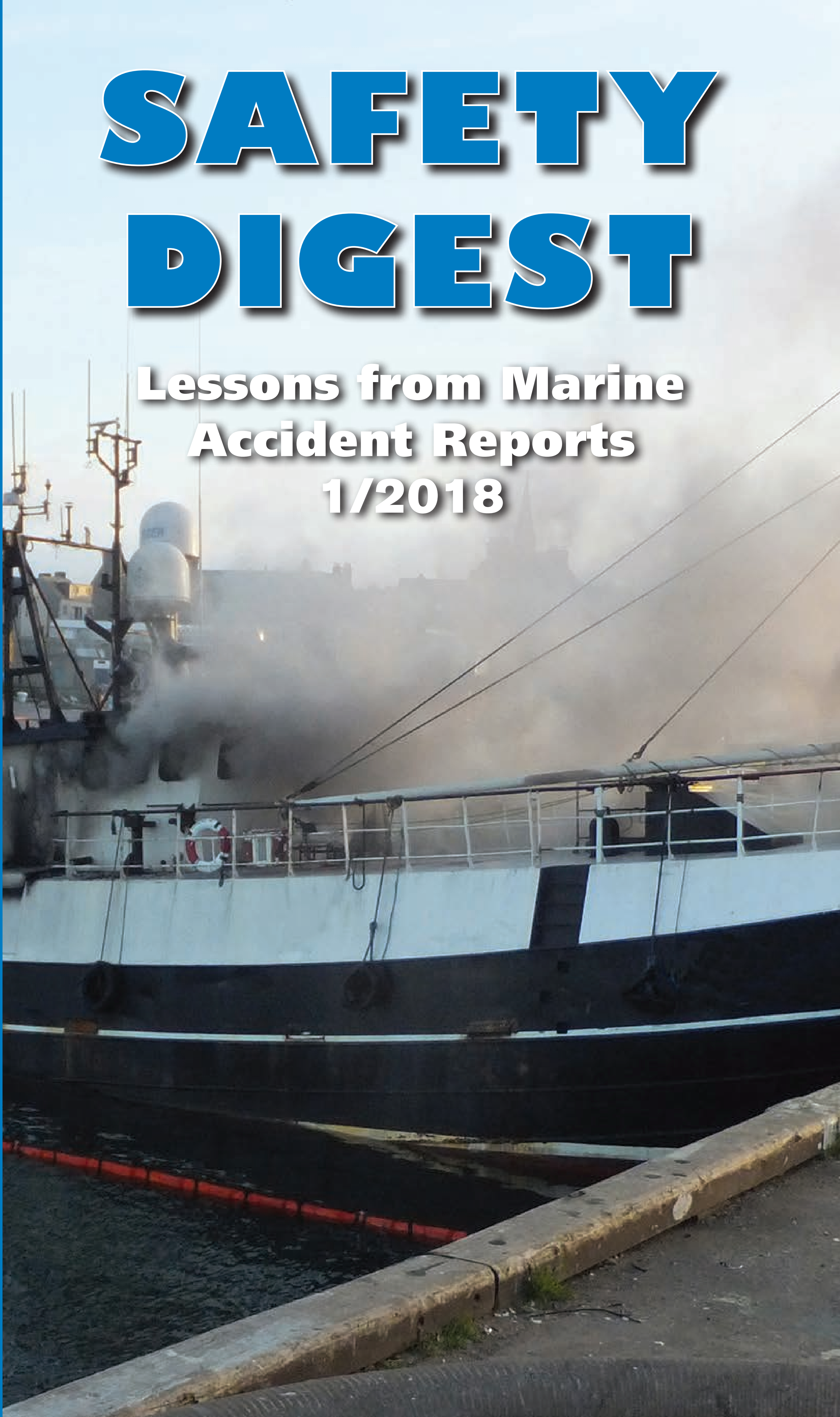
MARINE ACCIDENT
INVESTIGATION BRANCH

MAIB

SAFETY DIGEST

Lessons from Marine Accident Reports 1/2018



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Lessons from Marine Accidents

No 1/2018

MAIB

is an

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April 2018

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 a separate, 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 which has been determined up to the time of issue.

This information is published to inform the shipping and fishing industries, the pleasure 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, Jan Hawes, welcomes any comments or suggestions regarding this issue.

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MARINE ACCIDENT INVESTIGATION BRANCH

The role of the MAIB is to contribute to safety at sea by determining the causes and circumstances of marine accidents and, working with others, to reduce the likelihood of such causes and circumstances recurring in the future.

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

"The sole objective of the investigation 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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Glossary of Terms and Abbreviations

AB	-	Able Seaman
AIS	-	Automatic Identification System
ASD	-	Azimuth Stern Drive
C	-	Celsius
CCTV	-	Closed Circuit Television
COLREGs	-	International Regulations for the Prevention of Collisions at Sea 1972 (as amended)
CPR	-	Cardio-Pulmonary Resuscitation
DSC	-	Digital Selective Calling
ECR	-	Engine Control Room
EPIRB	-	Emergency Position Indicating Radio Beacon
FEW	-	Finished With Engines
GPS	-	Global Positioning System
IMO	-	International Maritime Organization
kts	-	knots
m	-	metre
"Mayday"	-	The international distress signal (spoken)
MGN	-	Marine Guidance Note
OOW	-	Officer of the Watch
OS	-	Ordinary Seaman
PFD	-	Personal Flotation Device
PTW	-	Permit to Work
RHIB	-	Rigid-hulled Inflatable Boat
RNLI	-	Royal National Lifeboat Institution
ro-pax	-	Roll on/Roll off passenger
ro-ro	-	Roll on, Roll off
RYA	-	Royal Yachting Association
SOLAS	-	International Convention for the Safety of Life at Sea
SOP	-	Standard Operating Procedure
UMS	-	unmanned machinery space
VHF	-	Very High Frequency

Introduction

As I write this, much of the country is slowly recovering from the effects of one of the worst snowfalls in a generation. It could be said that the chaos caused by a weather system described by the media as "the Beast from the East" was exacerbated by a collective failure to prepare for the worst. Regular readers of the MAIB's Safety Digest will be aware that failure by seafarers to prepare for the worst, or at least properly consider the potential risks before commencing a voyage, operation or task has been an enduring theme. I made a very similar observation when writing my first introduction to the Safety Digest in 2010 (and on several occasions after that!). Almost 8 years later, my final introduction provides the same message; most of the incidents described in the following pages could have been avoided had the protagonists taken the time, beforehand to simply ask themselves "what could go wrong?" and put in place appropriate control measures to prevent a bad outcome.

This edition of the Safety Digest contains an eclectic mix of safety lessons. Every accident provides a learning opportunity which often transcends traditional operational barriers. The importance of maintaining a proper lookout (Case 1), conducting effective passage planning (Case 3) and applying sensible maintenance regimes (Cases 4, 11, 14) has relevance for all sectors of our industry, as do the benefits of being prepared and doing the right thing when there is an emergency (Cases 19, 20, 23, 25). I would therefore urge you to take the time to read all the articles in this Digest – it is better to learn from the experiences of other seafarers, no matter what their background, than experience similar trauma first hand.

I am grateful to Grant Laversuch, Nigel Blazeby and Peter White for their sage and interesting introductions to the merchant vessel, fishing and recreational craft sections. I will be retiring from the MAIB in a few months and so I use this opportunity to also express my sincere gratitude to my staff, who have worked hard to produce successive editions of the Safety Digest on time and to a consistent standard during my time as Chief Inspector. Special thanks go to the MAIB's Technical Editor, Jan Hawes, who has steadfastly supervised the production of every Safety Digest almost since its inception.

In closing, I would also like to thank the readership of this Safety Digest for their continued support and for the very positive feedback you have given me over the years. Keep safe and best wishes for the future.

Steve Clinch.

Steve Clinch MNM
Chief Inspector of Marine Accidents

April 2018

Part 1 – Merchant Vessels

Here at P&O Ferries we have been running a course based on the human element for a number of years. Shortly after the start of each course, once we have looked at the first case study, invariably after a few minutes the C word appears; complacency. It is an easy way to explain a multitude of errors away, but if we really understood what complacency was, it wouldn't exist. Complacency isn't unique to seafarers; it is a weakness of human beings. We are all vulnerable to complacency in our daily lives. There are many definitions of complacency, however for me it is when we feel comfortable with something and start to let our guard down.

On the next page are details of a fatal accident that are similar to one we suffered on one of our vessels last year. The seafarer involved was highly experienced, well-qualified and had worked on board this vessel for five years. He was professional, well trained and certainly knew the risks involved in working on a vehicle deck. He did the same work every day, worked with the same people every day, and no doubt started to feel comfortable in the job he did. On this day he made one mistake and put himself into a place of danger. The consequences were tragic and the impacts were huge to him, his family and his colleagues. It could be said that he had become complacent. As I said before, complacency is something common to all human beings, but in a high risk industry like shipping the consequences are so often tragic.

The best example that I have seen of how complacency creeps up on us in our seafaring career, is demonstrated as follows: In the five years that I have been in this position at P&O I have interviewed 43 deck officers for the command interview before they take command for the first time. While many of these new captains have since been involved in incidents, none of those incidents were construed to have been caused by complacency. However during that same time, we have had some incidents that were complacency driven and without exception these have involved very experienced masters. I know with the passage of time those 43 younger Captains will be at risk of moving into the complacency trap.

How do we, as seafarers, guard against falling into this complacency trap? For me it is about never fully feeling comfortable in anything we do. The day we feel fully comfortable in anything we undertake, is the day that we are in for a nasty surprise.

We are all human and we all make mistakes, seafarers and management alike. We all need to acknowledge this, recognise our mistakes, share and support each other, challenge ourselves and challenge others.

GRANT LAVERSUCH
P&O FERRIES

Grant Laversuch is the Head of Safety Management and Designated Person Ashore at P&O Ferries. Grant started his career as a deck Cadet with Ocean Fleets before moving onto Shell Tankers UK and then Cunard. After fifteen years at sea, the last five years on the QE2, Grant moved ashore.

The first two years ashore was in Cunard's New York office working on cruise planning. This was followed by three years of cruise ship planning on a self employed basis. Grant then moved to Saga Cruises and spent 13 years as the Operations Director there.

The last five years has been at P&O Ferries. Grant sits on the Standard Club's Loss committee, is a member of the Nautical Institute and the Honourable Company of Master Mariners.

Ro-Pax - Vehicle Deck Fatality

An experienced AB was acting as a banksman for the loading of an unaccompanied piece of freight that was being loaded by a tug-master. The crew member became trapped between the rear of the trailer and a vent housing. He was fatally injured.

The vessel completes a 24 hour rotation between two ports, six days a week. The deck crew were employed to load and lash vehicles. Five crew were involved in this operation on the upper vehicle deck and were loading two pieces of unaccompanied freight being reversed in by a shore tug-master.

Normally crew members guiding reversing freight into position stand in a position of safety while they are directing the tug driver. Once the trailer is in the correct position a whistle is then blown by the banksman to indicate that the tug should stop.

The tug driver reversed the trailer, jack-knifing to the left and right to achieve a straight trajectory and line the trailer up with the freight already parked. He was expecting to hear a whistle signal from the banksman when the trailer reached the correct position. Meanwhile, the crew member acting as the banksman had moved from a position of safety and was crushed between the rear of the trailer and a vent housing. The whistle signal instructing the tug driver to stop was not given.

The Lessons

Although derived from the company's internal investigation, the following lessons are also relevant for the crews of many vessels engaged in ro-ro operations.

- A safe system of work is required to ensure no crew member moves into a dangerous zone behind moving freight.
- Whistle signals should only be used to stop a vehicle. **Whistle means STOP**.
- Crew members and tug drivers need to work as a team. **Watch my Back – always look after your team mates**.
- Training should involve both ship and shore teams working together.
- If the tug driver loses sight of the banksman he must stop.
- If the banksman loses sight of the tug driver he must blow his whistle.

Dented Fortunes

Narrative

In daylight and good visibility, a laden general cargo vessel commenced its passage to deliver bulk cargo and containerised goods to a group of islands; the ship did the same round-trip every week. Once clear of the harbour, the master and lookout left the bridge and the chief officer was left alone on watch. Having set course on the autohelm, the chief officer did some paperwork at the chart table and then sat down in the bridge chair.

A small bunker barge with a cargo of diesel fuel was on coastal passage ahead of the cargo ship. The vessels were on a steady bearing for about 25 minutes before colliding. The bunker barge quickly listed over 90º and both the master and crewman on board were extremely lucky to survive. The master escaped from the flooded wheelhouse through a window, and the crewman was washed overboard but managed to hold onto the bulwark top edge then climb back on board when the rush of water subsided.

The bunker barge suffered a large indentation below the waterline where it was struck by the cargo ship's bulbous bow (see figure). There was also significant flooding of the vessel, the main engine seized and there was some pollution from leaking fuel cargo.

The master pumped seawater into an empty ballast tank to correct the post-collision list. This reduced the stability of the barge to a dangerous level, but it was later towed back to the safety of a nearby harbour without further incident.

Figure: Indentation in the bunker barge's hull caused by the cargo ship's bulbous bow

The Lessons

1. Keeping a good lookout is perhaps the most fundamental watchkeeping requirement on any vessel; it is an essential task enshrined in Rule 5 of the COLREGs. In this case, both ships' watchkeepers were alone and not keeping a proper lookout so neither was aware of the risk of collision before the accident.

2. On board the cargo vessel, the chief officer missed opportunities to detect the bunker barge by visual, radar and AIS means; this happened because the repetitive nature of the vessel's tasking made him complacent and he allowed himself to be distracted by paperwork. On board the bunker barge, the master was on watch and was aware of a larger vessel approaching, but he did not monitor its relative movement, assuming that it would keep clear.

3. Lone watchkeeping is acceptable during daylight, in good weather conditions and low traffic levels where the OOW can focus on navigational safety. However, the decision to reduce to a lone watchkeeper needs to be taken with care, and all the associated risks properly assessed.

4. Understanding stability is critical for maintaining the safety of your vessel, especially if it is damaged. In this case, the master of the bunker barge pumped water into the vessel without understanding the effect on the damaged stability. This made the stability situation worse, not better, and could have resulted in the loss of the vessel and, potentially, the lives of him and his crewman.

Too Fast to Make Fast

Narrative

Two tugs were tasked to assist a car carrier that was arriving in port. The car carrier's pilot ordered one tug (Tug A) to make fast on the centreline forward, and the other (Tug B) to make fast aft. The weather was good, the sea was calm and there was a light breeze. An ebb tide was running.

The tug that was normally used on a ship's bow for this manoeuvre was unavailable for operational reasons. Tug A was an azimuth stern drive (ASD) tug and had occasionally been used as a bow tug. However, the tug's skipper had only conducted the intended manoeuvre (i.e. making fast on the centreline forward) in a tug fitted with a Voith Schneider propulsion system.

The car carrier was travelling at a speed of 6.5 knots (kts) through the water. Tug A approached the ship bow-to-bow, and a heaving line was passed from the ship to the tug. The tug's skipper then increased speed astern to clear the ship's bow. In doing so, Tug A started to 'yo-yo' directionally between port and starboard. The skipper was unable to counter the motion, and the tug was then overrun by the ship.

The car carrier's pilot immediately stopped engines. Tug A's skipper then managed to manoeuvre his tug clear of the ship, and to return it to its berth for damage assessment.

The Lessons

1. The skipper's experience of Tug A was limited and did not include operating it as a bow tug. He had therefore never manoeuvred it in a bow-to-bow configuration. While the skipper was very experienced, Tug A was not the tug that he was usually assigned to. Despite having not completed the bow-to-bow manoeuvre on this particular tug before, the skipper was nonetheless confident in his ability to carry it out.

   While a 'can do' attitude is admirable, a 'can do safely' approach is much better.

2. Bow-to-bow operations, while commonplace, are potentially dangerous. Only tugs that are designed for this role should be used. Tug A was an early ASD tug and, while manoeuvrable in many situations, it had a significantly different underwater profile from modern ASD tugs commonly used for bow-to-bow operations.

   Unlike a Voith Schneider tug or a more modern design of ASD tug, Tug A had a directional stability issue when manoeuvred astern, particularly at high speed.

3. Water pressure varies considerably at a ship's bow. The higher the ship's ahead speed through the water, the larger the pressure differences acting around the bow. A high pressure field directly in front of the ship reduces with distance from the bow. In this case, two different pressure fields acted at different points on Tug A's hull, causing the tug to 'yo-yo' directionally out of control.

   Industry guidance recommends that even with tugs more suited to acting as a bow tug, bow-to-bow operations should take place at speeds of less than 6kts through the water. In this case, taking account of the ebb tide, the car carrier was travelling in excess of 6kts through the water when the tug attempted to make fast.

Grounding on the Green Bit

Narrative

It was glassy calm, clear, warm and overcast when the skipper and crewman of a historic wooden passenger boat set off with 48 passengers on board for wildlife sightseeing. During the trip, the skipper manoeuvred the boat into a small, shallow bay in order for the passengers to enjoy a close-up view of seals basking on the nearby rocks.

After a few minutes, the skipper increased speed to head out of the bay when the boat struck an isolated rock, was holed and began to take on water. The skipper made a "Mayday" call using VHF radio, started all three electric bilge pumps and directed the crewman to issue lifejackets to the passengers and then inflate the liferaft.

There were a number of other small craft operating nearby that heard the "Mayday" call and responded immediately, helping out by evacuating the boat's passengers, who were then transferred ashore by the local lifeboat.

After the passengers had been disembarked, the boat floated off the rock unaided and made its way back to the safety of the harbour under its own power and with the bilge pumps keeping pace with the water ingress.

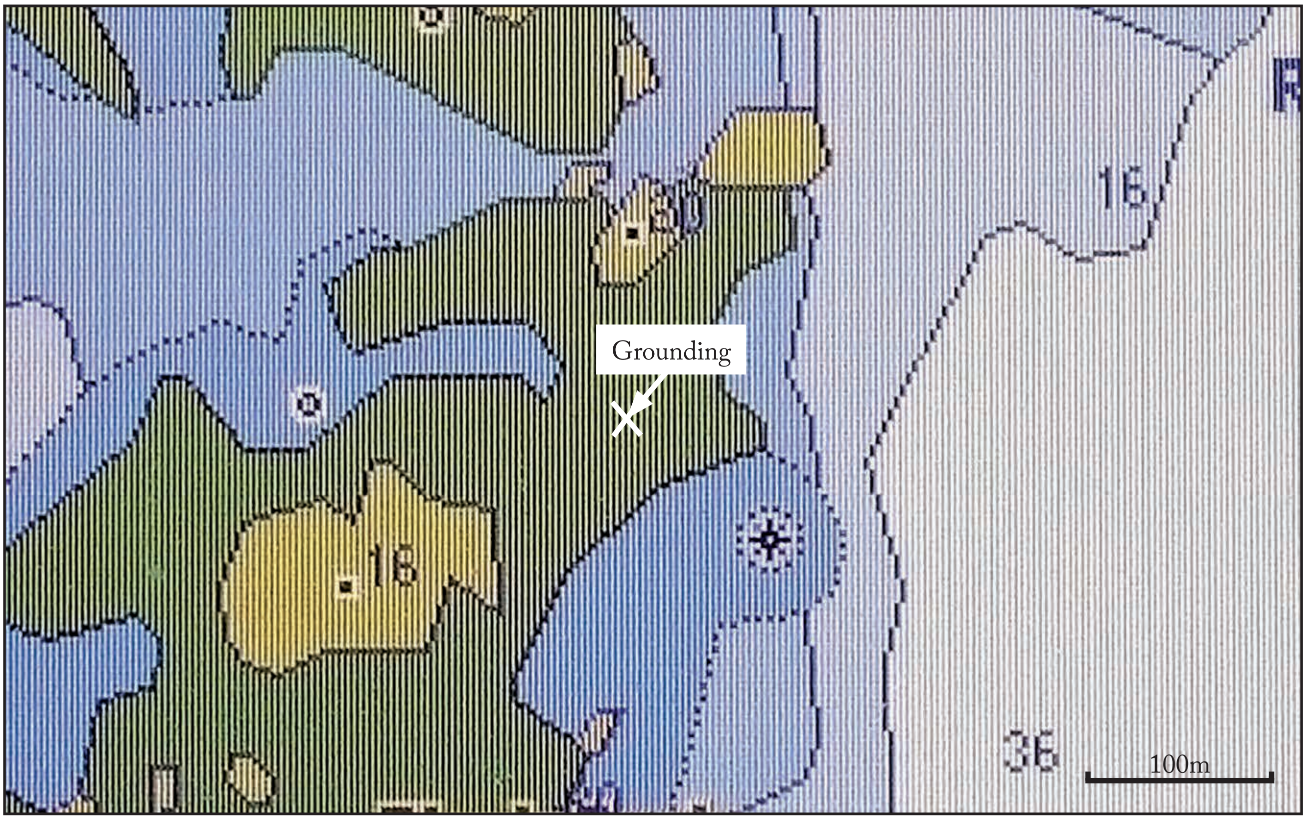


Figure: The grounding location on the intertidal area of the chart where no drying heights were shown

The Lessons

1. Whatever the nature of a vessel's task, every voyage needs to be properly planned and every plan should identify all the potential hazards that need to be avoided. In this case, the grounding occurred in an intertidal zone; this is the area between the high and low water marks and is coloured green on paper charts and electronic plotters. Navigating in intertidal areas needs to be undertaken with extreme caution. If there is a drying height (shown as an underlined number), it is possible to navigate safely where there is sufficient height of tide to account for the hazard heights and under keel clearance. However, in this case, there were no drying heights in the bay where the accident happened (see figure). This meant that the skipper was reliant on local knowledge or visual observation to prevent grounding. Unfortunately, the skipper was unaware of the exact location of every hazard at all states of the tide and had not seen the rock ahead, resulting in the grounding.

2. Electronic navigation aids can provide vital additional information for staying safe, especially in shallow waters. This historic passenger boat was not fitted with an echo sounder and the plotter's electronic charts were 10 years out of date. Although an echo sounder might not have provided sufficient warning to prevent this grounding, it would have aided the skipper's situational awareness. When persistently operating in the same shallow hazardous areas, familiarity with local depths would have been gained through echo sounder observations. Equally, keeping electronic charts up to date is important and simple plotter functions such as waypoints and cross track error alarms are helpful navigational features.

3. The actions of the crew, other local vessels and the lifeboat were swift and effective, ensuring all the passengers were safely transferred ashore. This was a good illustration of the importance of being ready for emergencies, which can happen in even the most benign conditions.

Are Your Fittings Leak Free?

Narrative

While alongside its berth, a coastal ro-ro passenger vessel was using its small auxiliary boiler to provide onboard accommodation heating while the main engines were shut down.

Shortly after the boiler began operating, the engine room fire alarm activated, indicating a fire in the vicinity of the auxiliary boiler. The vessel's engineers were mustered and sent to the engine room to investigate. When they approached the auxiliary boiler they saw flames inside the burner casing and smoke entering the engine room through the burner unit's melted sight glass (Figure 1). The engineers quickly shut the boiler down and put the fire out with a portable foam fire extinguisher.

When the boiler was examined, the engineers found that the internal fuel supply pipe to the burner nozzle (Figure 2) was leaking at a compression fitting. When the pipe was removed, one of its compression fittings was found to be worn and damaged to the point it could no longer provide a seal against the fuel pressure. Fortunately, in this case, the consequences of the fire were not serious. However, boiler explosions, including those resulting in fatalities, have occurred when there has been fuel leakage into a boiler furnace.

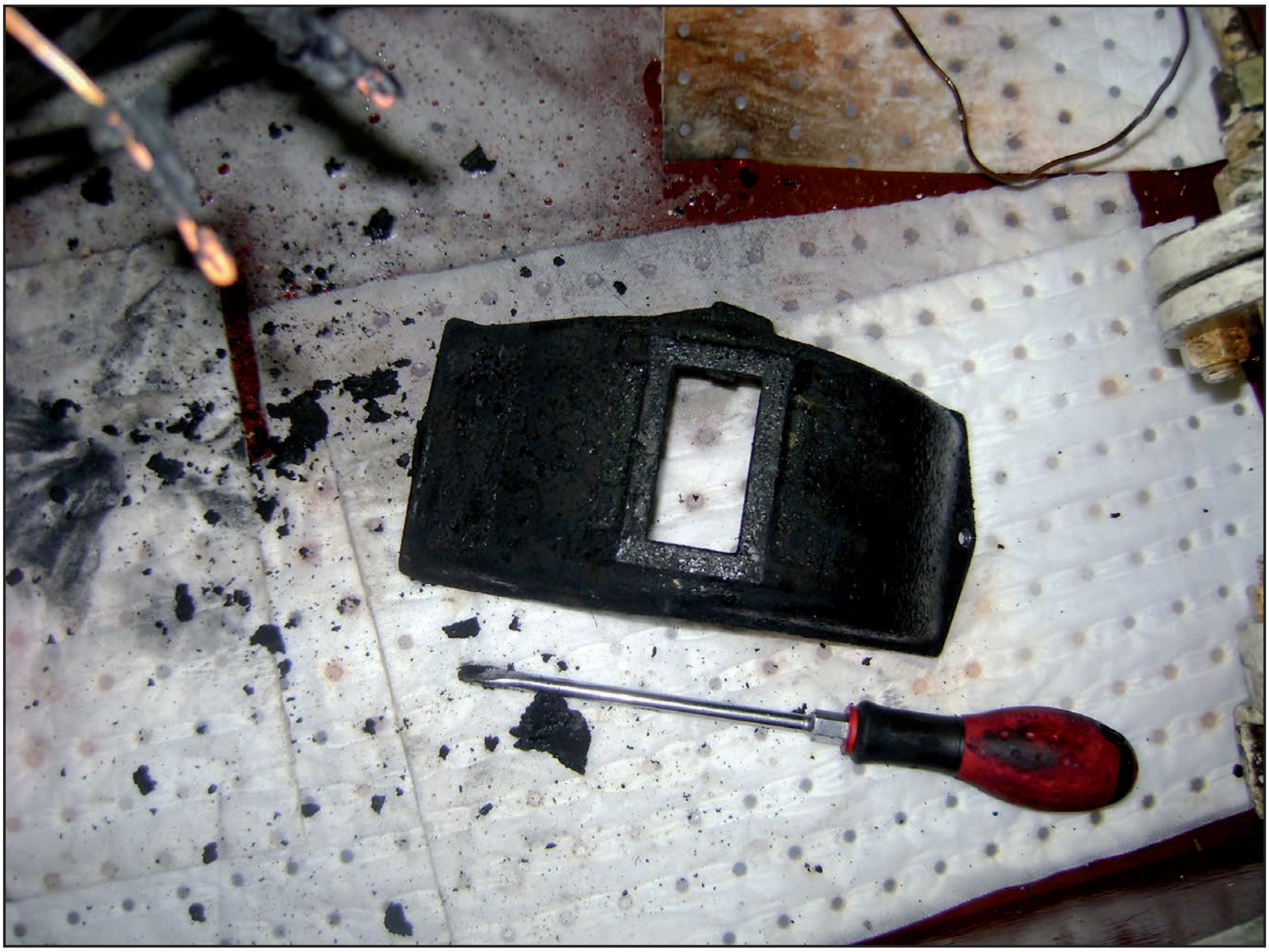


Figure 1: The burner unit's melted sight glass

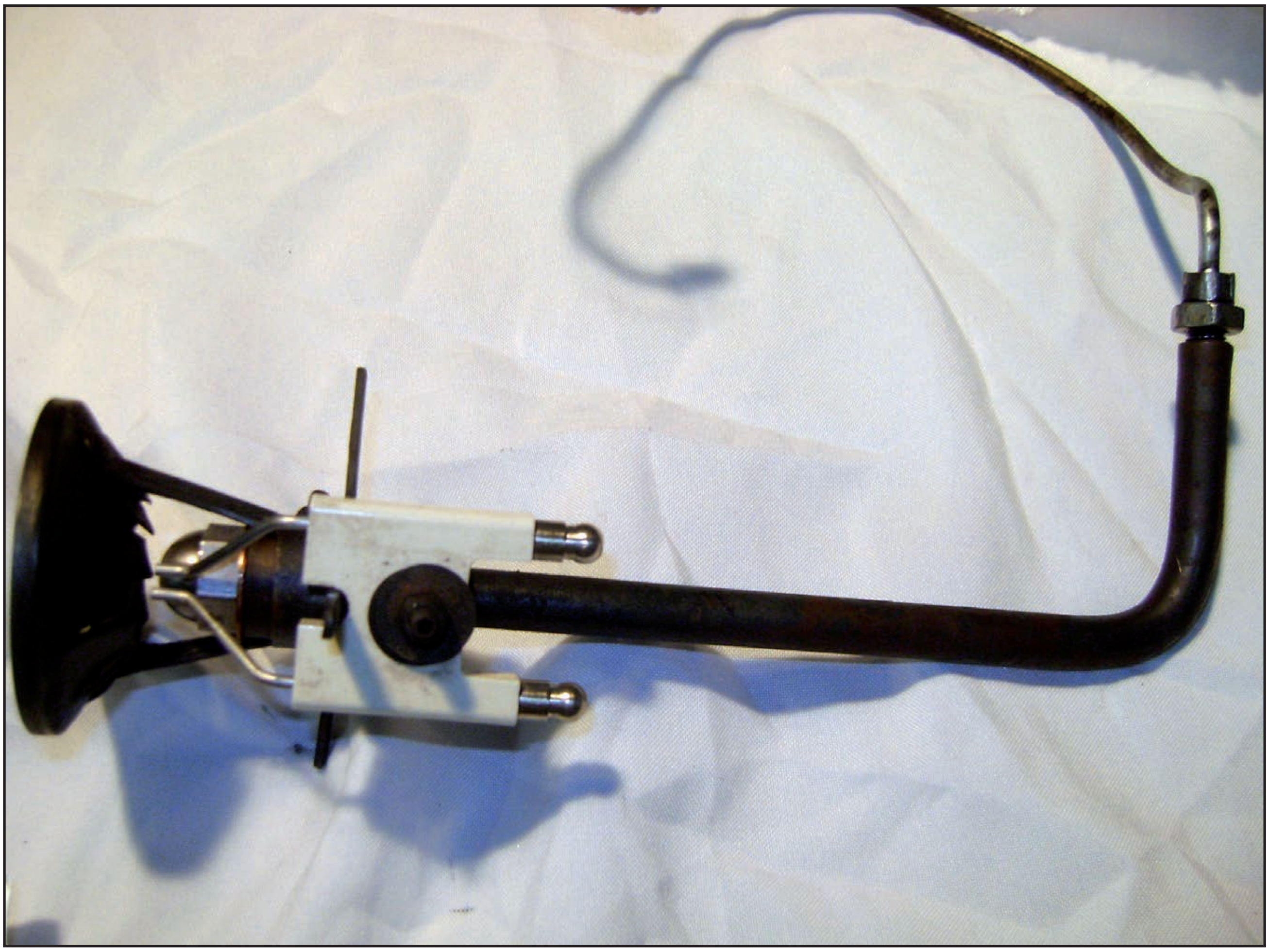


Figure 2: The leaking internal fuel supply pipe to the burner nozzle

The Lessons

1. Regular inspections of the boiler burner unit required the routine removal and refitting of the fuel supply pipe. This provided the opportunity for the condition of the pipe fittings to be assessed. However, as in this case, it also introduced the risk of damaging the seals. All work carried out to the fuel pipework and compression fittings should be closely inspected before being fitted; a zero tolerance on wear and damage will help minimize the risk of fuel leakage and the subsequent introduction of a fire danger.

2. Periodic inspections and maintenance are key to ensuring that equipment and machinery are performing correctly, and enable defects to be identified and rectified. Nevertheless, if the maintenance work introduces faults into the system then this is clearly counterproductive. Formal re-start procedures after an inspection should help ensure that leaks and ill-fitting parts are identified and addressed.

Too Much Speed Proves Fatal

Narrative

A tug (Figure 1) girted and capsized (Figure 2) while assisting a UK registered container ship departing from port. Two of the tug's five crew died as a result of the accident.

It was the 158m long container ship's first call at the port. The wind was pushing it onto the quay and there was a current running off the berth. The master, in conjunction with the port pilot, decided that a tug would be used to assist the ship to move clear of the berth during the departure operation.

The port's usual ASD tug was away from the port undergoing annual maintenance. A small, single screw tug had been brought into the port to provide temporary cover.

The tug was connected to the ship's port quarter to help pull its stern off the berth. During the manoeuvre, the prevailing wind and tidal conditions caused the ship to move towards an outlying mooring dolphin. To avoid striking it, the ship's master briefly increased ahead speed to 5kts, during which time the tug girted and capsized.

Figure 1: The tug

Figure 2: The capsized tug

The Lessons

1. The girting and capsize of tugs is an ever present risk if towing operations are not managed and executed safely.

2. Girting can rapidly lead to a tug capsizing. It occurs when high athwartships towing forces cause a tug to be pulled sideways through the water by the towline. If the tug is unable to manoeuvre out of this position it is likely to capsize. Single screw tugs with a low freeboard are at particular risk of girting.

3. The success of any manoeuvre involving tugs relies on the tug and its crew being capable of meeting changing manoeuvring demands. A common, detailed understanding of the plan, proactive communications between the bridge team, pilot and tug crew, and an agreed means for monitoring the tug throughout the towing operation are necessary.

4. The ship's master's and pilot's intention to apply ahead propulsion was not first communicated to the tug's crew by the pilot, resulting in the ship moving rapidly ahead before the tug could be manoeuvred in an attempt to prevent it from girting.

5. The tug's crew were inexperienced in this type of operation. The tug was not fitted with a gog rope and no emergency means were provided to release the tow rope under tension. As such, there was little that the tug's crew could do when the tug began to be towed by the ship. The tug also had open doors and hatches, and it is highly probable that their status contributed to the tug's rapid capsize due to downflooding.

Eye For An Eye

Narrative

A laden bulk carrier with a pilot on board was entering a port in the early hours of a dark winter's morning. Assisted by two harbour tugs, the ship was proceeding at slow speed towards an open lock gate.

One tug was standing by on the starboard side, assisting with the ship's alignment as it prepared to enter the lock. The second tug had been secured using the tug's line through the ship's centre lead aft.

As the ship approached the lock entrance the pilot instructed the stern tug to take some weight on the line, to slow the ship's progress. As soon as the tug put weight on the line it parted.

The pilot ordered full astern, and the tug that was helping with alignment moved quickly in an attempt to counter the resulting ship's swing to starboard. However, the ship's port quarter contacted a pier leading up to the lock entrance, causing damage to the ship's port side (Figure 1).

The tug recovered the parted line back on board. The messenger rope's eye, which was connected to the eye of the main towline, had parted (Figure 2). The crew on the bulk carrier's aft mooring deck had mistakenly placed the eye of the messenger rope rather than that of the towline over a bitt to make the towline fast.

Figure 1: Damage to ship's port side

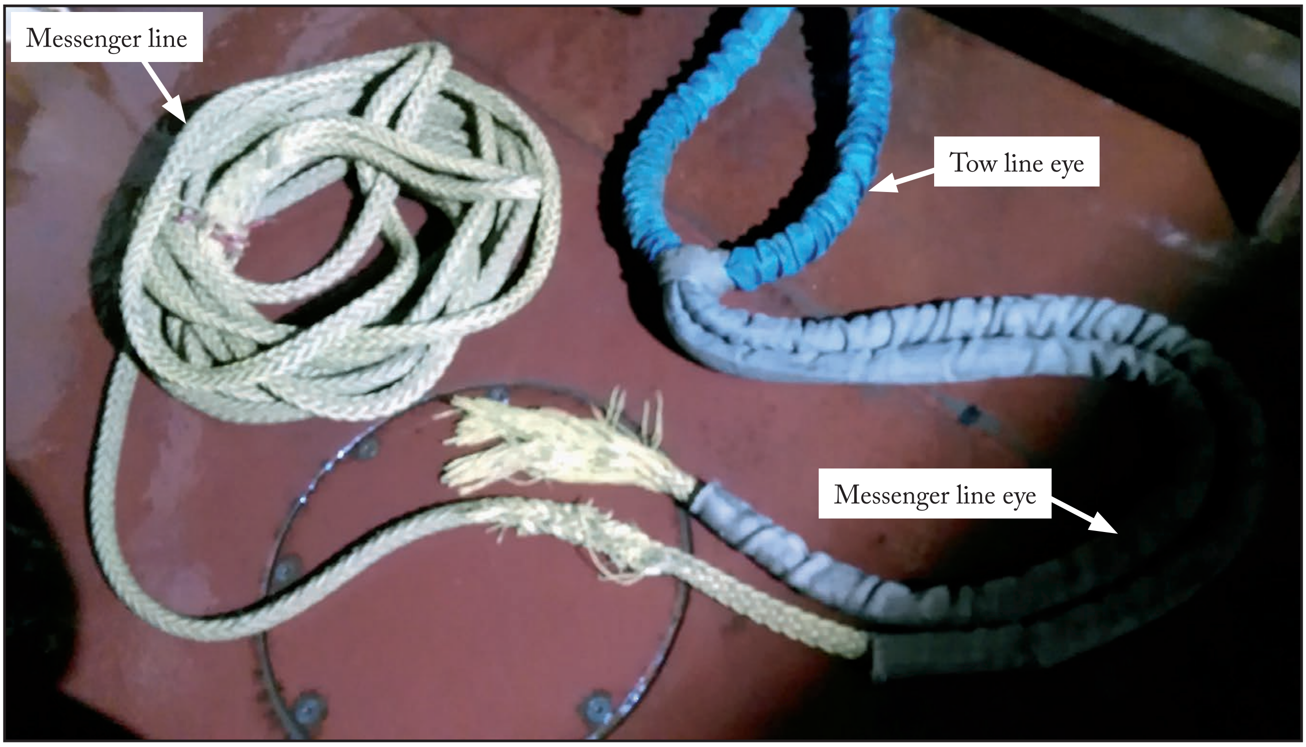


Figure 2: Parted messenger line eye

The Lessons

1. The messenger line's eye was similar in size to that of the towline and large enough to be readily placed over the aft deck mooring bitt. Although the cordage used for the messenger was smaller in diameter than the towline, the sleeves used on the eyes of both ropes were similar in appearance and led to the crew mistakenly placing the wrong eye over the bitts. The use of different coloured sleeves might have prevented the confusion.

2. Towing operations in harbour are routine tasks that are potentially hazardous or, as in this case, can lead to avoidable accidents if crew members fail to keep their wits about them at all times.

   It is especially important that the officer in charge of such operations can maintain an overview of the operation to ensure that safe working practices are maintained and mistakes avoided.

It's Just a Jump to the Left...

Narrative

A dive support vessel was alongside its berth undergoing several periodic surveys. The deck crew had lifted test equipment from the main deck level to two decks below, into a work space. The hatch at main deck level had then been closed but not fastened down in readiness for recovering the test equipment prior to sailing a few days later. To indicate that it presented a trip hazard, the crew had placed portable stanchions and chain barriers around the hatch, without fixing them to the deck.

A few days later the vessel was due to receive fuel from a bunker barge; during this operation the ship's crane could not be used. However, tests were complete and the test equipment was ready to be recovered to the main deck. The foreman decided that the lifts could be achieved before the bunker barge was due, and completed a pre-task assessment and safety briefing.

With the crew fully briefed for the task and aware of their own roles for the operation, the main deck hatch was raised and lifting operations commenced. The barriers at the main deck hatch remained in place to ensure that crew who were not participating in the lifts could clearly see the opening. When the bunker barge was sighted making its approach, the foreman stopped the lifting operations, but there was still some test equipment left to move.

To ensure that the vessel was secure and would be ready for departure as soon as possible after bunkering, the crew continued to move the test equipment by hand. Soon there was just a test skid left, which was too large to manhandle. The crew gathered to review what could be done to move the piece of equipment up to the main deck without using the crane.

It was decided to rig a series of two chain pulleys to conduct the lift. The first chain pulley was placed onto the pad eye above the main deck hatch. The second chain pulley was then placed onto the hook of the first, thus creating the necessary length to lift the equipment up two decks. After a quick toolbox talk, the crew took to their stations. Crew who were required to work inside the chain barriers to work the pulleys' chains donned safety harnesses with fall arresters before taking up their stations. The foreman was at the main deck hatch outside the chain barrier with a radio along with one crewman.

As the test skid was being lifted, the foreman took a step to his left to improve his view of the operation. As he did so, the foreman felt himself stumble towards the barrier. He tried to stop himself by grabbing a station, but continued onwards towards the opening. The crewman attempted to grab the foreman, but he was unable to do so and the foreman fell through the hatch and down two decks to the bottom deck, taking the barrier stanchion with him. He landed on his right side and lay prone on the deck. The foreman was immediately restrained by the crew to limit his movement and risk further injury, with attention being paid to possible head and neck injuries. He was later taken to hospital for the treatment of multiple fractures.

The Lessons

1. When rigging a barrier for an opening in the deck or when working at height, it is important to consider its effectiveness. Is the barrier there to stop a fall or to provide a visual prompt? The closeness of the barrier to the opening should also be considered; if it fails what will be the outcome?

2. It is not known what caused the foreman to stumble and fall. Whenever working at height or near openings where there is a risk of falling, due attention should be paid to your immediate working area. Consider wearing a fall restraint even if not directly adjacent to the drop.

3. Finding alternative ways of working can sometimes lead to a loss of situational awareness. Continuous assessment of how a task is being carried out can identify risks introduced by changes.

4. A casualty who falls from any height should be assumed to have suffered multiple injuries. When it is safe for them to remain where they are they should be kept as still as possible, as was the foreman in this case. Prompt medical advice and examination must be sought. Crew should be well versed in the required actions to be followed through regular, relevant toolbox talks and drills.

I've Got the Steering; or Have I?

Narrative

A passenger/ro-ro cargo ferry carrying 99 passengers and 53 crew grounded on a charted shallow area while arriving in port at low tide. It was morning twilight and the weather conditions were good. The vessel remained aground for over an hour and refloated on a rising tide. There was no resulting damage - except pride.

At the end of the sea passage, helm control was changed from autopilot to manual steering by altering the steering mode selector switch setting at the centreline helm console from 'auto' to 'helm', and a helmsman began steering the vessel. The master had the conn and he was assisted by the second officer on the bridge.

The master went to the starboard bridge wing in anticipation of commencing a turn to port towards the berth and then manoeuvring the vessel starboard side alongside. The speed was 13.5kts. The master took control of and tested the engines and the bow thruster. The helmsman remained at the helm, manually steering to the master's orders.

A short time later, the master pressed a selector button on the bridge wing console to take control of the helm, and then stated aloud that he 'had the helm'.

At the vessel's usual turn starting position, the master applied port helm on the bridge wing. However, the vessel did not turn and the master realised that there was a problem with the steering. He quickly split the engine controls and put the port propeller control astern. This reduced the speed and started to turn the vessel.

The master then sent the second officer to check the helm control system. On arrival at the centreline helm console, the second officer realised that the steering mode selector switch was still in the 'helm' rather than the 'call up' setting, which was required to transfer helm control to the bridge wing. He changed the selector switch to the 'call up' setting, and the master then took control of the helm on the bridge wing. However, it was too late, and the vessel grounded in a charted shallow area to starboard of the planned track.

The Lessons

The MAIB has investigated several accidents involving ferries that resulted from an omission to switch control from the centreline console to the bridge wing manoeuvring console during routine port arrivals.

The officers and crews of ferries are particularly vulnerable to such omissions as a consequence of routine familiarity and lack of previous incidents creating a potential for reduced situational awareness, as demonstrated in this accident.

1. The steering mode selector switch at the centreline helm console had four settings: 'auto', 'helm', 'call up' and 'nfu[1]' (Figure 1). The normal procedure when changing from autopilot to manual steering was to change the selector switch setting from 'auto' to 'call up'. The 'call up' setting allowed the vessel to be steered manually from the centreline helm console, and when a selector button was pressed on the bridge wing, to then be steered from the bridge wing. On this occasion, the selector switch was inadvertently changed to the 'helm' setting, which allowed manual steering from the centreline helm console only.

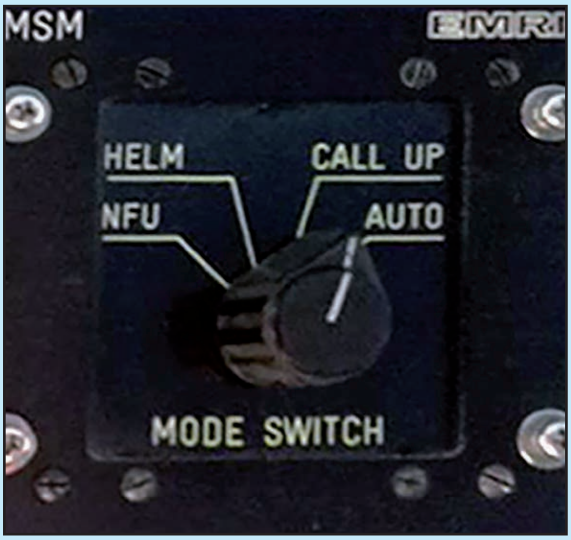


Figure 1: Steering mode selector switch

2. When the master went to the bridge wing and took control of the engines and the bow thruster, he tested them but did not report that he had done so. When he then pressed the selector button to take control of the helm, he reported to the remaining bridge team that he 'had the helm'; however, he omitted to test his control of the helm from the bridge wing.

   Positive reporting is a good thing. However, it is only effective if the positive report follows an affirmative test. In addition to testing and positive reporting, confirmation of receipt of the report ensures situation awareness by the bridge team as a whole.

3. A light panel indicated which station had control (Figure 2). However, none of the bridge team checked the indicator light panel to confirm that the helm control had been passed to the bridge wing.

   The bridge team no longer recognised the value provided by the indicator light panel.

Figure 2: Helm control station indicator light panel

[1] Non follow-up

Control is Everything

Narrative

A passenger/ro-ro cargo ferry arrived in port and berthed without incident. Its vehicle ramp was then landed and a shore ramp was lowered from an upper linkspan.

The ferry's manoeuvring controls had been set to a bridge wing for arrival and, on completion of berthing, the master transferred control back to the bridge centre console. He then shut down the bow and stern thrusters, informed the duty engineer in the engine control room (ECR) that he had finished with engines (FWE), and placed both backup telegraphs to FWE. With propeller pitch manual control retained on the bridge, the engine room team started to reduce the speed of the engines in preparation to declutch them. The standard operating procedure (SOP) required that, once both engines had been declutched, control was to be transferred to the ECR as a prerequisite to starting cargo discharge.

With propeller pitch still in bridge manual control, the master and second officer went to the chart room to complete end of passage paperwork and to begin preparations for the next voyage. Shortly afterwards, the cargo officer reported weight coming onto the stern mooring lines and the vessel moving ahead. The master promptly applied astern pitch to both propellers, and the cargo officer lifted the vehicle ramp. However, the upper linkspan shore ramp fingers dropped off the ferry and one mooring rope parted under tension, before the ahead momentum was arrested and the ferry came to rest approximately 15m forward of its original position.

The SOP was for the master to set both manual pitch controls to zero before placing both backup telegraphs to FWE. On this occasion, he had left the port propeller pitch control set at +2 and the starboard one set at -2. These settings were commonly used to hold the ferry in a neutral position until the mooring ropes were made fast. The duty engineer did not notice that the pitch controls were not set at zero before the engine room team started to reduce the speed of the engines in preparation to declutch them. As the port engine slowed, the engine management system automatically tried to compensate for the reduced engine speed by applying more ahead pitch to the port propeller, increasing it to 50% at one point, causing the ferry to move ahead.

The Lessons

1. This was a routine port arrival operation that had been carried out on numerous occasions over a period of several years. However, with all routine actions there is a risk that familiarity can compromise safety. The SOP required both manual pitch controls to be set to zero before engine speed was reduced. While the master was familiar with the routine of setting the manual pitch controls to zero before placing both backup telegraphs to FWE, he was equally familiar with the neutral, and hence apparently safe, position adopted by the ferry in setting the port propeller pitch at +2 and the starboard one at -2 during the final stage of mooring. He had not expected the consequences of reducing engine speed with the manual pitch controls not set at zero and, hence, had undervalued the SOP.

2. Operators must be familiar with the functionality of the equipment and systems that they are required to use. On this occasion, neither the master nor the chief engineer was aware of the full functionality of the engine management system. This lack of knowledge contributed to the SOP not being followed on this occasion.

   Machinery trials and operating procedures should identify the extent of the engine management functions, and suitable instructions and guidance should be available to operators. Following the accident, the ferry's deck officers were informed of the importance of setting the manual pitch controls to zero before reducing engine speed. The importance was also recognised in the form of an additional bridge checklist item and a requirement for the duty engineer to double-check the status of the manual pitch controls before reducing engine speed.

Hot Work Results in a Meltdown

Narrative

A ro-ro ferry was operating to a normal schedule with contractors on board to conduct repairs to an auxiliary boiler. The work was planned to start during an evening passage. The repairs involved hot work inside the boiler (Figure 1).

Hot work and enclosed space entry permits to work (PTW) were completed by the chief engineer and accepted by both the safety officer and the ship's master. The safety officer stressed the importance of maintaining a fire watch as a number of fire detector heads in the engine room were going to be isolated for the duration of the hot work.

The ferry sailed on schedule and work on the boiler was started as planned. On arrival at its destination port, discharge of passengers and vehicles commenced. The chief engineer then informed the safety officer that a small fire had occurred in the boiler about an hour earlier while the contractors were using flame-cutting equipment.

Investigations revealed that a portable light unit, used earlier in the day, had been left at the bottom of the boiler and that sparks from the cutting process had caused the unit to ignite. The contractors had reacted quickly and had extinguished the fire using fire-fighting equipment that had been located close to the work-site as part of the PTW requirements.

CCTV recording of the period leading up to the incident showed the fire watch moving potentially flammable material away from the area outside the boiler. However, the portable light unit (Figure 2), which was located inside the boiler, was not readily visible and so was left in place during the hot work.

Figure 1: Furnace access

Figure 2: Damaged light unit

The Lessons

1. It is vital that emergency procedures are followed. Although in this case the fire was successfully extinguished at an early stage, the master needs to be made immediately aware of all incidents that could affect the safety of the passengers, crew and vessel. Sharing of information also allows a review of actions taken and of potential consequences, such as re-ignition.

2. The raising of a PTW should always involve conducting a thorough risk assessment. In this case, the likelihood that the flame-cutting process would generate sparks should have prompted a thorough inspection of the surrounding area, both outside and inside the boiler, to identify and remove flammable items.

3. Paragraph 14.1.1 of the Code of Safe Working Practices for Merchant Seafarers states: '*Based on the findings of the risk assessment, appropriate control measures should be put in place to protect those who may be affected…*' The safety officer had cited the fire watch as an important control measure in this case. However, the particular danger posed by flammable items potentially left inside the boiler had not been identified by the fire watch.

Don't Forget to Check That You Can '*Let Go*' Before You Get Going

Narrative

A 21m aluminium windfarm support vessel was on an overnight coastal passage, returning post lay-up to its home port when it lost propulsion. Attempts by its two-man crew to anchor the vessel were unsuccessful and shore assistance was required to prevent it being set onto the shore.

In the early hours of the morning, the vessel's port engine shut down without warning and, despite repeated attempts by the crew, could not be re-started. The master alerted the coastguard of the situation and advised that he intended to continue on passage using the starboard engine.

About 4 hours later, the low fuel pressure alarm on the starboard engine sounded. In response, the master ordered his crewman to prepare the anchor for letting go. As the crewman arrived on the forecastle, the engine stopped and the order was given to let go the anchor. However, when the crewman released the windlass the anchor failed to 'free fall' (see figure).

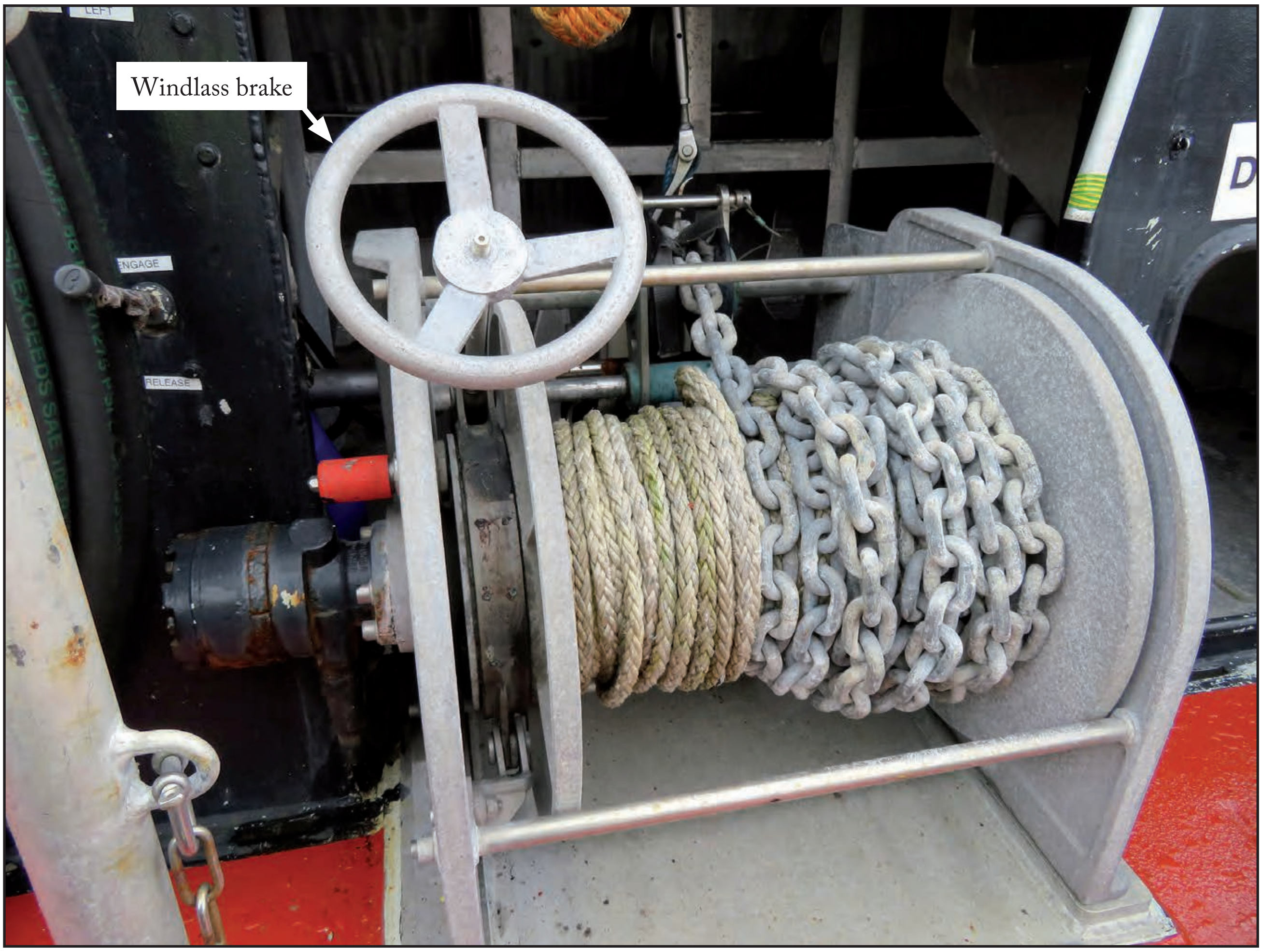


Figure: The windlass and brake

On seeing this, the master went aft and deployed the emergency anchor over the stern of the vessel. Once a sufficient amount of anchor rope had been payed out the master secured it to one of the vessel's Samson posts. As the weight of the vessel came onto the emergency anchor line the multi-plait rope parted.

Given the proximity of the vessel to danger, the master made a "Mayday" call to the coastguard, a lifeboat was deployed and the vessel was towed safely into harbour without further incident.

The Lessons

1. The port engine failed due to an electronic fault caused by water ingress, via a leaking hatch cover, into the diesel engine's electronic control panel. The starboard engine failed due to blocked fuel filters. Both issues were attributed to inadequate maintenance and operational routines. The hatch cover had not been properly sealed and the condition of the fuel in the vessel's tanks had not been monitored during the vessel's lay-up period. It is important to ensure that the seals on all watertight openings are maintained in good condition and that weather deck openings are kept closed during sea passages. Similarly, the condition of the fuels contained in storage tanks should be closely monitored and tank drains should be regularly checked for the presence of water or sludge.

2. One of the most significant safety issues identified in this incident was the crew's inability to anchor the vessel in an emergency. The post-incident inspection by the anchor windlass manufacturer revealed that the aluminium windlass bearings were clogged with dirt and, although it could still be operated under power, the debris prevented the anchor being 'let go' in the 'free fall' mode. A subsequent fleet-wide inspection revealed a similar defect in other vessels. This issue had not been previously exposed by either class or regulatory inspection. Following its investigations, the vessel operator introduced a planned maintenance routine that required weekly fresh water wash down of the windlass, anchor 'free fall' mode tests and an annual overhaul.

3. There was no documentation for the vessel's emergency anchor line and the residual strength of the multi-plait rope was not tested during the vessel owner's investigation. However, it was clearly apparent that the rope was not strong enough for the job. Following its investigation, the vessel operator sourced a new emergency anchor rope with a certified strength that was able to not only secure the vessel in an emergency, but also to do so without exceeding the safe working load of the vessel's Samson posts.

Nothing to See?

Narrative

A 187m long passenger/ro-ro cargo ferry carrying in excess of 400 passengers and crew was approaching a regular port in daylight. The bridge team were preparing to commence their arrival manoeuvre, which, once inside the breakwaters, involved turning the ship to starboard and then reversing and manoeuvring it port side alongside a berth located on one of a number of piers. It was a manoeuvre that the bridge team had carried out several times each day.

On this occasion, there was thick fog in the port with 200m visibility, and bright sunshine above the fog, resulting in significant glare.

The ship passed between the breakwaters and entered the port. The master had the conn and he was assisted by the chief officer on the bridge. A helmsman was steering the ship to the master's orders.

The master took control of the engines, thrusters and helm on the port bridge wing, and then commenced swinging the ship to starboard. The officer on the aft mooring deck reported clearing distances from the piers astern and the chief officer apprised the master of the ship's speed.

The officer on the aft mooring deck reported to the bridge team that he could see the intended berth and that the ship was swinging 60m clear of the pier astern. At this point, with the ship moving at 2kts ahead, the master set both combinator levers to 'stop'. He then temporarily repositioned himself on the bridge wing in an unsuccessful attempt to sight the intended berth astern.

Soon afterwards, the master moved both combinator levers to 30% ahead. The ship's speed quickly increased to 3kts and the officer on the aft mooring deck reported that the distance to the pier astern was now 80m. The master then moved the port combinator lever to 40% ahead, and asked the chief officer to change the docking radar display to the aft scanner. Soon afterwards, the master moved both combinator levers to 45% ahead, increasing the ship's speed to 5kts.

The master then recognised that the ship was moving ahead rather than astern as he had intended, and he moved both combinator levers to 50% astern. The helmsman shouted '*got the ship ahead of us*' followed by '*we are still doing 6 knots*', to which the master set both combinator levers to 90% astern and ordered the starboard anchor be let go.

Port control called the ship (see figure - Vessel A) on VHF radio advising of its close proximity to the ship berthed (see figure - Vessel B) on the breakwater ahead. The master activated a pre-recorded message on the public address system instructing passengers and crew to brace for an impending collision. However, the combined effect of the astern propulsion and deployed anchor prevented contact with the ship ahead, but only by 3m.

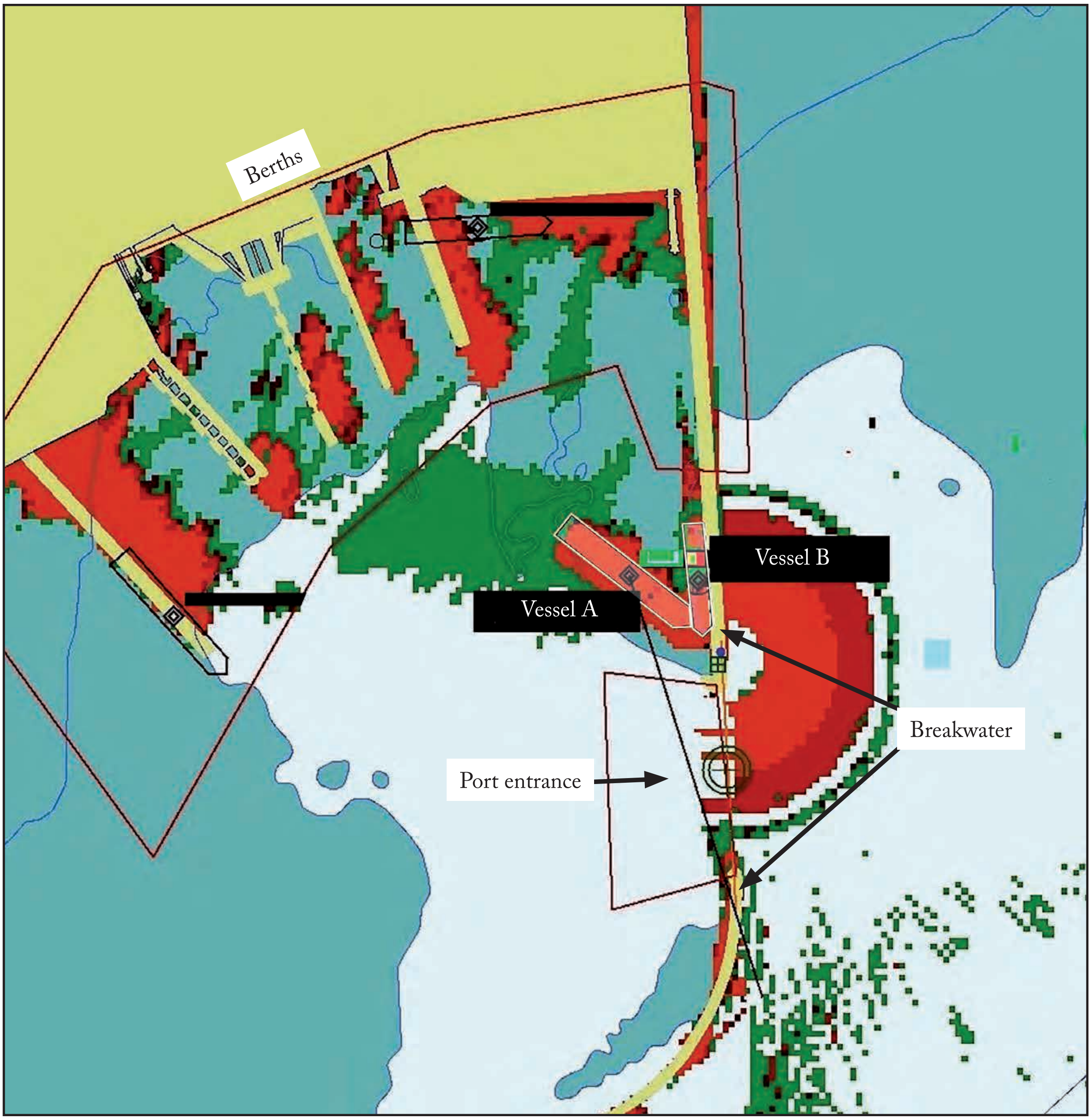


Figure: Radar picture from port control showing the proximity of the two vessels

The Lessons

1. While manoeuvring in restricted visibility with no visual shore references, it can be very easy to lose situational awareness in the confines of a regular port when manoeuvring is normally achieved by sight.

   Blind pilotage means the navigation of the ship through restricted waters in low visibility with little or no recourse to the visual observation of objects outside the ship.

   To navigate safely in restricted visibility, blind pilotage is knowing your ship's position, course and speed made good, as well as its handling characteristics, such that the ship is guided on its intended track in a precise fashion using all appropriate instruments and electronic displays to hand.

   Blind pilotage is a worthwhile skill that can be practised regularly in clear visibility. Mariners must be able to trust their electronic equipment and instruments, know which settings and scales work most appropriately for the intended manoeuvre, and proactively apply their skills and knowledge when conditions demand.

   In this case, the master was ill-prepared to conduct the astern manoeuvre without sight of the ship's intended berth. Instead of monitoring the electronic navigation aids available and noting the reported increasing clearing distance astern, he lost focus and mistakenly applied ahead propulsion in an attempt to gain his normal visual reference astern.

2. Manoeuvring a ship in close proximity to a berth is a dynamic process, and one which requires teamwork as well as skill to achieve safely, particularly in restricted visibility.

   Effective bridge resource management requires a continual flow of information between members of the bridge. A good practice is for the master, or whoever is manoeuvring the ship, to state aloud what he intends to do and when he is actually doing it. This allows the team to work together, from the same shared plan, enabling the team to monitor and immediately challenge any deviations from the plan.

   In this case, 56 seconds passed from the master's application of ahead propulsion to his mistake being recognised. However, the helmsman's focus, and shouted warnings concerning the ship ahead and the ferry's speed, were commendable. Furthermore, the subsequent actions of the bridge team to recover the situation - letting go the anchor, applying astern propulsion and instructing passengers and crew to brace, were effective and ultimately prevented far more serious consequences.

Anchor Watch Can Be a Drag

Narrative

Owing to forecast bad weather, a ro-ro cargo vessel sailed from port and went to anchor to allow the weather front to pass through. The local pilot recommended a sheltered anchorage with good holding ground.

The vessel anchored in the position recommended by the pilot, in 45m of water, using its port anchor with 8 shackles in the water.

At 0155, the second officer on watch on the bridge suspected that the anchor was dragging. The wind was gusting to 45kts. He called the master and the duty engineer telling the duty engineer that the engines and thruster were required as soon as possible. The master requested the attendance of a tug, and crew were sent to anchor stations.

On arrival on the bridge the master tried to turn the vessel to port using the bow thruster to counter the effect of windage on the port side. The anchor cable was leading abaft the port beam with very heavy weight. However, the bow thruster had insufficient power to turn the vessel and the windlass could not recover the cable.

At 0215, control of the engines was passed to the bridge. The engines and thruster were then used to bring the stern of the ship into

Figure: Hull indentation

the wind, successfully reducing the windage. This manoeuvre stopped the vessel dragging, but the close proximity of charted rocks meant that it was unsafe to recover the anchor.

While the master successfully avoided making contact with the rocks, the vessel's stern grounded on a shoal. All tanks were sounded and there was no indication of any damage. The echo sounder was indicating 21m under the vessel's bow.

At 0422, a tug arrived and began pushing the vessel away from the rocks. As the weight came off the anchor cable, it was heaved in, and the vessel was able to proceed to a place of safety.

A subsequent inspection identified indentation of the bottom plates in way of the engine room (see figure). There was no water ingress and the vessel was able to sail to its next port, where a dive survey took place.

The Lessons

1. While the pilot recommended a suitable sheltered anchorage, his recommendation was based on anchoring ships with significantly less windage.

   When planning any anchorage, particularly with bad weather forecast, it is imperative to allow sufficient sea room. The anchorage position should be sufficiently far from charted hazards to allow time to deal with a situation should the anchor begin to drag. The master did not consider the possibility of the vessel experiencing stronger winds than those forecast, which was the case in this incident. A higher wind speed increased the potential for the vessel to drag its anchor.

   The International Chamber of Shipping's *Bridge Procedures Guide, Chapter 2.4.10* provides guidance on planning an anchorage.

2. The Nautical Institute publication entitled '*Mooring and Anchoring Ships – Principles and Practice*' provides detailed information regarding anchoring operations. It references assumed worst conditions for vessels at anchor, discusses methods of anchoring, and suggests considerations for deciding the amount of anchor cable to deploy. A commonly used formula for calculating the minimum number of shackles of anchor cable to deploy is 1.5 x square root of the water depth (measured in metres).

   In this case the ship deployed 8 shackles of anchor cable in 45m of water. Based on the above guidance, particularly in view of the poor weather forecast and the ship's significant windage, at least 10 shackles of anchor cable should have been deployed. Alternatively, the master could have opted not to anchor but to instead proceed to sea.

3. When the vessel was anchored, the engine room was usually operated as an unmanned machinery space (UMS). In this case, due to the proximity of hazards and the poor weather forecast it would have been prudent to keep the engine room manned overnight.

   The decision to allow the engine room to operate in the UMS mode overnight led to a delay in the engines and thruster being made available to the bridge when they were needed.

4. The importance of keeping an effective bridge anchor watch is often overlooked. In this case, the second officer who was on watch suspected that the vessel was dragging anchor and alerted the master and woke the duty engineer before the GPS anchor watch alarm had sounded. His prompt actions ultimately prevented a deteriorating situation developing further.

Poorly Maintained Pilot Ladder Results in Rapid Transfer

Narrative

Three engineering technicians were preparing to disembark from a 180m long bulk carrier that was departing from port. The technicians had completed works on the ship during its outbound river passage.

The bulk carrier was in ballast with a freeboard of more than 11.5m. At the pilot's request the ship's crew had rigged a combination ladder on the starboard side, comprising an accommodation ladder and pilot ladder. A pilot boat came alongside with the intention of embarking the three technicians followed by the port pilot. The ship's bosun and an OS were at the ladder to supervise the disembarkation.

The three technicians proceeded to walk down the accommodation ladder to the top of the pilot ladder. With the pilot boat in position alongside the ship's side, the first technician began to descend the pilot ladder. The first technician was about 1.5m from the pilot boat's deck when the second technician stepped onto the pilot ladder. The pilot ladder immediately failed. Both of the ladder side ropes parted, and both technicians fell approximately 1.5m and 7m respectively (Figure 1). Both were subsequently taken to hospital by ambulance, but fortunately neither sustained serious injuries.

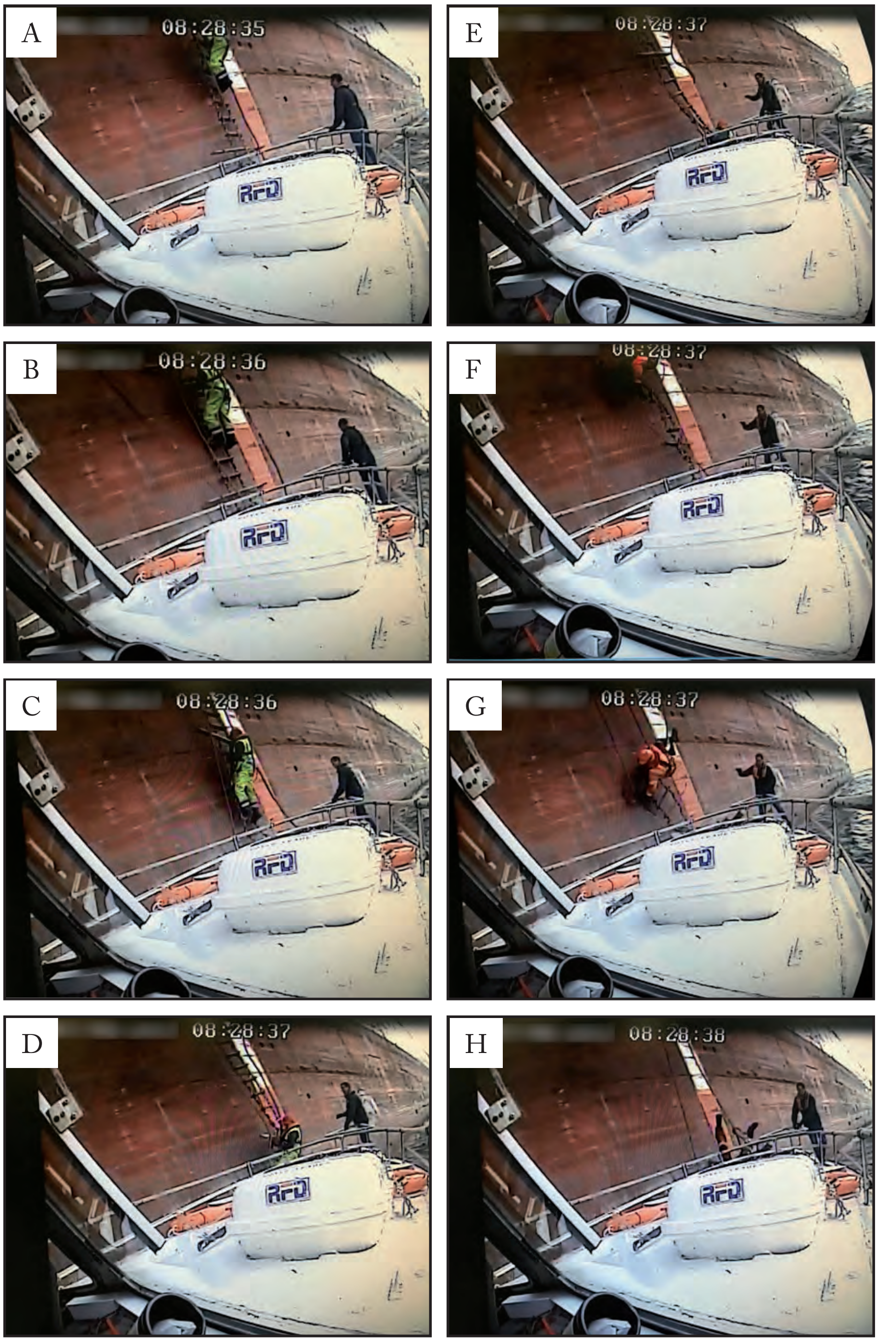


Figure 1: Stills from CCTV showing failure sequence

The pilot ladder that had failed was only 15 months old. An internal investigation by the company found that the pilot ladder side ropes had failed through exposure to salt deposits and sunlight (Figure 2), which the ship's crew had not identified.

The Lessons

1. The IMO Convention for Safety of Life at Sea (SOLAS) Chapter V, Regulation 23, sets out the principal requirements for the rigging of pilot ladders. This regulation states that '*Pilot ladders shall be kept clean, properly maintained and stowed and shall be regularly inspected to ensure that they are safe to use. They shall be used solely for the embarkation and disembarkation of personnel.*'

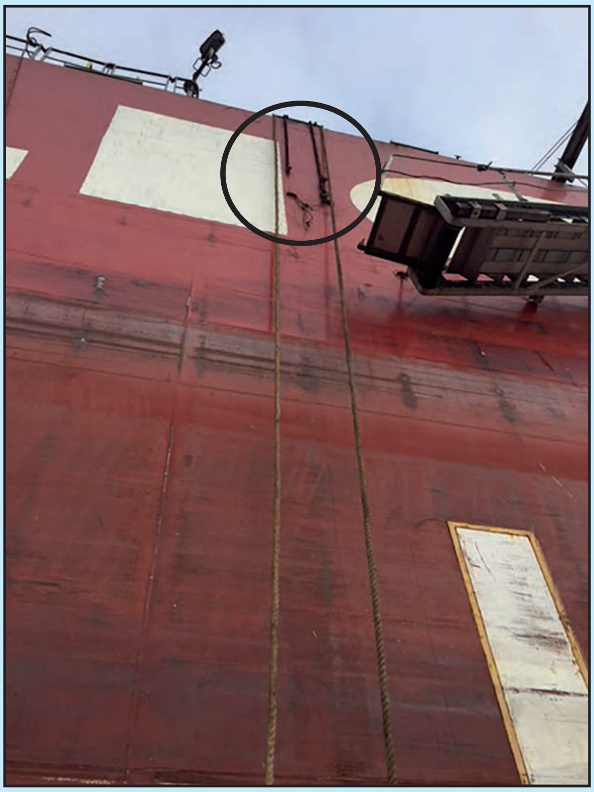


Figure 2: Ladder rigged position, showing broken section

Figure 3: Ladder side rope showing contamination

In this case, the relatively new pilot ladder had not been properly maintained and stowed, and deterioration to the pilot ladder side ropes had not been identified. Do not store ladders on an open deck where the ropes are exposed to contaminants or elements that can degrade the ropes (Figure 3). After use, ladders should ideally be hung up clear of the deck and stored wherever possible in a clean, dry environment. They must also be protected from oil, chemicals, paint, or any other source of contamination that could affect their strength.

2. Routine maintenance inspections of pilot ladders should be a part of the ship's planned maintenance system. Inspections should include opening the rope splice to view the internal state of the material.

3. The SOLAS convention also states that '*embarkation of a pilot shall be supervised by a responsible officer having means of communication with the navigation bridge*'.

   In this case a responsible officer was not monitoring the transfer of personnel to the pilot boat.

4. Pilot ladders should never be used by more than one person at a time. Use by multiple persons may overload the ladder and may cause it to move.

Part 2 – Fishing Vessels

I am often introduced as a 'gamekeeper turned poacher' having been an MCA surveyor and now leading a UK fishing company! It has been an interesting transition and one where every day I learn something new. One single fact continues to stand out for me; each of our company's skippers' desire to succeed; to bring home a good catch and keep their vessel and crew safe. Why wouldn't they? No skipper goes to sea to knowingly injure himself/herself, his/her crew, or at worst lose a crew member.

The latest MAIB Safety Digest reports on a variety of fishing vessel incidents, some with good outcomes, others which sadly tell stories of serious injuries and death. The factual accounts tell of some well-run vessels and some that fall short. They also reveal that even when you have a well-run vessel, things can go wrong. I believe if a skipper and crew are well prepared, then when things do go wrong (and they will!), how the crew react will often be the difference between life and death.

Reading the Safety Digest gives us all the opportunity to learn from others, so please take time to read the content. Discuss it with your crew, your owner, your skipper; I challenge you to ask yourself what can you learn from each incident?

I have my own observations. Does your vessel have a safe deck layout where systems of work have been thought through? for example, one of our Whelker skippers was insistent on the correct layout for his vessel at refit; but his focus has paid dividends; the vessel is proving safe and fishing has been good.

I would expect your crew to be correctly qualified. But do they really know what to do? For example,

- When snagged?

- When they open the engine room hatch to find the place flooded?

- Or when they must abandon the vessel in 45 seconds?

Qualifications are required, but it's competencies and understanding correct actions in dangerous circumstances that really counts (**just being able to do it**?!).

If you need to make changes to your vessel, then the European Maritime and Fisheries Fund (EMFF) grant money is still available till late 2019. Practical help is on hand, including assistance to complete grant application forms through the Federations, RNLI teams, training associations, mission people and local consultants who can all, in their own way, assist. I urge you to look and ask for help if you need it.

2017 was for many fishermen a good year. But where there are those who have reaped rewards, there will be some who have not had such a profitable 12 months. The winter season always brings challenges and the start to 2018 has brought atrocious weather and a disturbed start for many. Let's hope as we move into the spring of 2018 that it brings with it better weather and conditions that permit fruitful, but safe fishing.

NIGEL BLAZEBY
WATERDANCE LTD

Nigel Blazeby has been a seafarer for over 35 years, the last 15 years working with the fishing industry. He took up the role of Managing Director of the UK fishing company Waterdance Ltd (with 19 UK based vessels) in February 2018.

Prior to this role, he led a consultancy group which provided opportunities, advice and solutions relating to fishing vessel operations, licensing and safety. Prior to this, Nigel led a team providing survey and inspection services for fishing vessels in the West of the UK and UK flag vessels overseas for the Maritime and Coastguard Agency.

A former member of the national body for Fishing Safety (the Fishing Industry Safety Group; FISG), and a current member of the National Federation of Fishermen's Organisation's Safety Committee he is a member of the International Institute of Marine Surveyors and was elected a Fellow of the Nautical Institute in December 2014.

His seafaring life began by operating harbour launches, followed by service in the Royal Navy for 18 years culminating in command of wooden minesweepers and a coastal patrol craft squadron and time with SeaCo (passenger ferries and ro-ros). He currently lives in his home town of Salcombe, Devon where he has recently become a Deputy Launching Authority for the local RNLI station.

An Invisible Snagging Hazard

Narrative

It was a clear, calm day and a prawn trawler was towing its nets in coastal fishing grounds; the depth of water was about 100m and there were over 60 fishing boats, mainly trawlers, operating in the area.

At the same time, a nuclear-powered submarine was conducting a submerged passage through the area. The submarine was deep below the surface where periscopes and radar could not be used; this meant that it was reliant on its sonar systems to detect noises from other vessels in order to avoid them. As the submarine approached the fishing grounds, the command team on board realised that there was a fishing fleet ahead, but pressed on with the deep passage. While navigating around the fishing fleet, the submarine snagged the prawn trawler's gear.

On board the trawler, the skipper and his crewmen realised things were going wrong when the tow warps came bar-taut and the boat was pulled astern. The crew managed to quickly release the winch brakes, freeing the trawl warps, and the starboard warp ran out free of the boat. However, the port warp became fouled in the winch drum, dragging the trawler's stern underwater before the supporting gallows collapsed, and the warp parted under the weight of the submarine's pull (see figure).

The trawler's gear was lost but it was able to return safely to harbour under its own power; no submarine was seen at the surface and communications were never established. On board the submarine, some unusual noises had been heard, but a collision with a fishing boat or its gear was not considered and the submarine continued its passage.

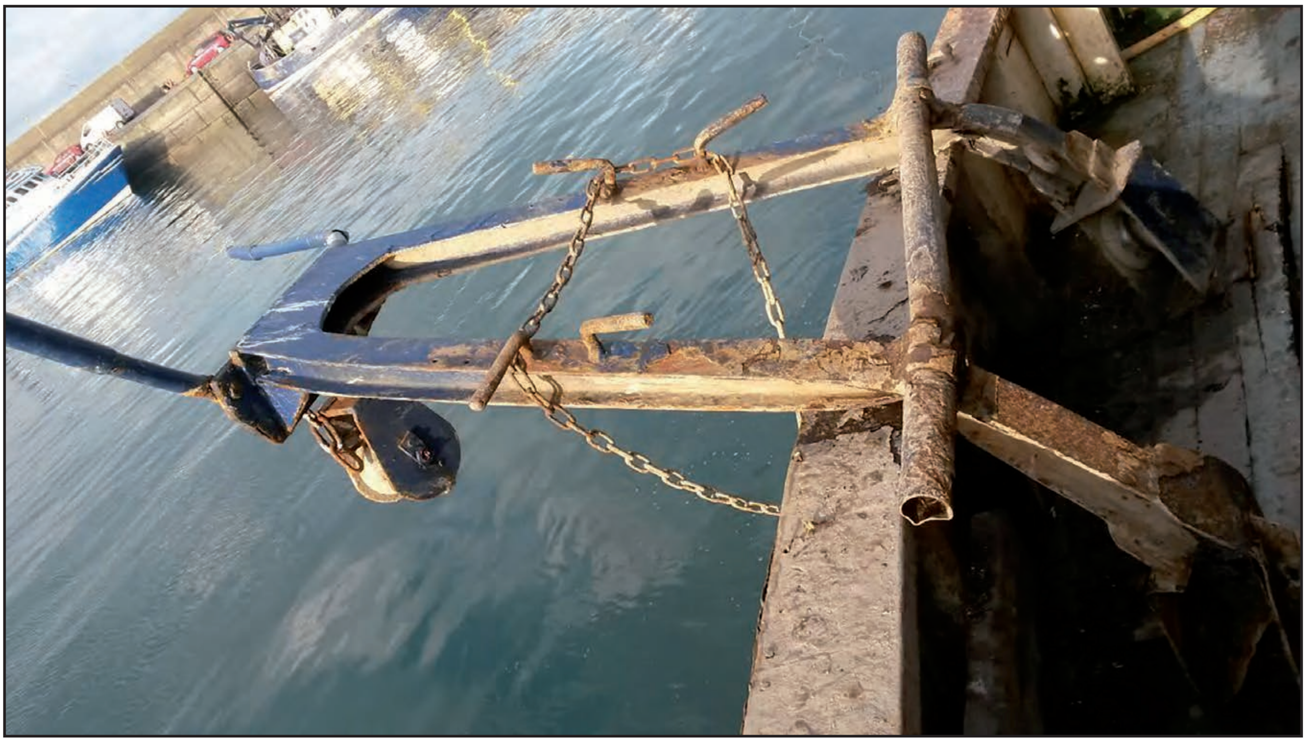


Figure: Damage to the prawn trawler's port gallows (looking from aft to forward)

The Lessons

1. Responsibility for collision avoidance between a dived submarine and any other vessel rests entirely with the submarine's command team. Even though submarines are well equipped with modern sonar systems, things can still go wrong, especially in an area with a high concentration of fishing vessels. This accident happened because the command team in the submarine mistook the noise made by the prawn trawler to be that of a merchant ship. The submarine was at a depth where no risk of collision existed with merchant ships, so no avoiding action was taken by the submarine and the collision resulted.

2. The crew of the fishing vessel suffered a harrowing experience and their lives were in peril until the port warp broke. It was extremely fortunate that the crew were on deck and able to release the winch brakes immediately. Had they been resting below when the accident happened, the outcome could have been catastrophic. Although unlikely, think through how to deal with this eventuality - prepare and be ready for any emergency.

3. Although there was nothing more the trawler's crew could have done, lessons can still be learnt:

    a. AIS information is widely used by submarines and their shore headquarters to understand fishing vessel operating patterns so, if fitted with AIS, all fishing boats should transmit continuously for the benefit of other vessels, including submarines.
    b. The quickest way to raise the alarm when things go wrong is to press the DSC alert button on a VHF radio. This alerts the coastguard and, critically, includes the vessel's position. DSC was not used by the trawler's skipper and, had the port warp not parted, the boat would have submerged rapidly, potentially without time to raise the alarm. Using DSC in an emergency needs to become instinctive.
    c. When fishing boats are operating in submarine exercise areas, they should always keep a listening watch on VHF radio, a good lookout, transmit AIS and listen to the SUBFACTs broadcast.

No Smoke Without Fire, No Escape Without Smoke Detection

Narrative

A fire started in the crew mess room of a fishing vessel that was secured alongside in port. The three crew who were sleeping on board escaped without injury but the vessel was extensively damaged.

The vessel's machinery had been shut down and shore power connected, enabling the three crew to live on board while the vessel was in port.

The vessel was scheduled to conduct guardship duties the following week so the crew had been preparing for the inspection and various contractors had been on board conducting repairs. The vessel's engineer had also been on board working in the engine room.

By 1800, the contractors had all left and the three crew who lived on board cooked a meal using a rice cooker in the crew mess room and a small oven in the galley. By 2345, all three crew were in bed, with the engineer still working in the engine room. He finished work and went home at approximately 0230, locking the door from the wheelhouse onto the upper deck as he left. All other doors and hatches were secured from the inside to prevent intruders.

At about 0515, one of the crew exited the accommodation and entered the crew mess room on his way to the toilet/washroom. He immediately became aware of the presence of black smoke and a smell of burning plastic. He alerted the other two crew, and all three then evacuated the vessel onto the quay.

At 0537, with flames emitting from the vessel, the crew of another fishing vessel secured nearby called the emergency services. At 0546, the first fire appliance was on scene and the fire service continued to tackle the blaze until the following day (Figure 1). By this time, the vessel was extensively damaged and it was later declared a constructive total loss.

Figure 1: The fishing vessel on fire

The Lessons

1. From examination of the fire patterns and other evidence, it was determined that the most likely source of the fire was an electrical multi-socket adapter (Figure 2), which supplied a domestic freezer in the crew mess room. Employers, who can include fishing vessel owners and skippers, have a responsibility to ensure electrical equipment is maintained in a safe condition. Regular visual inspection of electrical equipment to check for bare wires, that appropriate fuses are in place, and for signs of burning, together with regular Portable Appliance Testing, provides an effective means for reducing the risk of electrical fires.

2. It was fortunate that one of the crew awoke and discovered the fire shortly after it had started. In the absence of a smoke detector in the crew mess room, this alerted the crew to the fire and triggered them to evacuate the vessel without delay. The nearest sensor to the probable source of the fire was a heat detector in the galley, which would not have activated until later, or possibly not at all if the fire door to the galley had been shut. Fires can start from various sources, and only by installing a comprehensive fire detection and alarm system - that covers all spaces that pose a risk - will a fishing vessel crew be confident of being alerted early enough to be able to take effective action.

3. Crew living on board a fishing vessel are exposed to particular risks, which must be considered and addressed by the owner. In addition to ensuring that a fire detection and alarm system remains energised while alongside, the issue of access to the vessel in an emergency is something that should be taken fully into account before allowing crew to live on board. These, and other factors are listed in relevant current guidance provided in Marine Guidance Note (MGN) 413 (F) – Voluntary Code of Practice for Employment of Non European Economic Area Fishing Crew and MGN 425 (M+F) – Assessment of Risks for those sleeping on “Dead Ships”.

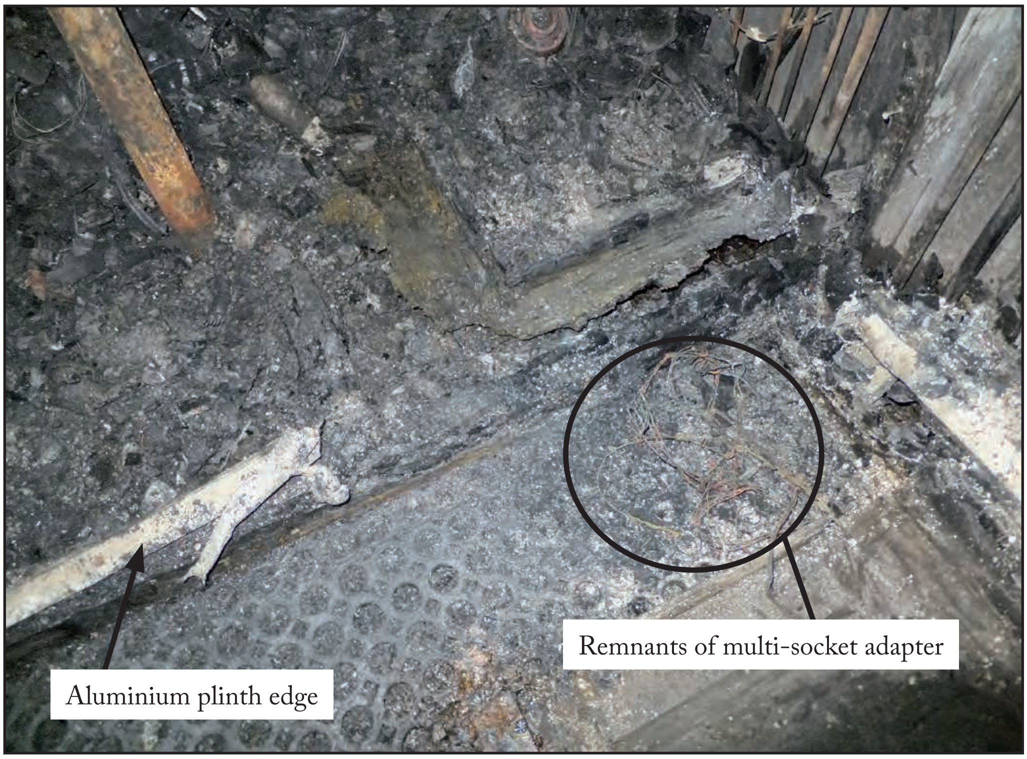


Figure 2: Remnants of multi-socket adapter

Sudden Sinking

Narrative

The skipper of a 6m potter boarded his boat and opened up the engine compartment to switch on the electrical isolator. The bilge appeared dry and all other checks confirmed the vessel was ready to put to sea. He loaded the boat with a fleet of 20 creels and headed out of the harbour.

The weather conditions were fair with a force 2 to 3 breeze and, although the sea was choppy at times, the skipper had no concerns with his boat as he headed to his fishing grounds.

When about a mile offshore, the skipper noticed the vessel take a slight list to port and moved aft from the small wheelhouse to investigate. He saw steam coming out of the engine compartment and the deck quickly flooding with water. He headed back towards the wheelhouse to raise the alarm, but before he could reach the VHF radio the boat capsized to port and then sank by the stern.

The skipper banged his head on the wheelhouse roof as he cleared the sinking vessel. When he surfaced, he kicked off his boots. He saw two fish boxes floating nearby, which he used for buoyancy.

Fortunately a small angling boat was in the vicinity and, within a couple of minutes, came to the skipper's aid. He was rescued from the water and taken back to the harbour, where he was safely landed ashore.

The Lessons

1. The cause of the sinking is not known. However, water must have flooded into the boat during the passage. Although fitted with an automatic electric bilge pump, whether it was running at any stage during the passage is unclear as the sound of it running could not be heard over the engine noise. While having an automatic bilge pump fitted has benefits, make sure there is an indicator fitted in the wheelhouse to show when it is running.

2. In addition to the electric pump, a bilge alarm would have given a warning of the flooding. Do not simply rely on an automatic bilge pump. The pump can become blocked or the flood flow rate can be greater than the pump is able to handle, so having a bilge alarm is important.

3. The skipper had been issued with a free personal flotation device (PFD), but he was not wearing it at the time. In a water temperature of 9°C and wearing oil skins, the skipper's ability to remain afloat unaided was limited. A PFD is useless unless worn and, while there can be concerns of becoming entrapped during a boat sinking, this should not become the excuse for not wearing one. If you consider the risks of entrapment are significant on your vessel wear a manual inflation PFD instead.

4. The skipper's PFD had been fitted with a personal locator beacon. If a vessel had not been nearby, this device would have enabled the skipper to alert the rescue services quickly, minimising his time in the water and, hopefully, the onset of hypothermia. Yet another reason why the PFD should have been worn.

The Twisted Chain

Narrative

The crew of a beam trawler had completed their last haul for the trip and were stowing the gear. The port tow beam was raised and tensioned using dedicated chains (Figure 1). Three crewmen climbed onto the conveyor belt and put a strop around the net to bring it on board. Two of them had just stepped off the conveyor onto the deck when the entire gear, comprising the tow beam, bridle chains and pulley block collapsed onto the conveyor and deck.

One of the crewmen on deck suffered a broken shoulder; the crewman who was still on the conveyor belt suffered injuries to his head and multiple fractures to one of his hands (Figure 2). Most of the injuries were caused by the bridle chains. It was fortunate that no one was struck by the tow beam or pulley block.

The accident was caused by the failure of a length of chain from which the block was suspended. One end of the chain was attached to a quick release wire and the other end was looped through the block and fastened onto itself with a hammerlock link (Figure 3). However, the two chain links joined by the hammerlock were not in the same plane, forcing them together under load, causing a twisting force (Figure 3). The starboard side chain had been linked without introducing such a twist and showed no signs of failure.

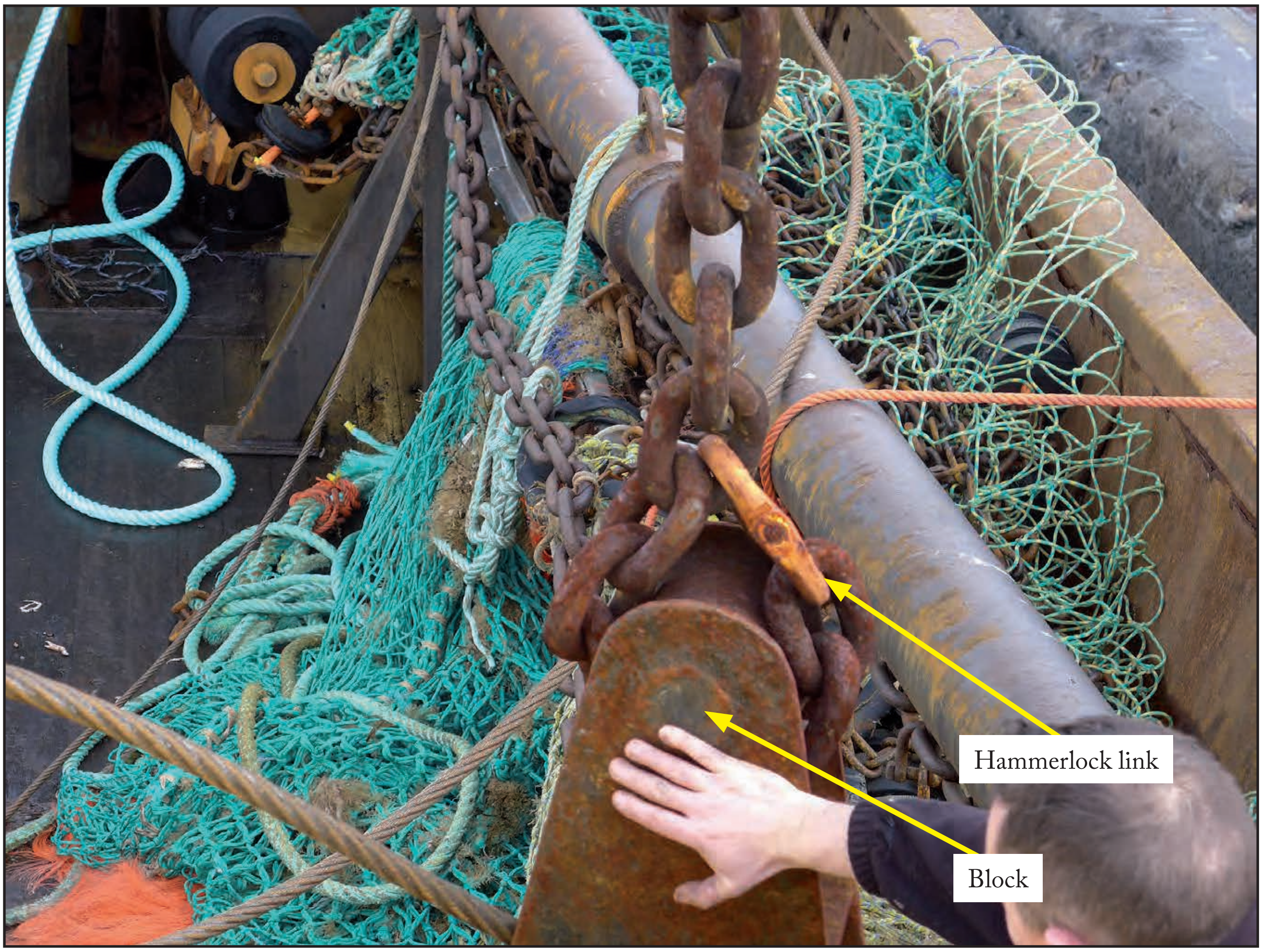


Figure 1: The port tow beam

Figure 2: X-ray showing multiple fr actures

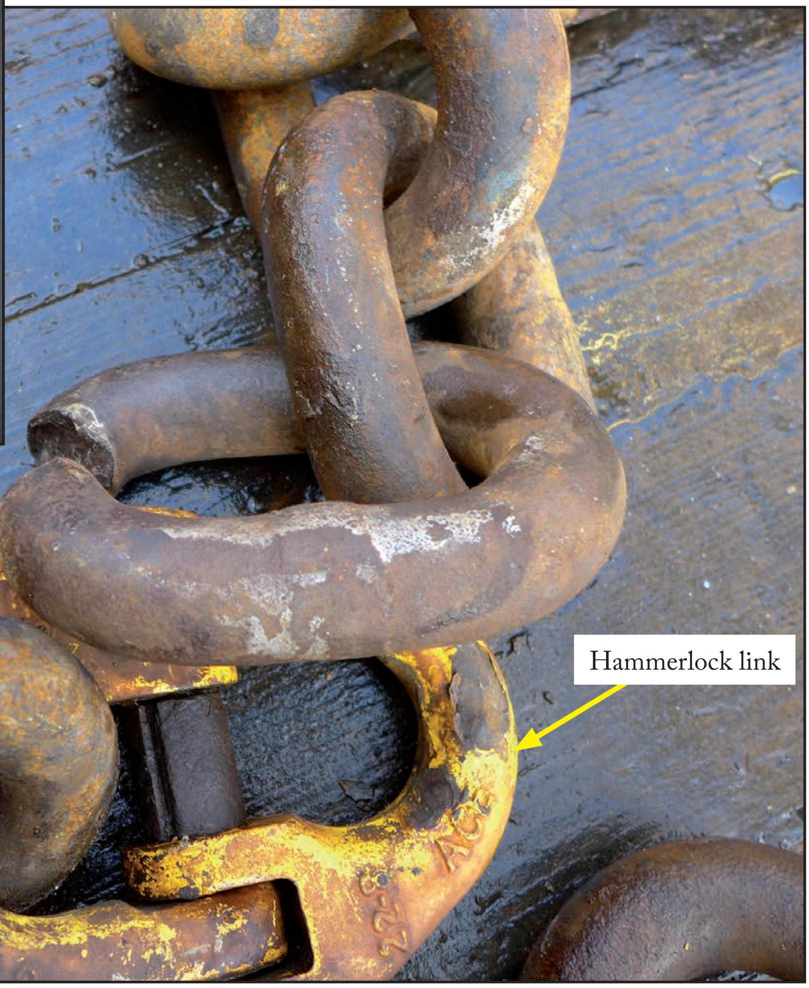


Figure 3: The twisted chain

The Lessons

1. Chains must not be twisted in operation. Twisted chains will fail at a significantly lower load than those that are not.

2. It is not good practice to loop chain around blocks as this will introduce additional loads on the chain links. If it cannot be avoided, the diameter of the block should be more than seven times the diameter of the chain link.

3. Avoid standing directly under loaded gear. Personal protective equipment must always be worn, but it cannot be expected to protect you fully if heavy gear falls on you.

Didn't Get His Feet Wet

Narrative

An 8.13m fibreglass fishing vessel (Figure 1) was engaged in picking up its fleets of creels when it began to take on water, and subsequently sink. The skipper, who was working alone, managed to deploy the boat's liferaft and climb into it as the boat was sinking. He was later rescued without having suffered any injury or ill effects.

The skipper went out to sea shortly after daybreak to recover his two fleets of creels. The weather was good, with light winds and a low sea. As soon as he arrived at the fishing grounds he hauled in the first fleet of creels and stowed it on the aft end of the deck. He then headed at speed toward the second fleet of creels. During the transit the skipper noticed smoke in the wheelhouse and, looking around, saw that it was coming from the engine hatch.

The skipper initially thought that the boat was on fire, so prepared the boat's fire extinguisher ready to use. As he slowed the boat down in preparation for opening the hatch, the boat's bilge alarm sounded. Once the boat was stopped, the skipper slowly opened the hatch, but saw no flames. When he opened it fully, the smoke quickly cleared and the skipper saw water flooding in from around the engine's cooling system. He immediately started the boat's two bilge pumps, but soon observed that they were not keeping pace with the inflow of water.

The skipper went back to the wheelhouse and made a "Mayday" call on VHF radio channel 16. He told the coastguard that his boat was sinking and gave them his position. The skipper's "Mayday" call alerted other vessels in the immediate vicinity to the unfolding distress situation, and those nearby offered their assistance. Meanwhile, the skipper donned his lifejacket and deployed the vessel's liferaft.

Figure 1: The fishing vessel

Deciding that his boat could not be saved, the skipper climbed into the liferaft and cast it adrift (Figure 2). A passenger ferry, alerted by the "Mayday" call and tasked by the coastguard, diverted to the scene and launched its fast recue craft. The ferry's rescue boat crew recovered the skipper from his liferaft and took him back to the ferry, where his condition was assessed. Another nearby fishing vessel picked up the liferaft and stood by the sinking boat (Figure 3) until it sank a few minutes later.

Analysis of the events identified that the fast planing vessel, when underway with a fleet of creels stowed at the aft end of the deck, adopted a stern trim. The boat had a single bilge alarm that was mounted under the engine toward the forward end of the engine space. When the boat started flooding, the inflow of water accumulated toward the aft end of the space because the boat had a stern trim. The floodwater came into contact with the engine exhaust and/or electrical circuits, causing smoke to be generated before activating the bilge alarm. As the boat slowed down and came more onto an even keel, the water flowed forward and set off the alarm. The volume of water inflow and the difficulty of access prevented the skipper from shutting the hull valve.

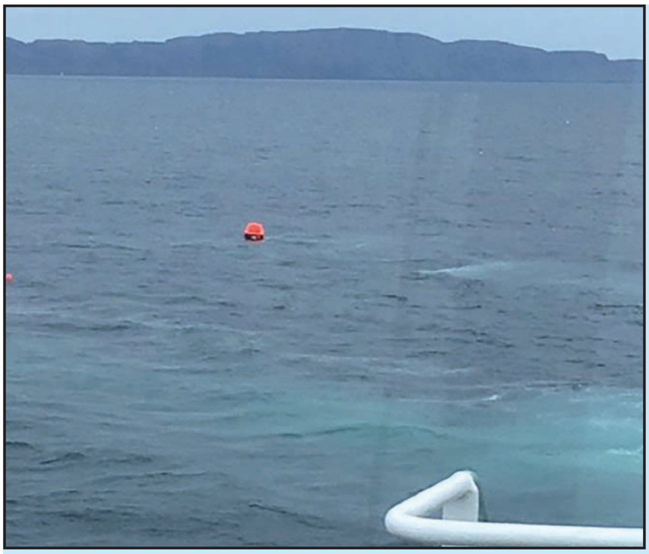


Figure 2: The liferaft

Figure 3: Fishing vessel standing by the sinking boat

The Lessons

1. The skipper's "Mayday" call to the coastguard, the availability of his lifejacket and his ability to don it quickly, and the correct operation of the liferaft when needed, demonstrated that the skipper knew the boat, looked after the equipment, and was practised in what to do. Emergency equipment will hopefully never be needed on a boat. However, if it is, every crew member should be fully aware of where it is, how to use it and, because it has been inspected and maintained properly, be confident that it is going to work.

2. Consideration should be given to the location and number of bilge alarms fitted on any fishing vessel. Flooding can be rapid and bilge alarms are critical in providing an early warning of problems in spaces that are not regularly visited. In this case, it was normal for the vessel to have a significant stern trim when underway, but not when alongside or drifting. The bilge alarm worked as it should, but consideration to its placement had not included the attitude of the boat when underway. Had a bilge alarm been fitted further aft, the skipper would have had an earlier warning of problems. He could then have had more time to implement further action that could possibly have saved the boat. It is recommended that all skippers take a moment to consider the number and location of their bilge alarms.

3. Lone working on small boats is not uncommon, particularly on board potters. The skipper did not wear a PFD routinely while working on deck. He considered them to be a snag hazard and interfered with his work. However, time and time again the MAIB has investigated fatalities on fishing boats that could have been prevented through the routine wearing of a PFD while working on deck. Small compact lifejackets have been provided freely to fishermen in recent years, and whilst the wearing of them has increased, the vast majority of fishermen steadfastly don't wear them, putting themselves at increased risk. Had the circumstances of this accident been slightly different, the MAIB could have been investigating yet another fatality.

4. The failure of engine cooling system pipework is one of the most common causes of flooding on small fishing vessels. The quick closure of hull valves will stop the flooding and therefore prevent serious damage or loss of the vessel. Consideration should be given to the provision of a remote means of closing hull valves.

CASE 20

A Quick Exit

Narrative

On a winter's afternoon, the skipper and a crewman on board a wooden potter spent an hour on deck hauling a string of creels. As soon as the hauling was completed, the skipper returned to the wheelhouse and heard the engine room bilge alarms sounding. He alerted the crewman, who was still on deck, who lifted the engine room escape hatch and saw that the water level was half-way up the side of the engine casing.

Figure: Recovery of the crew

The two men immediately launched the liferaft and the skipper also pressed the DSC distress alert and broadcast a "Mayday" on the VHF from the wheelhouse. A few minutes later, the men boarded the liferaft, but neither had donned a lifejacket. A rescue helicopter and a nearby fishing vessel quickly arrived at the scene and rescued the potter's crew (see figure).

The abandoned vessel sank 4½ hours later having spent much of that time upright and on an even keel. As it sank, the vessel's float-free EPIRB released and activated.

The Lessons

1. A wheelhouse is not just the place from where a fishing vessel is driven and navigated, it is also where safety-critical DSC, fire and bilge alarms are located. Therefore, if a wheelhouse is left unattended, there is a good chance that these alarms will not be heard above the noise of deck machinery, and that valuable time will be lost.

2. The decision to abandon ship is never easy. It should not be delayed, but also should not be taken too quickly. Abandonment is usually a measure of last resort when it is clear that it is the only action remaining to safeguard the lives of the crew.

3. Rapid flooding is an emergency that requires a rapid and effective response. Crews who have not 'drilled' or even discussed the different scenarios or the capabilities of the equipment available will not be anywhere near as well-placed to cope in such situations as those who have.

4. Liferafts, sea survival training, emergency communications and EPIRBs are proven lifesavers. So too are lifejackets. Regardless of how close assistance might be, water is water - and not donning a lifejacket when abandoning ship is pushing your luck a step too far.

Lotto Crabs

Narrative

The skipper and his crewman were rescued from their 6m potter by the crew of an RNLI lifeboat after the fishing vessel had taken on a lot of water. The fishermen were uninjured and the actions of the RNLI crew prevented the potter sinking.

The skipper and his crewman were returning to harbour having caught 800kg of crabs and re-shot their pots. The crabs had been stowed in boxes on the aft end of the deck and were secured ready for the passage back to the boat's home port.

The skipper set his course and increased to full speed. A short while later, the boat's engine space bilge alarm sounded and the skipper investigated. When he opened the engine space hatch cover he saw flood water lapping over the engine sump, so immediately started the boat's bilge pump. The bilge pump worked for a short while but its suction line quickly became blocked with rubbish from the bilges.

Concerned by the amount of water in the engine space and the loss of his bilge pump, the skipper called the coastguard on his VHF radio and alerted the watch officer to his situation, advising that he was heading back to port as fast as he could. The coastguard watch officer upgraded the call to a "Mayday" and re-broadcast the boat's information on VHF radio channel 16. He also tasked the local RNLI lifeboat to attend the scene and provide assistance as required. When the RNLI lifeboat reached the potter, the skipper shut down the boat's engine and the lifeboat crew used one of their salvage pumps to pump the water from the engine space. The fishermen were transferred across to the lifeboat and the potter was towed back to its home port.

Once securely tied alongside, the fishing vessel was pumped dry and the hull examined internally to identify the source of the flooding. No obvious cause of flooding could be seen and the bilge remained dry. The next day, the skipper engaged a local diver to inspect the hull and propeller shaft to seek any indications of the location of the water ingress. However, again none were found. A subsequent inspection of the engine space hatch cover identified that it had not been properly secured and was not watertight.

It was apparent that the 800kg of crab stowed on the aft end of the deck had a significant impact on the potter's freeboard and its trim. This had caused water to wash over the deck and enter the engine space through its access hatch while the boat was motoring at full speed. The blockage of the bilge suction further compounded the crew's concerns. The coastguard's timely escalation of the skipper's VHF report to a full "Mayday", and resultant mobilisation of the lifeboat, prevented the fishing boat from sinking and the crew probably ending up in the water.

The Lessons

1. Weathertight spaces should be weathertight. All boat owners and operators are reminded that external doors and hatches should always be closed and dogged down at sea, and regular checks should be made of their seals to ensure weathertight integrity is maintained.

2. In addition to causing water to wash over the boat's working deck, the weight and location of the catch almost certainly had an adverse impact on the potter's stability. Skippers should make every effort to assess the stability of their boats and set a maximum safe load for their catch. They should also ensure that their catch is stowed as low in the boat as possible so as to not compromise their boat's stability, and distribute it to maintain an upright attitude and an optimal trim for the boat when underway.

3. The blockage of the bilge suction meant that the skipper's only mechanical method of pumping the water from the engine space became unusable. The correct operation of bilge pumps is safety-critical on any boat. It is therefore crucial that bilges are kept clean and free from detritus that could prevent bilge pumps from working properly.

Heath Robinson Would be Proud…

Narrative

A 6m fibreglass hulled, single-handed fishing vessel with an outboard engine sailed from its home port at first light on a calm summer morning heading for fishing grounds approximately 15nm off the UK coast.

The skipper had refuelled the previous evening, filling the 72-litre plastic petrol tank, located in a stern locker, through a flush deck fitting. He also loaded three spare cans of fuel.

During the transit to the fishing grounds, the skipper noted an aroma of petrol coming from the vessel's bilge. He then mopped the bilge as dry as possible. Approaching the grounds, he set the autopilot and began to prepare the fishing gear. He then noticed an acrid burning smell, which he associated with an electrical short circuit, and promptly returned to the wheelhouse to isolate the electrical systems. As he turned off the power isolation switch, flames emerged into the wheelhouse through a cable penetration in the deck. The skipper threw a towel over the hole to arrest the spread of flames. At that moment, there was an explosion, which blew out the wheelhouse windows and blew off the roof (Figure 1).

Flames spread throughout the vessel's bilge. The skipper was able to use a plastic funnel to scoop up sea water from over the vessel's side, using this to fight the fire. Concurrent with his fire-fighting efforts, he managed to extract the spare fuel cans from the flames and discard them overboard. The fire had spread to the vessel's wooden frames, but with some effort the skipper was able to extinguish the fire.

With the fire extinguished, the skipper assessed his situation and found that the vessel was drifting further out to sea. He had suffered some burns, and the explosion had effectively disabled the communications equipment as the aerials had been attached to the wheelhouse roof. A survey of the remaining equipment revealed a radio/CD player with an FM aerial, which the skipper removed and attached to a fishing rod outrigger to provide an ad hoc aerial for his VHF radio. He attempted to transmit a distress call but received no response.

The skipper then attempted to start the outboard engine. He found that the insulation on the power cables from the battery had melted in the fire and that the supply fuse for the starter circuit had blown. However, he was able to salvage sufficient cable to rig power lines to the engine starter and found a replacement for the blown fuse. Having managed to start the engine, the skipper headed towards land. The fire had disabled the hydraulic steering system, and he was therefore only able to steer by manually manipulating the engine. Owing to the physical effort required to hold the engine, the vessel's speed was necessarily limited to approximately 3kts.

The skipper encountered two small coasters and tried to attract attention with hand-held flares, but neither vessel responded. Sometime later, he saw another fishing vessel and, again using hand-held flares, was able to attract the crew's attention. This vessel came to his aid and its crew alerted the rescue services. A lifeboat was deployed and it rescued the skipper and towed his vessel into harbour.

Prior to the incident, the vessel had been ashore for repairs and refurbishment. Some items of equipment, including fire-fighting appliances, had not been refitted to the vessel before its departure.

It is likely that a leak between the flush deck fitting and the fuel tank allowed petrol to leak into the vessel's bilge when the tank was filled the evening before departure (Figure 2).

Figure 1: Wheelhouse with missing roof and windows

Figure 2: Layout of the vessel

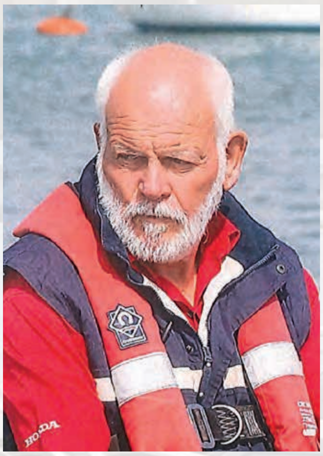
The Lessons

1. Preparation and planning are vital safety factors when undertaking a trip to sea. That the vessel was being maintained is a positive aspect. However, not carrying out a check of safety equipment before departure was a major failing.

2. Despite minimum fire-fighting mandatory requirements, the carriage of petrol in significant quantities should have prompted the skipper to conduct a risk assessment in the form of a review of the associated hazard and a coherent plan to deal with the consequences in the event of an incident.

3. When working a single-handed vessel, it is particularly important that the skipper possesses the level of knowledge and skills required to properly equip, maintain and operate the vessel safely.

Part 3 – Recreational Craft



Having been on the water for close on fifty years, one would imagine that I had seen it, and done it, and know all there is to know about it, and be a master of the sea? Well, sometimes I feel I know very little.

With sun shining and a light breeze I was helming a demonstration boat and suddenly I was within 30 metres of a helm dying in the water having just been struck by the propeller of his boat. It is often the shock of the unexpected that concentrates the mind. Why did this accident have to happen? Many aspects of the incident were wrong but he made one simple error that cost him his life. He forgot to connect the engine kill-cord to his person.

I see many professional operators on the water not wearing the kill cord. It takes only five to fifteen seconds to put one on.

All Yachtsmen should be working towards the boat becoming an extension of their own body. Working a small powerboat through a following sea towards Pwllheli, Gwynedd from St Patrick's Causeway I was passenger when I felt through my body a slight shudder. Unnoticed by the Skipper. Each time we dropped off the front of the wave. I said, "Slow down, going into the bow to check." Quickly returned and asked the helm to slow to five knots. We had split the portside bow that now had a metre long vertically jagged gash. It looked as if the lining was all that was holding it together. We recovered the boat onto its trailer and into a boat yard. Following a long investigation it was deemed to be structurally sub standard in its manufacture.

The seas around our shores are seldom very warm and although the RYA say that the wearing of life preservers are not required to be worn on yachts in all weathers (it's the Skipper's call!), I will **always** don the appropriate life jacket, automatic, manual, or buoyancy correct for the sport. If I am in the water I do not want to waste energy trying to keep my nose in the air.

I was demonstrating at the Earls Court Boat Show in London by falling into the water three times a day and being recovered onto a yacht. There was no tide, no wind and no waves and yet it was still extremely hard work getting back on-board. Interestingly all thirty-three of the recoveries during the show were slightly different. Master the skill of seamanship in light conditions and, when competent, carry out exercises in heavy weather with a dummy. Choose suitable sea room and then carry out the same procedure in the dark, with a light fitted to the dummy. Who picks the Skipper up if the Skipper is the MOB?

Risk Assessment and Safety is a state of mind based upon sound knowledge and experience. Then add an excellent dose of common sense. If this characteristic is missing, then spell out "the obvious". Again I have been known to walk away.

Keynote to success is the 5 x P's on all aspects of every trip afloat, "Proper Preparation Prevents Poor Performance"

A start up procedure with small powerboats includes a visual propeller check. There are many reasons for this but I particularly look for people in the water around the prop. I have this true story. I was on the water working and my mobile phone rang. It was a call from abroad and I asked if it was okay with my students for me to take it.

The gentleman on the phone was a former student and he was calling from a twin-engine hire boat in the Mediterranean. The tone of his voice indicated to me he was obviously rattled.

He said, "Pleased I got hold of you. I had been sitting bow facing a beach. No anchor down as there is no tide, no wind, having our lunch. We had been sitting there for at least thirty minutes. I was about to fire up the engines and drop into reverse and I thought of you, so I left the controls to look over the stern only to find a young lad of about ten looking up at me and grinning. He was wrapped around and hugging one of the drive legs. I shooed him away and it has taken me ten minutes to compose myself. I felt really ill. I phoned to say thank you so much for the extensive training that you delivered, AND, more to the point, I have not injured or killed anybody and I am still able to enjoy my boating."

Establish your routine, discuss and amend (as necessary), and then stick to it, never taking the proverbial short cuts. Please remember that a written risk assessment (RA) is a living document and will be required to be updated and amended as required. Do not lock it away in a drawer!

A learned and safe procedure carried out as 'pre start checks' to cover safety is incredibly important.

It is a lot easier and less costly than clearing up the mess, dealing with emergency services, writing reports, sorting out insurance and the big one: living with the aftermath of a disaster maybe caused by, in some cases, our own inappropriate action.

Happy Sailing

PETER WHITE
RYA COACH AND ASSESSOR,
POWERBOAT ADVANCED TRAINER

A life changer, in every sense of the word, gave Peter the opportunity in the early 70s to experience sailing, first with racing dinghies and then onto yachts between 8 and 15 meters in length. Peter very quickly learnt the skills required to teach sailing to young people. During the next 15 years he spent thousands of hours teaching on the water, working through the RYA Dinghy Scheme he became an RYA Senior Instructor and Assessor. Recommended for Coaching, he attended in 1985 the RYA National Sailing Centre, Cowes and became a Coach/Examiner. In 1988 he became RYA Powerboat Trainer.

In 1988 Peter retired from the Sussex Police Constabulary to set up Seafever, an organisation that specialises in powerboat training, not just for amateurs but professionals too. In 1990 Peter published his first book, 'Powerboating' – the official handbook for the RYA Powerboat Scheme, followed by his current book which takes the same title. In 1992, by popular demand from students, the Seafever Powerboat Club was formed, producing the newspaper 'The Bug'.

He was awarded 'Sportboat Personality of the Year' in 1993.

Peter is the author of 'Outboard Trouble Shooter' and 'Powerboat Companion'.

In 1996 assisted by his colleague, the late Mic Randle, they spent hundreds of hours of training and research in designing a new course for Personal Watercraft. It was first run under the umbrella of the BMIF, and then became part of the RYA. Peter was awarded in 2004 the Mic Randle Memorial Award for Safety by the manufacturers association (MEEMA) Quote: 'Achieving the highest levels of on – water training whilst instilling a feeling of mutual respect for other water users.'

Peter has a quote from his book, ***'I don't go to work. I just go boating.'***

Too Fast, Too Close, Too Late

Narrative

A military sail training centre was hosting a windsurfing event. The centre was located inside a sheltered harbour and the windsurfing was taking place on the open sea outside (Figure 1). For the 2 days prior to the event, three officer cadets had successfully undertaken an RYA powerboat level 2 training course. These cadets were then tasked to helm three RHIBs as support boats for the windsurfing racing; laying and recovering marks and operating under the direction of the event's safety officer.

On the second day of the event and after the racing had finished, all three RHIBs were heading back to the sailing centre. There were 10 officer cadets in the three boats; all were wearing buoyancy aids and the helms had their kill cords attached. Although the sea was relatively calm, there was a swell from the south-east of about 1.5m and 15kts of wind from the south-west. The three RHIBs (A, B and C) headed home in a line about 400m apart at a speed of about 30kts (Figure 1).

On the way towards the navigation pole marking the harbour entrance, the helm of the lead boat noticed that a paddle had come loose, so slowed down to sort it out; this significantly reduced the distance between boats A and B. As the day's events had finished earlier than planned, there was spare time available for planing practice, so when boat A reached the pole, the helm decided to turn to starboard into the swell, rather than turn to port into the harbour.

Boat A's manoeuvre brought it directly into the path of boat B, which was still planing at full speed. When the helm of boat B realised what had happened, it was too late to avoid collision (Figure 2) so he pulled the kill cord to stop the engine. Boat B struck boat A violently on its starboard side then rode right over boat A into the sea beyond; all of boat A's four crew were thrown into the water and three were injured, one seriously.

The helm of boat B made a "Mayday" call on VHF radio and then the crew of boat B recovered boat A's crew members out of the water. All three boats then headed back towards the harbour, where they were met at the harbour entrance by the harbourmaster's launch and the local lifeboat that had responded to the "Mayday". The boats then headed to a nearby marina, where an ambulance was waiting; the casualties were attended by the ambulance paramedic and then transferred to the nearest hospital for further assessment and treatment.

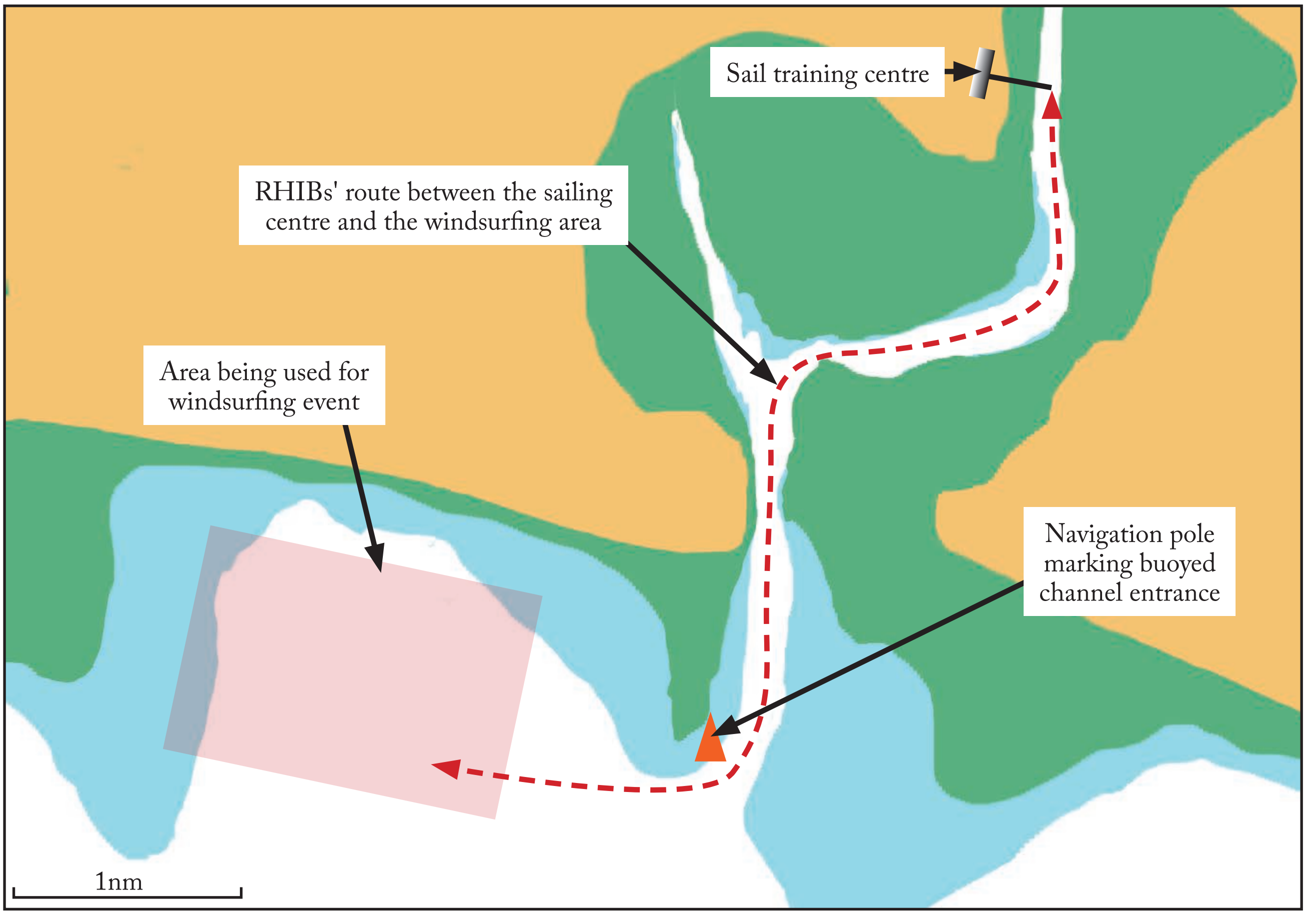


Figure 1: Overview of the area showing the sailing centre, windsurfing area and channel navigation pole

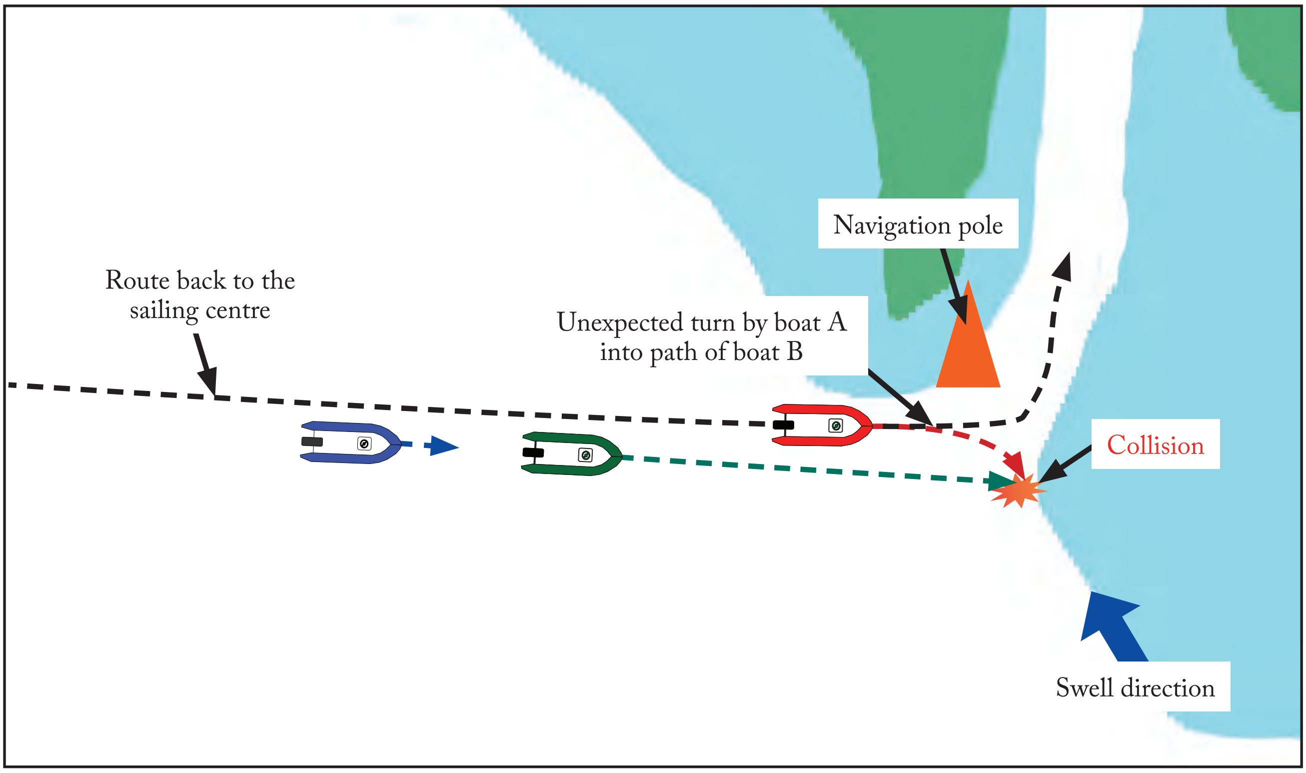


Figure 2: Expected and actual routes of boats A and B leading to collision (not to scale)

The Lessons

1. When the collision happened, everyone who was thrown overboard was wearing a buoyancy aid and both boats' helmsmen were wearing their kill cords. These actions probably prevented loss of life. Had the kill cords not been connected, at least one - maybe both - boats would have continued underway and out of control, presenting a serious threat to those in the water. Cold water immersion can lead to a shock response and rapid loss of muscle function with risk of drowning. Wearing a lifejacket or buoyancy aid greatly assists casualties in this situation, keeping them at the surface until rescued.

2. Prior to the collision, the RHIBs were planing at high speed and in company on the open sea. The RYA powerboat level 2 course focuses on low speed boat handling with only an introduction to planing speeds. Although operating as event support boats was intended to consolidate their training, the cadet helms' operation of their boats went well beyond their taught skill level or experience and resulted in the serious risk of collision. This could have been prevented by a higher level of supervision from the sailing centre's staff and clearer direction about how the boats were to be handled and operated.

3. Whatever the size of vessel or the task, every passage needs a plan. Although it had not been discussed, the plan on this occasion was to return to the sailing centre; a route taken by all the boats several times over the preceding days. The decision by the helm of boat A to turn to starboard at the navigation pole was a deviation from this route. The helm of boat A did not communicate his intentions beforehand and the manoeuvre placed boat A directly in the path of boat B. The close proximity of boat B prevented its helm from taking effective avoiding action. To minimise the risk of collision, high speed planing in company requires absolute clarity of the plan, a 'shared mental model' and good communications to maintain situational awareness and understand other boats' intentions.

4. Although a VHF "Mayday" was called, the boats were fitted with digital selective calling (DSC) radios and the distress button function could have been used to raise the alarm. The key benefit of using the DSC distress function is that the coastguard will automatically receive the casualty vessel's position. In this case, the boats were so close to shore that the casualties were probably transferred to hospital by the fastest means.

Carbon Monoxide Strikes Again

Narrative

The owner of a small motor cruiser boarded his vessel at its marina mooring, unzipping one side of the cockpit canopy to gain access (Figure 1). His plan was to start and run the inboard petrol engine. Before starting the engine, however, he noticed a significant amount of water in the engine compartment bilge, which stretched into the cabin area. He started the boat's electric bilge pump to clear the water. Once the water was below the level of the starter motor he started the engine.

To assist with pumping out the water, the owner engaged slow ahead while still moored, to force the boat's bow up and cause the water to flow aft into the engine compartment. Approximately an hour later a friend called the owner, but there was no answer. He called another friend who was a berth holder in the marina and asked him to check if the owner was okay.

The owner was found face-down in the cabin by two berth holders, with the engine still running. One raised the alarm while the other commenced CPR on the owner. Another person arrived and assisted with the CPR. The first rescuer felt dizzy 10-15 minutes later, and developed a headache. Shortly afterwards, he was helped out of the boat into fresh air.

Paramedics arrived and were directed to the first rescuer initially. After quickly examining him, the paramedics rapidly removed the cockpit canopy and took over first-aid of the boat owner. He was transferred ashore and taken to hospital, but never recovered consciousness.

The two rescuers were also taken to hospital suffering from carbon monoxide (CO) poisoning; both made full recoveries.

On examination, it was determined that at least two of the flexible rubber bellows of the boat's wet exhaust system were leaking, allowing water and exhaust gas into the boat (Figure 2).

Figure 1: The motor cruiser

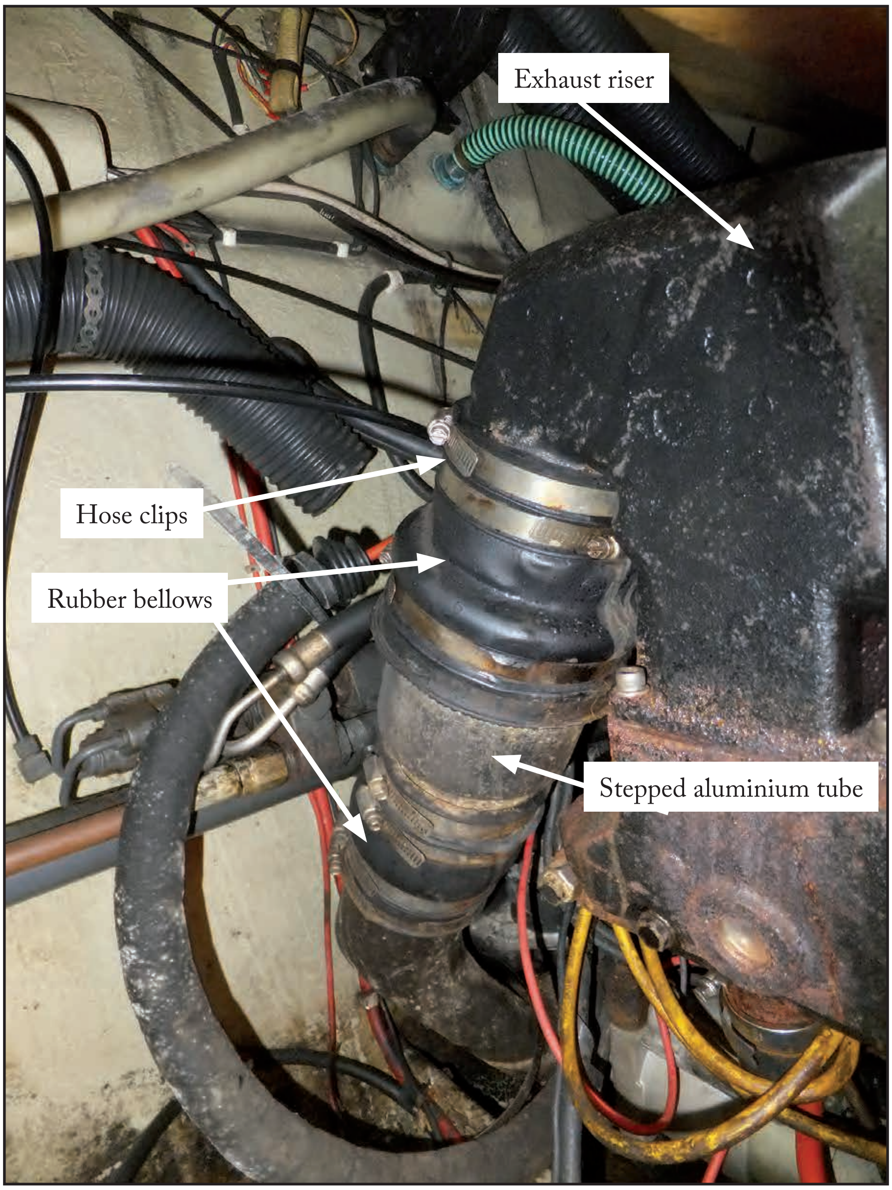


Figure 2: Exhaust riser and rubber bellows

The Lessons

1. CO is a highly poisonous gas and weighs the same as air. It cannot be seen, smelled, tasted or felt. When breathed in, CO readily replaces oxygen in the human bloodstream and prevents oxygen being supplied to the heart, brain and other vital organs. The gas is produced as a result of incomplete combustion and is commonly found on recreational craft. CO detectors/alarms are widely available and will provide an early warning of the presence of the deadly gas. Make sure you have one fitted in your boat and, when it sounds, ventilate the space and move into fresh air.

2. The inboard petrol engine had not been regularly serviced during the previous 5 years of ownership. However, during the boat's life the wet exhaust system had been modified, adding further flexible joints. Flexible rubber bellows are an important part of an inboard engine's wet exhaust system as they allow for the vibration and motion of the engine. But they also maintain the boat's watertight integrity. The couplings do deteriorate and generally require replacement every 2-3 years. Ensure your boat's engine is regularly serviced by a competent technician.

A Tough Decision

Narrative

An experienced yachtsman, with two crewmen, was skippering his yacht on an ocean passage back home. The boat had been underway for several days and the voyage was going well.

During the morning, the skipper was on watch and both crewmen were below. The weather was fine and the boat was running downwind at about 6kts; conditions were perfect and there was nothing in sight. The skipper went below and, just as he arrived at the chart table, he heard and felt an unusual rumbling for a few moments, followed by a violent shudder. The skipper was thrown across the saloon area, thankfully landing in soft furnishings and uninjured. The skipper shouted to the crew to get up and then went back to the cockpit, where he saw the tail fluke of a large whale astern of the yacht.

Then aware that the boat had collided with a whale, the crew thoroughly searched for damage; the bilges were dry and nothing untoward was found. Nevertheless, given the violence of the impact, the skipper decided that the bilges should be inspected every 2 hours. The boat continued its passage, sailing downwind without significant stresses on the rig and only rolling gently in the ocean swell.

Over the course of the following 17 hours, the crew observed hairline cracks gradually appearing around the visible keel bolts (Figure 1); slight weeping of water steadily increased to slow flooding. However, the rate of water ingress was well within the capacity of the boat's bilge pumps.

When the water ingress started, the skipper used his satellite communication system to send a message to his wife to raise the alarm with the UK Coastguard, but elected not to set off the EPIRB as the flooding was under control. The UK Coastguard then liaised with the nearest coastal state and a military maritime patrol aircraft was dispatched to the area to find the boat and contact the crew. A nearby merchant vessel was also alerted and changed course to head towards the yacht.

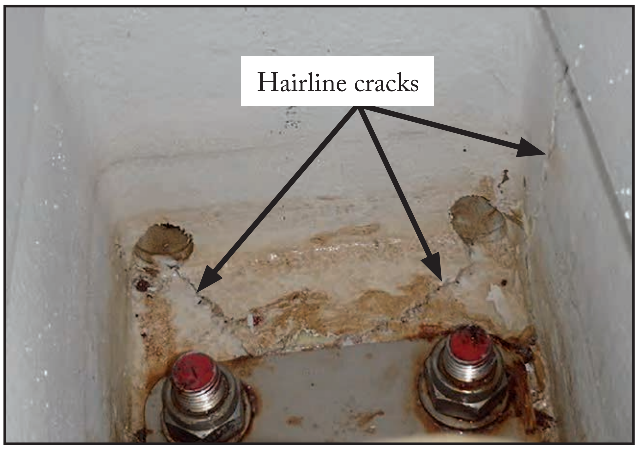


Figure 1: Hairline cracks around the yacht's keel bolts

During the night, the skipper started hearing a clunking sound each time the boat rolled and assessed it to be movement of the keel; a significant development that led to the decision to abandon the boat. When the merchant vessel arrived on scene, the skipper drove the yacht alongside and the crew transferred to the safety of the ship (Figure 2). The yacht was then cut free, with a hull valve left open in order that it would flood and sink.

Figure 2: The yacht alongside the rescuing merchant vessel as the crew transferred to safety

The Lessons

1. It was a tough but necessary decision to abandon the boat. At the time, the water ingress was under control and the boat was sailing normally. However, the noises associated with movement of the bolted keel were a significant development and led to a situation of uncertainty over the structural integrity of the yacht. Even in benign conditions, had the keel bolts failed, it is highly likely that the boat would have rapidly capsized, placing the lives of the crew in immediate danger. The decision to abandon the boat was the only safe course of action to preserve life.

2. Good communications are critical. The boat was equipped with a reliable satellite communications system that meant the skipper could raise the alarm at the appropriate moment. Good communications were then maintained using satellite and VHF between the yacht, shore authorities, aircraft and the rescuing ship. This meant that there was a shared picture of events and safety related decisions were taken in an orderly sequence.

3. Unexpected events can happen at any time and to any vessel. Being ready to deal with an emergency means thinking through how to respond when things go wrong. This incident involved a well-equipped leisure vessel with an experienced crew, but operating a great distance from safety. When things went wrong, the skipper put emergency routines in place to monitor the situation and prepared the liferaft for immediate use in the event of the situation deteriorating rapidly.

INVESTIGATIONS STARTED IN THE PERIOD 1/09/17 TO 28/02/18

Date of Occurrence	Name of Vessel	Type of Vessel	Flag	Size	Type of Occurrence
07/09/2017	*Windcat 8*	Service ship	UK	26.2 gt	Fire
12/09/2017	*Wight Sky*	Passenger ship | Ro-Pax ship	UK	2546 gt	Fire
23/09/2017	*Constant Friend*	Fishing vessel | Stern trawler	UK	152.0 gt	Occupational accident (1 fatality)
26/09/2017	*Solstice*	Fishing vessel | Multi Purpose	UK	9.2 gt	Capsizing | listing (1 fatality)
08/10/2017	*Islay Trader*	Cargo ship | Solid cargo | General cargo	Barbados	1512 gt	Grounding
10/10/2017	*Ruyter*	Cargo ship | Solid cargo | General cargo	Netherlands	2528 gt	Grounding
30/10/2017	*Ever Smart*	Cargo ship | Solid cargo | Container ship	UK	75 246 gt	Damage to ship or equipment
31/10/2017	*CV24*	Sail boat (auxiliary motor)	UK	49.6 gt	Grounding | Stranding | Drift
06/11/2017	*Enterprise*	Fishing vessel | Potter	UK	5.6 gt	Occupational Accident (1 fatality)
12/11/2017	*Illustris*	Fishing vessel | Stern trawler	UK	146 gt	Occupational accident (1 fatality)
18/11/2017	*CV30*	Sail boat (auxiliary motor)	UK	49.6 gt	Occupational accident (1 fatality)
20/11/2017	*Varuna*	Fishing vessel | Potter	UK	6.9 gt	Occupational accident (1 fatality)
10/12/2017	*Pride of Kent*	Passenger ship | Ro-Pax ship	UK	30 635 gt	Grounding
18/01/2018	*Nancy Glen*	Fishing vessel | Stern trawler	UK	19.6 gt	Capsize | Listing (2 missing)
20/01/2018	*CMA CGM G. Washington*	Cargo ship | Solid cargo | Container ship	UK	140 872 gt	Damage to ship or equipment
01/02/2018	*SMN Explorer*	Cargo ship | Solid cargo | General cargo	Liberia	1 882 gt	Occupational accident (1 fatality)
05/02/2018	*North Star*	Fishing vessel | Potter	UK	150 gt	Occupational accident (1 fatality)
07/12/2017*	*Tyger of London*	Sail boat (auxiliary motor)	UK	18.3 gt	Capsize | Listing

*investigation started on 19/2/2018

Reports issued in 2017

Johanna C
Fatal accident during cargo operations on board a UK registered cargo vessel at Songkhla, Thailand on 11 May 2016
Report 1/2017 Published 12 January

Toby Wallace
Fatal man overboard from an ocean rowing boat in the North Atlantic Ocean on 14 February 2016
Report 2/2017 Published 1 February

City of Rotterdam/Primula Seaways
Collision between the pure car carrier *City of Rotterdam* and the ro-ro freight ferry *Primula Seaways* on the River Humber on 3 December 2015
Report 3/2017 Published 8 February

Petunia Seaways/Peggotty
Collision between the ro-ro freight ferry *Petunia Seaways* and historic motor launch *Peggotty* on the River Humber on 19 May 2016
Report 4/2017 Published 8 February

King Challenger
Fatal man overboard from a scallop dredger off Scalloway, Shetland Islands on 23 June 2016
Report 5/2017 Published 2 March

Uriah Heep
Passenger ferry made contact with Hythe Pier, near Southampton on 13 May 2016
Report 6/2017 Published 6 April

CV21
Two fatal accidents on board a UK registered yacht 122nm west of Porto, Portugal on 4 September 2015 and mid-Pacific Ocean on 1 April 2016
Report 7/2017 Published 12 April

Pauline Mary
Fatal man overboard from a fishing vessel, east of Hartlepool on 2 September 2016
Report 8/2017 Published 4 May

Love for Lydia
Carbon monoxide poisoning on board a motor cruiser on Wroxham Broad, Norfolk between 7 and 9 June 2016, resulting in two fatalities
Report 9/2017 Published 11 May

Osprey/Osprey II
Collision between RIBs resulting in serious injuries to one passenger in the Firth of Forth on 19 July 2016
Report 10/2017 Published 18 May

Royal Iris of the Mersey
Grounding of a passenger ferry on the Mersey River on 10 July 2016
Report 11/2017 Published 25 May

Ardent II
Fire on board a fishing vessel while alongside in Port Henry Basin, Peterhead on 16 August 2017
Report 12/2017 Published 14 June

Zarga
Failure of a mooring line on board an LNG carrier while alongside the South Hook Liquefied Natural Gas terminal, Milford Haven, resulting in serious injury to an officer on 2 March 2015
Report 13/2017 Published 15 June

Surprise
Grounding and evacuation of a domestic passenger vessel at Western Rocks, Isles of Scilly on 15 May 2016
Report 14/2017 Published 29 June

Sea Harvester
Serious injury to a deckhand on a fishing vessel while in Firth of Clyde on 3 August 2016
Report 15/2017 Published 6 July

Domingue* and *CMA CGM Simba
Capsize of the tug *Domingue* while assisting the container ship *CMA CGM Simba*, resulting in two fatalities in Tulear, Madagascar on 20 September 2016
Report 16/2017 Published 20 September

Louisa
Foundering of a fishing vessel while at anchor off the Isle of Mingulay in the Outer Hebrides on 9 April 2016, resulting in three fatalities
Report 17/2017 Published 27 July

Vasquez
Fatal CO poisoning on board a motor cruiser while moored at Cardiff Yacht Club on 12 November 2016
Report 18/2017 Published 10 August

Transocean Winner/ALP Forward
Grounding of the semi-submersible rig *Transocean Winner* after the loss of tow from the tug *ALP Forward* on the Isle of Lewis, Scotland on 8 August 2016
Report 19/2017 Published 7 September

Hebrides
Loss of control and grounding of a ro-ro passenger ferry at Lochmaddy, North Uist on 25 September 2016
Report 20/2017 Published 14 September

Sunmi/Patrol
Accident during pilot transfer between a general cargo vessel *Sunmi* and a pilot transfer vessel *Patrol* with loss of one life on the River Thames on 5 October 2016
Report 21/2017 Published 12 October

Muros
Grounding of a bulk carrier at Haisborough Sand in the North Sea on 3 December 2016
Report 22/2017 Published 19 October

CMA CGM Vasco de Gama
Grounding of an ultra-large container vessel in the Thorn Channel, Southampton on 22 August 2016
Report 23/2017 Published 25 October

Typhoon Clipper/Alison
Collision between the high-speed passenger catamaran *Typhoon Clipper* and the workboat *Alison* on the River Thames on 5 December 2016
Report 24/2017 Published 2 November

Graig Rotterdam
Cargo collapse on a bulk carrier with loss of one life at Alexandria Port, Egypt on 18 December 2016
Report 25/2017 Published 18 December

Nortrader
Gas explosions on a general cargo ship anchored off Plymouth with one person injured on 13 January 2017
Report 26/2017 Published 18 December

Safety Bulletins issued during the period 1/09/17 to 28/02/18

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY BULLETIN

SB1/2018

January 2018

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.

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Use of safety harness tethers on sailing yachts

Fatal accident on board the sailing yacht

CV30

in the Indian Ocean

on 18 November 2017

MAIB SAFETY BULLETIN 1/2018

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 or to issue safety lessons at any time during the course of an investigation if, in his opinion, it is necessary or desirable to do so.

The Marine Accident Investigation Branch is carrying out an investigation into the fatal man overboard accident on board the commercial sailing yacht CV30, which was taking part in the Clipper Round the World Yacht Race.

The safety issue raised in this safety bulletin highlights just one of potentially several factors that contributed to this tragic accident.

The MAIB will publish a full report, including all identified contributing factors, on completion of the investigation.

Steve Clinch
Chief Inspector of Marine Accidents

NOTE

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

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

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BACKGROUND

The sailing yacht *CV30* was taking part in the third leg of the Clipper Round the World Yacht Race having left Cape Town on 31 October 2017 bound for Fremantle, Western Australia.

At about 1414 local time on 18 November 2017, the yacht was in position 42°30.3'S, 087°36.3'E, approximately 1500nm from Fremantle, when a crew member, Simon Speirs, fell overboard. He was attached to the yacht by his safety harness tether. The hook at the end of the tether that was clipped to a jack-line, deformed and released resulting in him becoming separated from the yacht. Simon Speirs was recovered unconscious onto the yacht but sadly could not be resuscitated.

INITIAL FINDINGS

Simon Speirs was using a three-point webbing tether attached to the integral harness of his lifejacket that allowed him to clip on to the yacht with a short or long tether.

A safety issue identified during the investigation was that the hook on the end of Mr Speirs' tether had become caught under a deck cleat (see **Figure 1**), resulting in a lateral loading that was sufficient to cause the hook to distort (see **Figure 2**) and eventually release.

The harness tether was certified under ISO12401 (Small craft – Deck safety harness and safety line – Safety requirements and test methods), which is the international standard applicable to this equipment. The standard contains detailed testing requirements that assume the tether and its hooks will be loaded longitudinally rather than laterally.

The tether hook was of a conventional design and quality of build, and was commonly used by manufacturers of safety harnesses and tethers that were certified under ISO12401.

When loaded longitudinally, the tether can withstand a load of over 1 tonne. However, when loaded laterally a tether hook will deform at much less load. It is important that tether hooks remain clear of obstructions and are free to rotate to align the load longitudinally.

SAFETY LESSON

To prevent the strength of a safety harness tether becoming compromised in-service due to lateral loading on the tether hook, the method used to anchor the end of the tether to the vessel should be arranged to ensure that the tether hook cannot become entangled with deck fittings or other equipment.

Issued January 2018

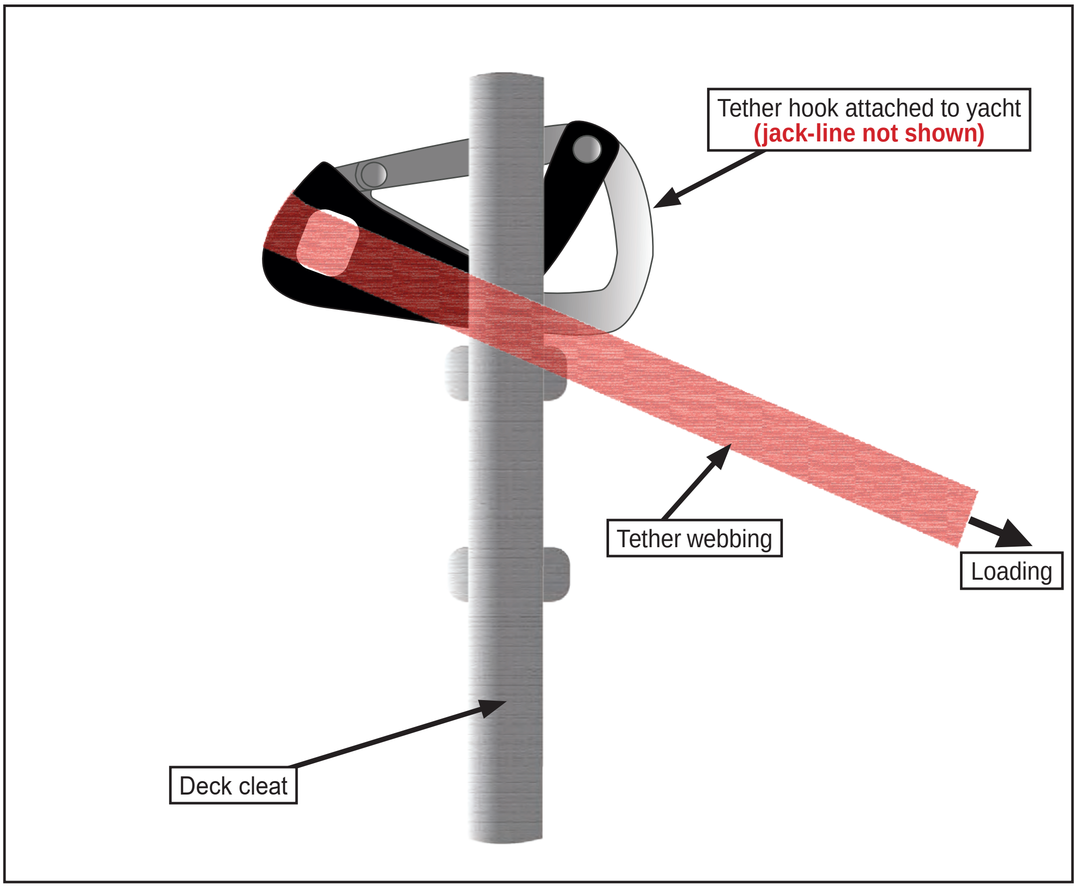

Figure 1: Tether hook under deck cleat

Figure 2: Example of a tether hook and a tether hook after lateral loading

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