main deck and pulled the deckhand back on board as the vessel rolled to port, freeing them from the net (see figure).

The deckhand was subsequently airlifted to hospital and later discharged with broken ribs and significant bruising.

The Lessons

1. **Maintain →** Ensure that on board telegraphy and telephony equipment is updated to reflect the vessel's current name and details. This could prove vital to make certain you receive the help you need in time for a successful rescue.

2. **Plan →** The repositioning of the guide poles during hauling operations must be carefully controlled to minimise risk of entrapment by the net. Hauling nets is a frequent evolution, but it entails risk and vigilance must be maintained. On every occasion, take the time to reassess the risks involved, the manner in which the task is to be conducted and the effect of the environment on the job in hand.

3. **Hazard →** An unconstrained net during hauling is a significant hazard in anything other than the most benign conditions. The operation requires careful monitoring to prevent shortcuts being taken or complacency creeping in. Reminding crew of the hazards before they start working the net is advised.

4. **Observe →** The quick actions of the skipper in this case prevented a much more serious situation developing. Close observation of the crew and their activities during high-risk operational tasks ensures full awareness of the situation and enables swift action to be taken in the event of an emergency.

Figure: Reconstruction, showing the deckhand standing in working position between the bulwark and net

Digit-less door access

stern trawler | accident to person

A fishing vessel crew member very nearly had their finger amputated when an internal door slammed shut on their hand.

The 24m stern trawler was fishing over 200nm offshore in gale-force winds and the crew member was heading to the galley after a long stint working on deck. The vessel lurched to port, causing the crew member to steady themself by holding onto the doorframe of an open door as they passed through it. The door suddenly released violently from its hold-open mechanism (Figure 1), slamming shut on the crew member's fingers and partially severing their little finger (Figure 2).

The skipper was alerted at once by other crew members and, on seeing the severity of the injury, immediately altered course to reduce the vessel's distance from the coast. The skipper then called the coastguard for assistance and was put in contact with a doctor to discuss the extent of the crew member's finger injury. The doctor confirmed that the casualty would need to be airlifted to hospital as soon as possible.

Other members of the crew administered first aid, including pain relief, as the fishing vessel continued on passage to bring it within helicopter range. Having endured uncomfortable and environmentally challenging conditions for about 10 hours, the injured crew member was airlifted from the fishing trawler and transferred to hospital where they underwent surgery. Fortunately, the surgeon managed to save the little finger.

The crew member was able to return to their regular duties on board the fishing vessel after several months off work.

Figure 1: The hold-open mechanism on the door

Figure 2: The partially severed little finger

The Lessons

1. **Aware →** Take care when moving around any vessel, particularly in rough seas. Entrapment of hands in doors is a common hazard and you should exercise caution when walking through or standing near to a doorway. Keep hands and fingers clear of the doorframe to prevent accidents occurring due to the unexpected release of a hold-open door mechanism, which can cause self-closing doors to shut quickly and with force. The fitting of pneumatic door closers can reduce the force with which the door is pulled shut.

2. **Check →** Regular inspections of door mechanisms helps prevent accidents caused by doors unexpectedly opening or closing while the vessel is moving. Make sure doors are securely retained in their open and closed positions and that the mechanisms for doing so function correctly. The fitting of pneumatic door closers can reduce the force with which doors operate.

3. **Teamwork →** The quick and decisive action by the skipper to change course, contact the coastguard and obtain medical advice and the crew's care of the casualty in the intervening period demonstrated a collective understanding of emergency situations and how to deal with them. Periodic emergency drills enable crew to discuss and practice their responses in preparation for when a real situation arises.

RECREATIONAL VESSELS

The importance of being prepared has been instilled in me from the age of 10, when I was a sea scout in Mudeford harbour. Although I might not have taken the advice given at that young age very seriously, these core principles have stayed with me throughout my career and I truly believe this attitude results in a more enjoyable boating experience.

Whether you have been sailing for most of your life or are just getting into boating and keen to set off on your maiden voyage, taking time to learn about your passage, vessel and equipment is always recommended. As strong and passionate as the online boating community is, the amount of people sharing 'tips and tricks' that could result in serious trouble for you on the water is worrying.

A bit of forethought could mean the difference between life and death

It may feel unnecessary to allow time for proper sailing preparation – particularly if you have some boating experience – but a bit of forethought could mean the difference between life and death in the event of bad weather or a breakdown. Unfortunately for those who rely solely on YouTube tutorials for their boating knowledge, it is much easier to make the right decisions when fortified with strong practical and theoretical knowledge imparted by a professional instructor.

While I understand both the excitement of boating and urge to get out on the water without much (or any) professional training, it can be a recipe for disaster. This not only concerns me as the owner of a sea school, but also makes me worry about the future of recreational boating and how the principles I was taught as a young enthusiast may be losing some of their importance within our community.

Continuous learning and periodic professional training are essential

Every situation outlined in the following section of this MAIB Safety Digest could have been avoided had some comprehensive forward planning been applied; this is not to say that all accidents are avoidable but, in my experience, adhering to the APEM (appraise, plan, execute and monitor) risk management approach to passage planning will steer you in the right direction:

Step 1 – gather and appraise all relevant information required for your passage, from when you depart to arrival at your destination;

Step 2 – plan your intended passage in detail, for example the timings of tidal gates and tidal heights and weather windows;

Step 3 – execute the plan taking account of prevailing conditions, sharing it with your crew and prepping the boat to ensure it is ready for the intended passage; and

Step 4 – monitor the boat's headway against the plan continuously during your passage, checking your progress at specific and relevant points.

Every passage out to sea requires planning regardless the length of the trip. However, as a lifelong boating enthusiast I know that even the most careful planning does not always achieve safe passage, which can be incredibly frustrating. In this moment, the importance of remembering core boating values is vital as you reassess and potentially adjust your plan to suit the circumstances. Sometimes, putting your ego aside and admitting that despite your best efforts you may have to turn back, use one of your predetermined ports of refuge or, in the worst-case scenario, abandon your boat is the hardest but most pragmatic thing you can do.

Always be prepared when boating

The rapid advances in technology over the last 50 years means some kit will inevitably work differently to how it did 20 years ago; lithium batteries are increasingly involved in fires on superyachts and motorboats while the chemical compounds of cleaning equipment are also likely to have changed. Everyday routines such as leaving your batteries on trickle charge or completing maintenance work upon mooring may no longer be best practice, which is why continuous learning and periodic professional training are essential.

The knowledge and subsequent experience gained through recognised industry training provides boat users with the confidence to tackle problems as they arise and the ability to make a qualified decision in the event of an unexpected or dangerous situation, which in turn helps to keep you, your crew and your vessel safe. I have heard many stories throughout my career of those who have prioritised their pride over safety, to which I always counsel that you are never too old, too experienced or too important to learn something new. It could save your life!

I will continue to advocate for being prepared every step of the way and, while some might roll their eyes and claim to have all the knowledge they need, I remain steadfast in passing this simple message on to novices and experienced sailors alike: always be prepared when boating.

Andy Murray

ANDY MURRAY | Principal, Ocean Sports Tuition

Andy learned to sail aged 10 and has been passionate about the world of boating ever since, his youth having been filled with excitement and wonder around boat safety and teaching as a sea scout and dinghy instructor. Being diagnosed dyslexic as a child only fuelled Andy's ambition to prosper in the industry he loves, teaching him resilience and giving him an appetite for success.

Andy travelled to Australia at the age of 21, where he sailed the Whitsunday Islands on an 80ft maxi boat, fell in love with big boats and vowed to his skipper that he would become a Yachtmaster when he returned to the UK, which is exactly what he did. He consequently set up his own specialist Royal Yachting Association (RYA) recognised training school in Southampton.

Ocean Sports Tuition has been a boating hub for over 20 years, providing top quality instruction to boating enthusiasts along the south coast of England and specialising in power, motorboat and shore-based training. Andy continues to build a legacy that champions safety and practical training, running regular courses for new boaters, experienced skippers and those who want to gain commercial endorsement.

Brief encounter

motor cruiser | fatal accident

Boats can be used for many different things: a means of getting from A to B; to take part in sporting activities; or as a platform to fish. However, and as one family discovered, not using safety precautions can lead to tragic losses.

One late spring morning, three people left harbour on a wooden motor cruiser for a recreational fishing trip. The weather was fine and clear, with an easterly Beaufort force 3 to 4 wind and the tide ebbing in a south-westerly direction at a rate of about 0.6kts. Following the departure from its berth, the boat briefly grounded on a mud bank; the owner applied more engine power to free it and continued to follow the buoyed channel out to sea.

Shortly after leaving the sheltered channel, the boat began to take on water at such a rate that the bilge pumps were unable to cope. The owner

Figure: Recovered hull section

was able to make a "Mayday" call using a portable VHF radio before all three occupants entered the water as the boat sank beneath them. No one was wearing a PFD, although the group did have two lifebuoys, which they used to keep themselves afloat. Two people were rescued but the third unfortunately drowned.

The Lessons

1. **Check →** The wooden motor cruiser had an unknown heritage and maintenance record. Further, the day of the accident was the first time that the owner had taken the boat out to the open sea. A post-accident examination of part of the boat's hull established that it was in poor condition (see figure). While surveys are not mandatory when buying a pleasure boat, they can inform a new owner of the vessel's condition and any repairs required to ensure its seaworthiness.

2. **Equipment →** Although the owner was able to use the VHF radio to raise the alarm, there was no time to activate the distress flares and no one considered donning one of the many PFDs that were available. This drastically reduced their chances of survival once they entered the water as the boat sank. Boat users are reminded to familiarise themselves with on board safety equipment: you never know when it might be needed.

3. **Plan →** The motor boat briefly grounded despite the calm weather conditions and owner's familiarity with the harbour. The damage sustained was sufficient to cause water ingress once the boat reached open seas. The importance of planning a safe passage cannot be understated, regardless the length of the trip.

Charging into danger

sailing yacht | fire

The lone skipper of a recently refurbished sailing vessel had just departed port for a weekend trip; the wind was light and the vessel was making way under engine power. The skipper had taken the opportunity to charge their laptop and two mobile phones in the below deck saloon area while the engine was running. They soon became aware of a large amount of smoke and, unable to avoid inhaling it, briefly entered the saloon to investigate the source.

A fire had started near the electronic devices that had been left to charge. The skipper considered using one of the handheld fire extinguishers on board but the fire appeared to be spreading rapidly and, recognising the gravity of the situation, they quickly grabbed their weekend bag and handheld VHF radio and headed back up onto the deck. Already wearing a lifejacket, the skipper was able to launch the tender along the windward side of the sailing vessel and abandon ship.

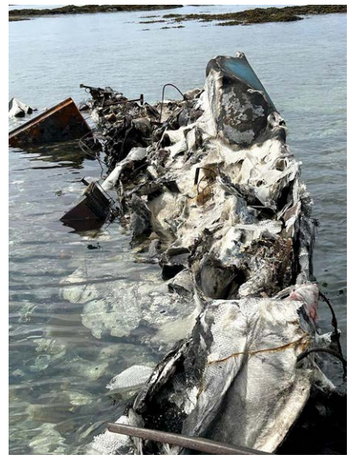

Figure: The remains of the vessel

The skipper used the VHF radio to transmit a "Mayday" call and was picked up by another sailing vessel and taken ashore. Fortunately, they had not sustained serious injuries and were treated for smoke inhalation and emotional shock; however, the sailing vessel burned down to the bilges and sank, eventually coming to rest on a sandbank (see figure).

The Lessons

1. **Hazard →** Lithium-ion (Li-ion) batteries present a fire hazard and should be used with this in mind, particularly when they are being recharged. Ensure that associated equipment such as charging cables and plugs are both compatible with Li-ion devices and undamaged before use. Never attempt to charge potentially damaged batteries. Items containing Li-ion batteries should be stored in a non-combustible area maintained at a temperature of 4°C to 26°C. Consider the consequences of activities that pose a combustion risk on board sailing vessels, which are often constructed of wood, plastic and fibreglass, and take steps to mitigate this by installing appropriate equipment such as fire extinguishers and fire blankets. The London Fire Brigade provides useful fire safety guidance on Li-ion chargers and batteries: https://www.london-fire.gov.uk/safety/the-home/electrical-items/batteries-and-chargers/

2. **Plan →** The skipper was unable to fight the fire due to the speed and ferocity with which it progressed. However, the readiness of their personal belongings packed in a single bag and a handheld VHF meant they were able to evacuate the area quickly and with the equipment needed to improve their chances of rescue. The skipper was also already wearing their lifejacket so were prepared to enter the water had they not had time to launch the tender.

3. **Action →** The skipper recognised the risk to their life and took immediate and effective action to ensure their survival. Taking the VHF with them meant they were able to call for rescue once safely in the tender and away from harm. The skipper remained calm in a fast-moving situation and evaluated their best course of action at each stage, including launching the tender on the windward side to avoid the smoke and flames as well as reducing the risk of the wreckage being blown down onto them.

25

Catastrophe

yacht | fire

A couple were enjoying a holiday cruising inland waterways on their 5-metre motor yacht when a careless slip led to tragedy.

Shortly after safely mooring the vessel in a marina, the owner decided to remain on board to carry out some maintenance work while their partner went for a walk. The owner started to clean the yacht's engine compartment with some solvent, which suddenly ignited because the engine was still hot; the resulting flames engulfed the engine compartment and caught the owner's clothes alight. Reacting fast, the owner jumped overboard into the loch and their burning clothes were extinguished.

By this time, the fire had developed rapidly on board the yacht. The owner climbed from the water onto onto the marina's pontoons and reboarded the yacht to attempt to save their two dogs who were trapped in the cabin. The gas cylinder for the yacht's stove exploded soon afterwards, ejecting the owner overboard and into the loch once again.

Figure 1: Emergency services attending the scene

The emergency services arrived on the scene, having been called by marina staff. The fire brigade doused the yacht with water to extinguish the flames (Figure 1). The owner was recovered from the loch by police and medics and evacuated to hospital by helicopter, having suffered significant burns from which they were lucky to survive. Tragically, both dogs perished in the accident. The fire-ravaged motor yacht (Figure 2) later sank to the bottom of the loch.

Figure 2: The burned-out motor yacht just before it sank

The Lessons

1. **Risk →** Take a moment to consider the potential hazards before starting maintenance tasks on board your vessel. Solvents evaporate quickly and the resulting vapours are highly flammable. In this case, tragedy might have been averted by waiting for the engine to cool and applying a less volatile cleaner.

2. **Equipment →** Safety equipment such as fire blankets, handheld fire extinguishers and fixed fire suppressant systems can make all the difference when things do go wrong. Ensure you carry the right type of firefighting equipment for your vessel, that it is properly serviced and you know how to use it.

3. **Action →** It is easy to react quickly and without thought for your own safety when faced with an emergency, especially when others are in danger. The owner's attempt to reboard the yacht to save their dogs was understandable, but introduced considerable risk to their own survivability. Sometimes, the safest option is to wait for the emergency services.

INVESTIGATIONS

started during the period 1 March 2023 to 31 August 2023

Date	Occurrence
11 March	Grounding of the 11m Anguilla registered commercial day excursion boat ***Calypso 2*** on the north-west coast of Anguilla, causing the 2 crew and 4 passengers to be thrown overboard and resulting in several injuries and 2 fatalities.
17 April	Fall of an engine room crew member down a ventilation duct on board the Cayman Islands registered bulk carrier ***Equinox Seas*** at a shipyard in Ermoupoli, Greece, resulting in 1 fatality.
23 April	Grounding of the UK registered bulk carrier ***Indian Partnership*** near Misool, Indonesia.
29 April	Machinery failure and subsequent grounding of the UK registered ro-ro passenger ferry ***Pentalina*** at St Margaret's Hope, South Ronaldsay, Scotland.
7 June	Passengers dislodged from their seats during a sea safari ride on the RIB ***Lundy Explorer*** as it departed Ifracombe, Devon, England, resulting in several injuries.
20 July	Grounding of the commercial swim event support vessel ***Channel Queen*** on a wreck near The Needles, Isle of Wight, England resulting in the damaged vessel being abandoned by its crew and passengers and later declared a total constructive loss.

Correct up to 31 August 2023. Go to www.gov.uk/maib for the very latest MAIB news

REPORTS

issued in 2023

Emma Louise
Carbon monoxide poisoning on board a privately-owned sports cruiser moored in Port Hamble Marina, River Hamble, England on 12 January 2022, resulting in 2 fatalities.
1/2023 Published 27 April

Harriet J
Person overboard from a lone-operated creel fishing vessel west of Fast Castle Head, south-east Scotland on 28 August 2021, with loss of 1 life.
2/2023 Published 22 June

Copious
Person overboard from a twin rig stern trawler south-east of the Shetland Islands, Scotland on 18 February 2021, with loss of 1 life.
3/2023 Published 29 June

Moritz Schulte
Engine room fire on a liquefied petroleum gas/ethylene carrier in Antwerp, Belgium on 4 August 2020, with loss of 1 life.
4/2023 Published 17 August

Emma Louise

Copious

Harriet J

Moritz Schulte

SAFETY BULLETINS

issued during the period 1 March 2023 to 31 August 2023

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY BULLETIN

SB1/2023 MARCH 2023

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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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 be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

All bulletins can be found on our website:
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Potential fire hazards from flexible hose installations identified following a fire on board the roll-on/roll-off cargo ship *Finnmaster* in Hull, England on 19 September 2021

Finnmaster's fire-damaged compartment

MAIB SAFETY BULLETIN 1/2023

This document, containing safety lessons, has been produced for marine safety purposes only, on the basis of information available to date[1].

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 fire on board the roll-on/roll-off cargo ship *Finnmaster* in Hull, England, on 19 September 2021.

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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[1] A previous safety bulletin, issued by MAIB in March 2022, focused on separate safety issues arising from this accident: https://www.gov.uk/maib-reports/safety-warning-issued-after-discovery-of-blocked-fixed-co2-fire-extinguishing-system-pilot-hoses

BACKGROUND

On 19 September 2021, a fire broke out in the auxiliary engine room on board the Finland registered roll-on/roll-off cargo ship *Finnmaster* while departing Hull, England. The fire was contained and subsequently extinguished without injury to the crew, but the equipment in the auxiliary engine room suffered serious damage **(Figure 1)**.

Figure 1: Damage sustained to auxiliary engine room

Finnmaster's auxiliary engine room was equipped with two main alternators. These were driven by marine gas oil (MGO) fuelled engines and named as auxiliary engine 1 (AE1) and auxiliary engine 2 (AE2). Each auxiliary engine comprised 12 cylinders in a v-shaped configuration and was rated at 1100 kilowatts.

A fuel supply pump supplied the MGO to both auxiliary engines. The fuel supply pipe was then routed to an inboard and outboard set of cartridge filters[2] and a high-pressure fuel injection pump, which were mounted on either side of each engine **(Figure 2)**.

For illustrative purposes only: not to scale

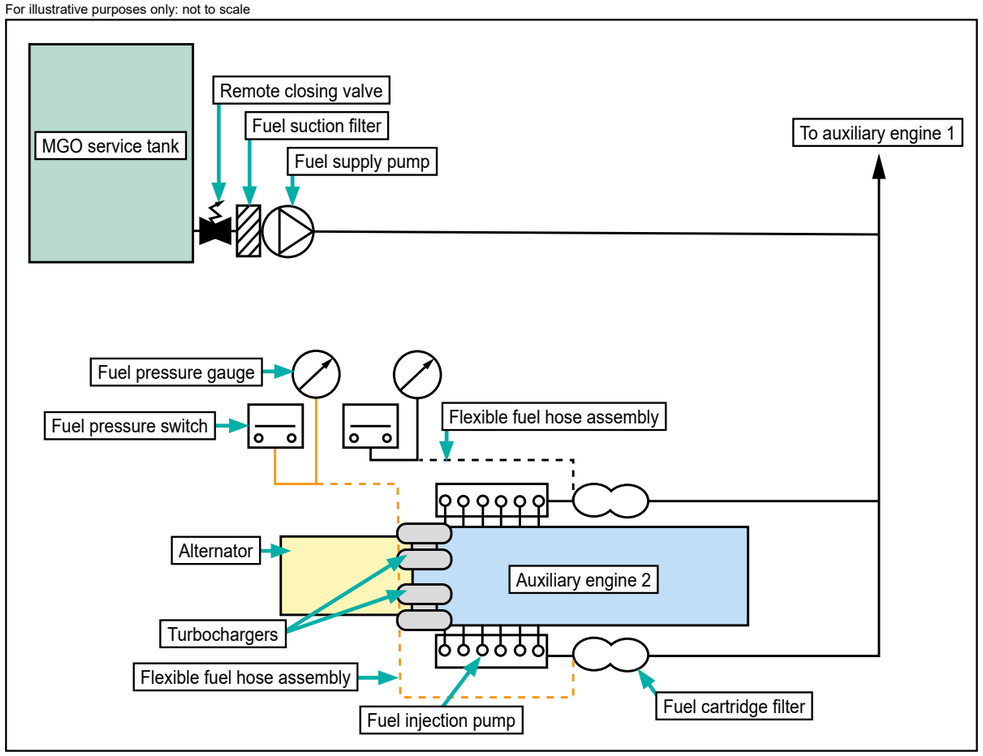

Figure 2: Schematic diagram of auxiliary engine fuel supply system

INITIAL FINDINGS

The MAIB investigation identified that the fire started below the outboard turbocharger of AE2 when a small-bore flexible fuel hose failed. Exhaust gas had leaked from the outlet of the turbocharger and caused the fuel hose to overheat and fail allowing MGO to spray onto a high temperature surface, where it ignited and a significant fire developed.

Auxiliary engine alarm system modifications

Maintenance records showed that the alarm system for both auxiliary engines had been modified between April 2003 and July 2006, when *Finnmaster* was under different ownership. Low pressure fuel alarm pressure switches and gauges had been installed to both AE1 and AE2 to alert the ship's engineers should the fuel cartridge filters become blocked.

The flexible fuel hose that failed in the accident was connected to the outlet from the inboard set of AE2 cartridge filters **(Figure 3a)**; the hose was routed aft along the engine and passed over the top of the flywheel cover under the turbochargers **(Figures 3b** and **3c)**. It then connected to a pressure sensor on an instrument panel mounted outboard of the AE2 alternator. Both this hose and the matching hose on AE1 were 3.4m in length. No isolation valve was installed at the connection to the cartridge filters.

The thermal insulation that covered the auxiliary engine turbochargers had also been modified by the installation of bespoke insulation pads over the existing insulated box structure. The flexible fuel hose from the AE2 inboard fuel cartridge filters was routed under these insulation pads.

Regulation and guidance

SOLAS Convention[3] Chapter II-2: Construction – Fire protection, fire detection and fire extinction, permitted the restricted use of flexible hose assemblies *in positions where the Administration is satisfied that they are necessary*, and that, *oil fuel lines shall not be located immediately above or near units of high temperature*.

The International Maritime Organization (IMO) provided guidance on compliance with SOLAS on the use of flexible hose assemblies through its Maritime Safety Committee (MSC). In June 1994, the committee issued circular MSC/Circ.647 – Guidelines to Minimize Leakages from Flammable Liquid Systems. This stated that flexible hose assemblies *should be in as short lengths as practicable and only used where necessary to accommodate relative movement between fixed piping and machinery parts*. In June 2009, the MSC consolidated the IMO's guidance on fire safety into circular MSC.1/Circ.1321 – Guidelines for Measures to Prevent Fires in Engine-Rooms and Cargo Pump-Rooms. This circular stated that, in addition to the requirements of MSC/Circ.647, flexible hoses *should not, in general, exceed 1.5m in length*. It further advised that *hoses should be constructed to a recognized standard and be approved as suitable for the intended service, taking into account fire resistance, pressure, temperature, fluid compatibility and mechanical loading including impulse where applicable*.

[3] The International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended.

The IMO guidance on flexible hose installations, including the limitation of length, were incorporated into the rules of the two classification societies that provided oversight of *Finnmaster* during the period that the flexible hoses were in place on the vessel.

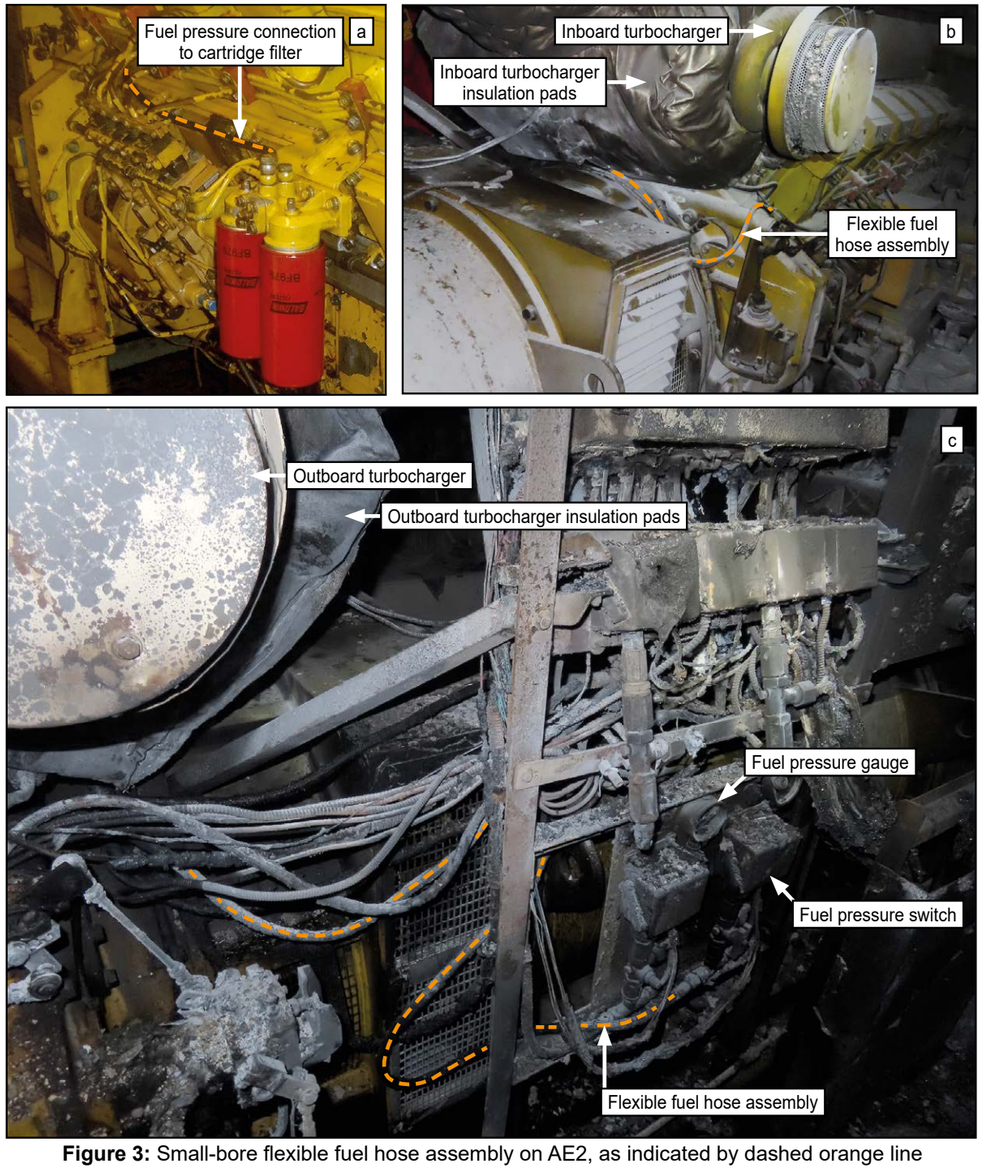

Figure 3: Small-bore flexible fuel hose assembly on AE2, as indicated by dashed orange line

FINDINGS

In this case, the flexible hose assemblies were not needed to accommodate relative movement between fixed piping and machinery parts over their entire length between the cartridge filters and the instrument panel. Furthermore, the routing of the hoses under the turbochargers covered by the insulation pads exposed them to the risk of contact with high temperatures and also made them difficult to inspect.

SOLAS, IMO guidance, and classification society rules all provided the means to ensure that systems are designed, installed and maintained so as to reduce the risk of fires in machinery spaces. The MAIB investigation into the modifications to the auxiliary engine alarm system is ongoing, but has established that the initial proposal to modify the system on board *Finnmaster* had not been submitted to the classification society for approval and the installation was not surveyed on completion. Although the flexible fuel hose was subsequently replaced a number of times during the period of over 15 years before the accident, its material, length and routing had remained the same throughout. Furthermore, the risk that the flexible fuel hoses posed to the safety of the vessel had not been identified or mitigated.

SAFETY LESSONS

- The risks associated with a modification on safety critical equipment should be considered before and during the work being completed. In this case, the positioning of the fuel pressure gauges and pressure switches required the pressure signal to be transferred from one side of the engine to the other. The relocation of the pressure switch closer to the cartridge filters would have removed the need for a long hose; if this was not possible, a rigid metal pipe secured with clamps and routed at an appropriate distance from the engine's exhaust might have been a safer option.
- Flexible hoses are recognised as having a higher risk of failure than a properly fitted metal pipe. An isolation valve fitted at the point of supply allows a flexible hose to be safely isolated in the event of leakage.
- Flag state administrations, ship operators, classification societies, marine surveyors and port state control officers are advised of the risks posed by flexible hose assemblies used in systems that carry flammable liquids if they are not installed and maintained in accordance with IMO MSC.1/Circ.1321.

Issued March 2023

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY BULLETIN

SB2/2023 AUGUST 2023

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."

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Potential failure of Deutsche Schlauchboot GmbH (DSB) liferafts serviced by Comfer Marin SL, Marin, Spain identified following the foundering of the fishing vessel *Piedras* (FD 528) south-west of Mizen Head, the Republic of Ireland on 1 June 2022

Recovered *Piedras* starboard liferaft

MAIB SAFETY BULLETIN 2/2023

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 foundering of the fishing vessel *Piedras* (FD 528), 78 nautical miles south-west of Mizen Head, the Republic of Ireland, on 1 June 2022.

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

Captain Andrew Moll OBE
Chief Inspector of Marine Accidents

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

On 1 June 2022, the engine room of the UK registered stern trawler *Piedras* (FD 528) flooded while fishing 78 nautical miles south-west of Mizen Head, the Republic of Ireland in Beaufort force 3 winds and smooth seas. The crew of *Piedras* were unable to contain the flooding and the skipper gave the order to abandon the vessel. The crew manually released the port liferaft and pulled the painter, but it failed to inflate correctly. The starboard liferaft was successfully launched by the same method. The crew used this liferaft to transfer to a nearby fishing vessel. *Piedras* capsized and sank over 2.5 hours later.

INITIAL FINDINGS

MAIB's investigation identified that *Piedras* was equipped with two 12-person SOLAS[1] approved liferafts manufactured by Deutsche Schlauchboot GmbH (DSB), a subsidiary of Survitec Group Limited (Survitec).

The port liferaft carried on board *Piedras* was an LR97 model and the starboard liferaft was an LR05 model. The annual certification[2] for both liferafts had been issued by the marine liferaft service station Comfer Marin SL (identity number 50826; previously 375), in Marin, Spain. Comfer Marin SL had been accredited by Survitec as one of its approved liferaft servicing agents.

It was not possible to determine the cause of the port liferaft's failure to deploy correctly, as it was not recovered after the accident. It was last observed drifting in an inverted orientation, having apparently released from its canister and partially inflated **(Figure 1)**.

Figure 1: The port liferaft, floating inverted and partially inflated

Subsequent examination by the MAIB of the SOLAS A[3] pack in the recovered starboard liferaft **(Figure 2)** found that:

- the first aid kit had not been replaced since it was supplied in 2007;
- the liferaft repair kit had expired in September 2008;
- the torch batteries had expired in January 2010;
- all of the pyrotechnics had expired in March 2010; and
- all of the food and water supplies had expired in January 2012.

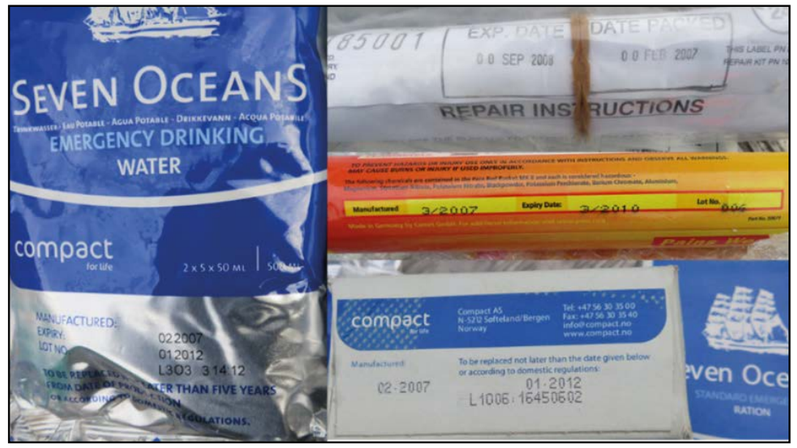

Figure 2: Examples of the expired consumable items in *Piedras*'s starboard liferaft

The starboard liferaft had not been correctly serviced since its manufacture in March 2007, despite having been routinely certified by Comfer Marin SL.

Survitec conducted further investigations into DSB liferafts certified by Comfer Marin SL and inspected a sample of liferafts that had been serviced by Comfer Marin SL during 2022, which were found to have the following defects:

- gas cylinders had not been tested;
- inflation hoses had not been replaced, with some found to be in poor condition;
- emergency pack items such as flares, first aid kits and repair kits had passed their expiry date;
- internal and external light batteries had passed their expiry date;
- canisters displayed original labels and had corroded strapping bands; and
- service record labels had not been completed.

Annual checks by the Capitanía Marítima de Vigo[4] and routine audits undertaken by Survitec before this accident had not identified any significant servicing issues with Comfer Marin SL. Survitec has been unable to contact all potentially affected liferaft owners and operators and, consequently, has been unable to fully assure all identified liferafts of concern. With a gas inflation test being required at 5-yearly intervals[5] Survitec recognised that a routine annual service may not, on its own, highlight all the potential problems resulting from the significant servicing issues identified.

[1] International Convention for the Safety of Life at Sea, 1974, as amended.

[2] Merchant Shipping Notice 1873 Amendment No.1 (F) – The Code of Practice for the Construction and Safe Operation of Fishing Vessels of 24m Registered Length and Over – stated that every inflatable liferaft must be serviced at intervals not exceeding 12 months and in accordance with Marine Guidance Note 548 (M&F) Life-Saving Appliances – Inflatable SOLAS Certificated Liferafts, Lifejackets, Marine Evacuation Systems and Repair of Inflated Rescue Boats – Servicing Requirements and Approved Service Stations.

[3] Refers to liferafts fully loaded with food and water rations, flares, and a first aid kit.

[4] Capitanía Marítima de Vigo is the local harbourmaster empowered by the Spanish government's ministry for transport to approve service stations.

[5] IMO Resolution A.761(18) as referenced in Marine Guidance Note 548 (M&F).

SAFETY ISSUES

Safety issues identified during the initial stages of the investigation included:

- Both of the liferafts carried by *Piedras* exhibited deficiencies that were sufficient to raise concerns relating to their servicing and certification; it is likely that these deficiencies contributed to the failure of the port liferaft to function correctly during the abandonment of the vessel.
- There is a risk that DSB liferafts certified by the service station Comfer Marin SL in Marin, Spain might not function correctly when deployed.

MAIB ACTIONS

The **MAIB** has:

- Written to Survitec and highlighted the issues identified with the liferafts carried on board *Piedras* and issued recommendations 2022/129 and 2022/130, as detailed below:

  2022/129 *Ensure that the corrective actions identified during the audit of its authorised service station 375, in July 2022, are verified as completed and that there is an appropriate level of oversight to confirm that the future servicing of liferafts by this station is rigorous and in accordance with statutory requirements.*

  2022/130 *Take urgent action, as appropriate, to provide assurance that all liferafts serviced by the authorised service station 375 within the past 5 years are fully functional and comply with statutory requirements. This should include informing all affected customers of the potential risks that their liferafts may not be compliant and of any immediate actions required to ensure their effectiveness.*

- Written to the Comisión Permanente de Investigación de Accidentes e Incidentes Marítimos (CIAIM)[6] to advise them of concerns regarding the servicing of the liferafts on board *Piedras* and the possibility that other liferafts serviced by Comfer Marin SL may be similarly affected.
- Issued this safety bulletin to inform vessel owners and operators potentially affected by the identified issues relating to liferafts serviced by Comfer Marin SL.
- Written to the Ministerio de Transportes, Movilidad y Agenda Urbana[7] to ask it to assist Survitec in identifying vessel owners and operators that have had DSB liferafts certified by the service station Comfer Marin SL during the period from 1 January 2017 to 30 June 2022.

[6] Comisión Permanente de Investigación de Accidentes e Incidentes Marítimos – Permanent Commission for the Investigation of Maritime Accidents and Incidents. CIAIM are the Spanish marine safety investigation authority and have similar roles and responsibilities to that of the MAIB.

[7] The Ministry of Transport, Mobility and Urban Agenda (MITMA) is the Spanish government's ministry for transport.

ACTIONS TAKEN BY OTHER ORGANISATIONS

Survitec Group Limited has:

- Conducted an audit of Comfer Marin SL in July 2022 and subsequently terminated its approval of the station to act as a Survitec liferaft servicing provider.
- Issued Survitec Alert Service Bulletin 13/22 – *A LR 07 liferaft: Immediate recall of liferafts serviced by Comfer Marin SL* – dated 17 November 2022 to its approved service stations in support of the immediate recall of the 230 liferafts that had been certified by Comfer Marin SL over the preceding 5 years.
- Contacted the Capitanía Marítima de Vigo to advise them of the alert service bulletin and inform them that Comfer Marin SL is no longer an approved Survitec service agent.
- Undertaken an initial investigation of the issues identified by the MAIB by inspecting a sample of liferafts serviced in 2022 by Comfer Marin SL and rectifying the defects found.

The **Ministerio de Transportes, Movilidad y Agenda Urbana** has:

Confirmed, through the Capitanía Marítima de Vigo, that Comfer Marin SL is no longer authorised to operate as a liferaft inspection/service station.

RECOMMENDATIONS

Survitec Group Limited is recommended to:

S2023/103 Distribute a copy of this safety bulletin to all vessel owners and operators that have had Deutsche Schlauchboot GmbH liferafts certified by the service station Comfer Marin SL during the period 1 January 2017 to 30 June 2022 and continue to take actions to urgently address recommendation 2022/130.

All vessel owners and operators that have had DSB liferafts certified by the service station Comfer Marin SL during the period 1 January 2017 to 30 June 2022 are recommended to:

S2023/104M Immediately contact their nearest approved Survitec liferaft service station to arrange for the liferafts to be urgently reinspected and serviced to ensure they are fully functional and comply with statutory requirements.

Issued August 2023

SAFETY FLYERS

issued during the period 1 March 2023 to 31 August 2023

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE RECREATIONAL CRAFT INDUSTRY AND PLEASURE CRAFT USERS

Carbon monoxide poisoning, resulting in two fatalities on board the sports cruiser *Emma Louise* at Port Hamble Marina, River Hamble, England on 11 January 2022

Emma Louise

Narrative

On the morning of 12 January 2022, the bodies of two men were found on board the 5.5m sports cruiser *Emma Louise*, which was moored to a pontoon at Port Hamble Marina, Southampton. It was later established that they had both died as a result of carbon monoxide (CO) poisoning.

The sports cruiser's 3 litre petrol-driven engine had been started when the two men boarded *Emma Louise* the previous evening and left idling, probably to charge the boat's batteries. Exhaust gas from the waterline exhaust was likely funnelled between an inflatable towable ringo and the boat's transom and seeped into the covered cockpit through small gaps where the boat's canopy was fastened to the transom.

During tests with *Emma Louise* in its as found condition MAIB inspectors measured accumulated CO levels in the covered cockpit that were capable of causing damage to health and collapse within 35 minutes. With no CO detector fitted it is likely that the two men were unaware of the danger and were overcome soon after starting the engine, fell unconscious and died later that evening.

Safety lessons

1. CO is always present in the exhausts of engines and appliances such as cabin heaters and portable generators that run on fossil fuel. CO is colourless, tasteless and odourless and difficult for people to detect. It is therefore essential that CO alarms are fitted in areas where CO can accumulate and pose a risk to health such as the cabins and cockpits of motor cruisers. When selecting a CO alarm, preference should be given to those that meet safety standard BS EN 50291-2:2010, which are designed for use in a marine environment. It is essential to fit detectors following manufacturer guidance, test them routinely using the test button and not ignore them should the alarm sound.

2. Exhaust gases containing lethal CO can accumulate inside a boat even when it is underway. Boat users should ensure that all spaces are well ventilated, including those under a canopy or awning. Never ignore the smell of exhaust fumes in any enclosed space.

3. Although external engine exhaust outlets are intended to discharge exhaust fumes into the open air, the wind, aerodynamic effects and the proximity of nearby structures can result in the fumes entering the boat. Boat users should ensure that exhaust outlets are clear from obstructions. In this instance, it is likely that the two men's exposure to CO would have been at a much lower level and would not have resulted in their deaths if the ringo on the transom had not helped funnel the exhaust gas into the covered cockpit.

4. The symptoms of CO can be similar to those of a cold, the flu or a hangover; warning signs include headaches, dizziness, nausea, vomiting, tiredness, confusion, stomach pain and shortness of breath. Over the past 10 years, the MAIB has investigated five accidents that involved CO poisoning, including this one, which have resulted in the tragic loss of nine lives on pleasure boats. If CO poisoning is suspected, stop the source immediately, move to the open air and seek medical attention.

To support the UK government's Carbon Monoxide Awareness Week 2022, MAIB's Chief Inspector shared safety critical advice with boat users:
https://www.gov.uk/government/news/carbon-monoxide-awareness-week-2022

MAIB also released an information video with simple ways to keep you safe:
https://www.youtube.com/watch?v=jNatvhBrlqo&ab_channel=MarineAccidentInvestigationBranch

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

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Publication date: April 2023

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE FISHING INDUSTRY

Fatal man overboard from the lone-operated creel fishing vessel *Harriet J* (AH180) west of Fast Castle Head, south-east Scotland, on 28 August 2021

Narrative

In the early hours of 28 August 2021, the lone-operated creel fishing vessel *Harriet J* left St Abbs, Scotland, accompanied by two other fishing boats. The three vessels proceeded west around St Abbs Head and along the coast towards Siccar Point where *Harriet J* started working creels to the west of the bay.

Harriet J

At about 0730, the skipper finished hauling the fourth fleet of the morning and reversed *Harriet J*'s course ready for shooting; the vessel settled on a heading of 095° at a speed of 5.4 knots over the ground. The skipper shot the fishing gear through *Harriet J*'s shooting door when the vessel was aligned with the previous position where the fleet had been laid.

It appears that, at 0736, the skipper was pulled through the shooting door and into the water; it is likely that his right foot was caught in the fishing gear while he was attempting to clear a snag during the shooting operation. With the throttle set, *Harriet J* continued on its course.

The skipper of one of the accompanying fishing boats noticed the advancing *Harriet J* and attempted to contact its skipper by very high frequency radio but received no response. He was concerned by the behaviour and heading of the vessel and set off in pursuit, raising the alarm as he did so. Once he had manoeuvred alongside *Harriet J*, his crew member boarded the vessel and discovered that it was unmanned.

The alarm was raised and Aberdeen Coastguard launched an extensive search and rescue operation involving several assets and local vessels. At about 0900, *Harriet J*'s skipper was recovered from the sea and, at 0906, transferred to a rescue helicopter. He was taken to Edinburgh Royal Infirmary but declared deceased less than an hour later.

The MAIB investigation found that *Harriet J* motored away from the skipper after he was pulled into the sea, and so he was unable to reboard the vessel. The skipper was neither wearing a personal flotation device (PFD) nor carrying a personal locator beacon (PLB), despite *Harriet J* being equipped with both, and he succumbed in the water before he could be found.

In the 5 years before this accident there have been eight fatal accidents involving UK fishing vessels under 15m in length where a person went overboard. Of these, four were lone-operated boats and four were the result of entanglement in the gear. All were creel (or potting) vessels. Only one of the fishers who died was wearing a PFD and none was carrying a PLB.

Safety lessons

1. There was no means of separating the skipper from the fishing gear on the deck of *Harriet J*. Although a pound board ran along the starboard side of the working deck, the equipment stowed behind it meant that it was impossible for the skipper to access the deck without placing himself near to the fishing gear. The presence of an effective physical barrier between the skipper and the gear would have helped him to stay safe while shooting the gear and clearing any snags.

2. The skipper was working alone on deck without a PFD. Once he entered the water, he had no means to help him stop the boat, assist him to get back on board or remain afloat. Without any additional buoyancy in the cold water, the likelihood of his survival was significantly reduced.

3. An activated PLB quickly initiates a search, enables rescuers to focus their search and improves the chances of finding someone in the water. In this case, the alarm was raised relatively quickly from a nearby boat, but it still took more than an hour to find the skipper in the water.

4. Lone fishing is a high-risk profession that continues to cause fatalities. Publications such as the Maritime and Coastguard Agency's *Fishermen's Safety Guide and Single handed fishing guide* provide invaluable information on how fishers can prepare risk assessments and deal with the hazards they face. Further guidance is also available on the FISG Home and Dry safety campaign website (https://www.homeanddry.uk).

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

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MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE FISHING INDUSTRY

Fatal man overboard from the stern trawler *Copious* (LK 985), approximately 30 nautical miles south-east of the Shetland Islands, Scotland, on 18 February 2021

Image courtesy of David Meek (marinetraffic.com)

Copious

Narrative

On 18 February 2021, at night and in a 3m following swell, a deckhand drowned after falling overboard from the twin rig stern trawler *Copious* while he was attempting to repair the gear.

The deckhand had identified a failed hammerlock while hauling the nets and had climbed onto the aft bulwark on the vessel's main deck to attempt a repair. He lost his balance and fell overboard. The deckhand was conscious and wearing a lifejacket, which automatically inflated. Although he was quickly brought alongside the vessel, the crew's attempts to recover him back on board were unsuccessful. The crew had practised throwing a lifebuoy and deploying the man overboard recovery equipment during man overboard drills. However, the lifebuoy was thrown to the deckhand after he became unconscious, and the recovery equipment was left unused. The MAIB investigation found that *Copious* did not carry the required supplementary equipment for its man overboard recovery system to be used to safely recover unconscious casualties.

The deckhand's lifejacket was not being worn correctly and it did not keep his airways clear of the water when he succumbed to the effects of cold water incapacitation and fell unconscious. The deckhand was unresponsive when recovered from the water by a coastguard helicopter and he was pronounced dead on arrival at hospital.

Safety lessons

1. The deckhand stood on the aft bulwark without taking any safety precautions to prevent him falling overboard. Working over the side of the vessel, especially from a vulnerable position like a bulwark, should be avoided unless absolutely necessary. Essential tasks must be carefully considered, and control measures that reduce the risk of falling overboard to an acceptable level must be put in place and communicated to the crew.

2. The deployment of the man overboard recovery equipment was among the first actions taken during drills that had been practised on board. However, the recovery equipment was not deployed when the deckhand fell overboard, which significantly reduced his chances of recovery while still conscious. It is vital that realistic man overboard drill scenarios are practised to ensure an effective and prompt response in a real situation. The early deployment of the recovery equipment in this case would have significantly improved the deckhand's chances of recovery and survival.

3. There was little chance of recovering the deckhand back on board once he had fallen unconscious. This was because the crew were unaware that supplementary training and equipment were needed for the safe recovery of an unconscious casualty using the onboard man overboard recovery system. When selecting recovery equipment it is essential that its suitability for recovering unconscious casualties is considered.

4. The deckhand was wearing an auto-inflate lifejacket, which inflated when he fell overboard. Unfortunately, the waistbelt was very loose and the crotch strap had not been used, which meant that when he became unconscious it rode up around his face and he drowned. The manufacturer's instructions on how to correctly wear inflatable lifejackets should always be followed as this will afford both the casualty and their crew mates precious extra time during a recovery attempt.

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