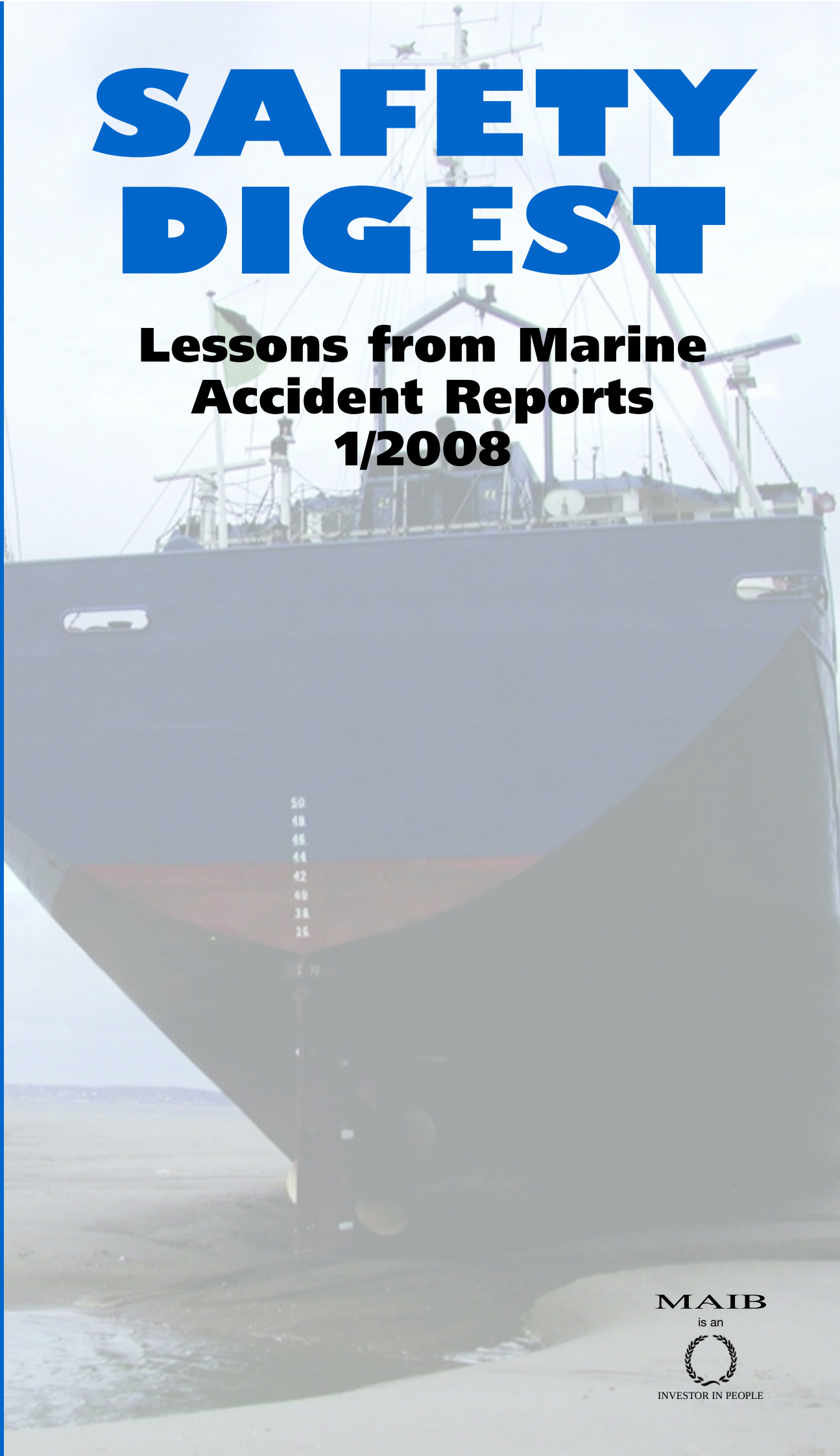
MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY DIGEST

Lessons from Marine Accident Reports 1/2008



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Department for Transport

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Lessons from Marine Accident Reports

No 1/2008

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MARINE ACCIDENT INVESTIGATION BRANCH

The Marine Accident Investigation Branch (MAIB) is an independent part of the Department for Transport, the Chief Inspector of Marine Accidents being responsible directly to the Secretary of State for Transport. The offices of the Branch are located at Carlton House, Carlton Place, Southampton, SO15 2DZ.

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 facts which have 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.

Extracts can be published without specific permission providing the source is duly acknowledged.

The Editor, Jan Hawes, welcomes any comments or suggestions regarding this issue.

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Summaries (pre 1997), and Safety Digests are available on the Internet:
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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 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of 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

Glossary of Terms and Abbreviations

AB	-	Able seaman
ARPA	-	Automatic Radar Plotting Aid
Cable	-	0.1 nautical mile
CATZOC	-	Category of Zone of Confidence
CNIS	-	Channel Navigation Information Service
CO_2	-	Carbon Dioxide
CPA	-	Closest Point of Approach
DSC	-	Digital Selective Calling
EBL	-	Electronic Bearing Line
ECDIS	-	Electronic Chart Display and Information System
ECS	-	Electronic Chart Systems
GPS	-	Global Positioning System
GRP	-	Glass Reinforced Plastic
GT	-	Gross tonnes
HGV	-	Heavy goods vehicle
HRU	-	Hydrostatic Release Unit
kW	-	kilowatt
LPG	-	Liquid Petroleum Gas
m	-	metre
“Mayday”	-	The international distress signal (spoken)
MGN	-	Marine Guidance Note
MOB	-	Man Overboard
Nm	-	nautical miles
OOW	-	Officer of the Watch
PPE	-	Personal Protective Equipment
RNLI	-	Royal National Lifeboat Institution
Ro-Ro	-	Roll on, roll off
RYA	-	Royal Yachting Association
SOLAS	-	International Convention for Safety of Life at Sea
STCW	-	International Convention on Standards of Training, Certification and Watchkeeping
TSS	-	Traffic Separation Scheme
UHF	-	Ultra High Frequency
UTC	-	Universal Time Co-ordinated
VHF	-	Very High Frequency
VLCC	-	Very Large Crude Carrier

Introduction

In the last few months of each year, the MAIB puts considerable effort into compiling its statistics for marine accidents/ incidents in the previous year. These will be published in detail in the MAIB's Annual Report, due out in June. However, with the normal caveat that these numbers are still provisional, there are some sobering figures that should remind all of us of the need for vigilance at sea:

1. We are aware of 12 fatalities in merchant vessels over 100gt, the highest number since 1992. While 6 seafarers died in just 2 accidents (*Viking Islay* and *Flying Phantom*) the others died in 6 separate accidents.

2. We have recorded 55 deaths in the "leisure sector". While this dataset has a very broad definition, covering everything from canoes and canal barges to ocean-capable yachts and commercially operated leisure craft, it is still a tragically high number of deaths.

3. Although fishing has had a relatively average year (10 deaths, after 2006's high of 16), there is no room for complacency here either. In November the MCA published Dr Stephen Roberts's study updating "mortality for workers in the UK merchant shipping and fishing sectors", which shows that over the 10 years 1996-2005, fishing remained, by many orders of magnitude, the most dangerous industry in the UK.

Finally, I would like to thank the large number of readers who have responded to our recent readership survey. Details of the survey, and our responses are on our Noticeboard at page 68.

Stephen Meyer
Chief Inspector of Marine Accidents
April 2008

Part 1 – Merchant Vessels

It is a great pleasure to be invited to write this Introduction to the Merchant Vessels Section of the MAIB's Safety Digest 1/2008, and it has a certain resonance for me as I am an avid reader of the MAIB Accident Reports. In my opinion, the publishing of these Reports is a vital service to the shipping industry and there are lessons to be learned from each and every incident.

It is said that 'experience is the best teacher' but that 'the wisest learn from the experience of others'. That is what the MAIB reporting scheme is all about – to make us all wiser.

Anyone who regularly reads the MAIB Accident Reports will know that the same type of accidents occur on a regular basis. The Reports cover merchant vessels of all sizes and types undertaking short sea as well as ocean passages. It is quite clear that many of the accidents reported could equally apply to any vessel and that, therefore, lessons can be learned irrespective of the trading pattern and vessel size and type.

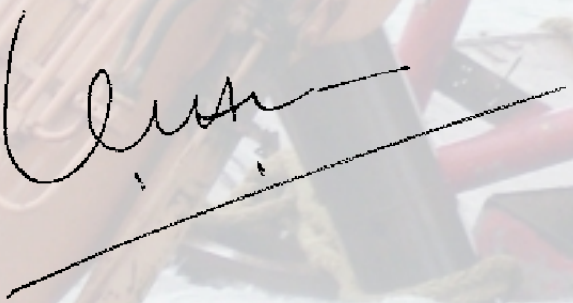
I would very much like to see the development of the MAIB accident reporting model in a wider international context so that more can be learned from the incidents which occur constantly around the world, but I have no expectation that this will happen in the near future.

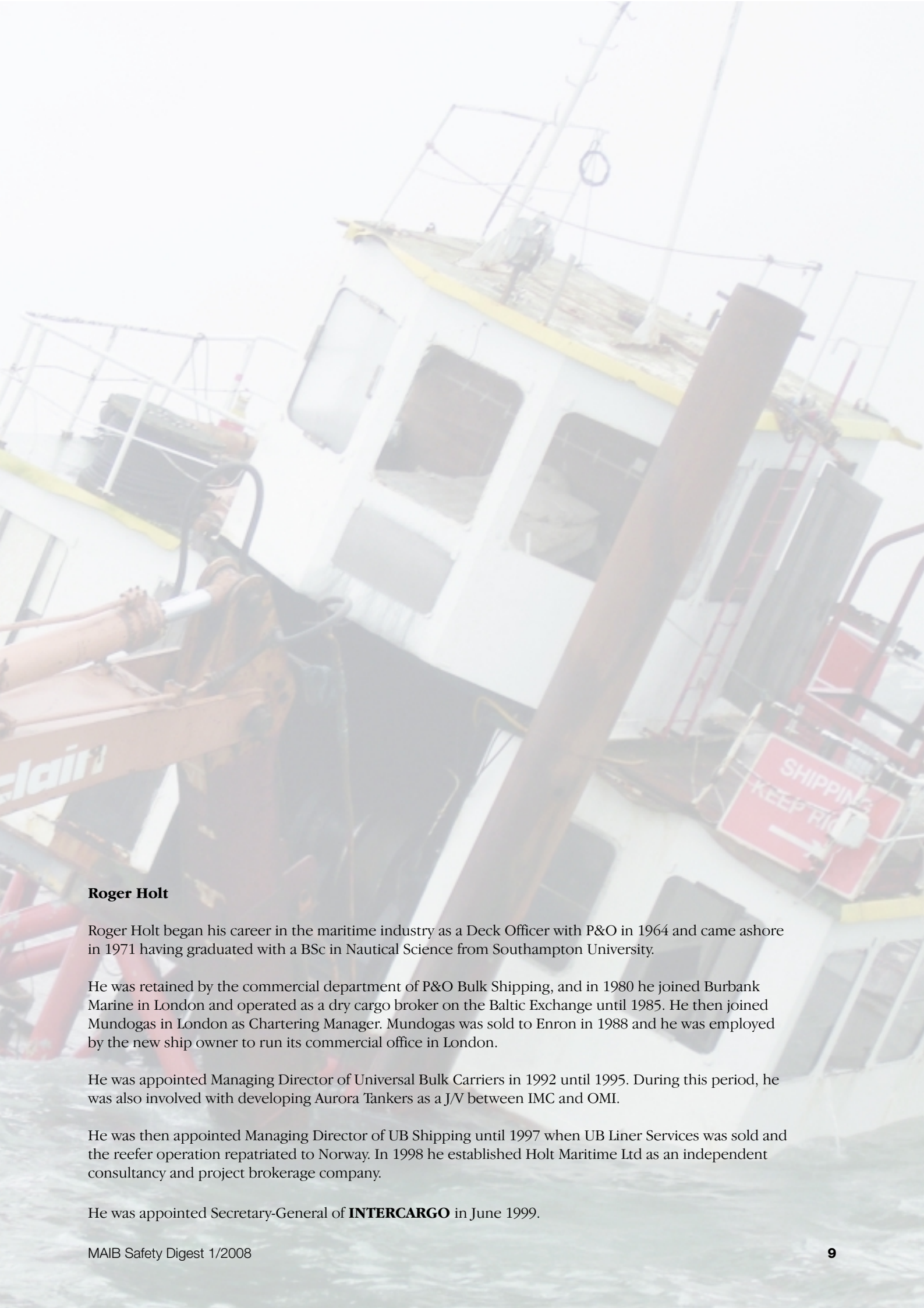
In this Digest, we have some important recurring themes which relate to groundings, collisions and mooring accidents. All of these could have been averted through proper implementation of team management and briefing/planning prior to the event. In most cases the adoption of an effective monitoring process would have prevented the accident from occurring. The industry has effective tried and tested methods of ensuring safe operations, but it is the implementation of these methods which seems to fail.

It should be noted that the articles chosen for this Digest are just a few of the reported accidents which have occurred during the period, but each one is interesting and of relevance because of the specific lessons which can be learned.

The international association of dry cargo ship owners, INTERCARGO, continues to promote the goal of quality across the dry bulk sector and is placing a greater emphasis on the role of the human element through the recent creation of a joint committee with INTERTANKO to provide a focus for the adoption of industry best practices. The publication of the MAIB's Safety Digest is a useful tool in our efforts to achieve this goal.

As I have done in the past, I congratulate the MAIB for the standard of reporting that it continues to produce and I hope that seafarers in conjunction with their managers and owning companies can be made more aware of the experience of others and thereby become wiser and less liable to repeat the same mistakes, with the inevitable tragic consequences.





Roger Holt

Roger Holt began his career in the maritime industry as a Deck Officer with P&O in 1964 and came ashore in 1971 having graduated with a BSc in Nautical Science from Southampton University.

He was retained by the commercial department of P&O Bulk Shipping, and in 1980 he joined Burbank Marine in London and operated as a dry cargo broker on the Baltic Exchange until 1985. He then joined Mundogas in London as Chartering Manager. Mundogas was sold to Enron in 1988 and he was employed by the new ship owner to run its commercial office in London.

He was appointed Managing Director of Universal Bulk Carriers in 1992 until 1995. During this period, he was also involved with developing Aurora Tankers as a J/V between IMC and OMI.

He was then appointed Managing Director of UB Shipping until 1997 when UB Liner Services was sold and the reefer operation repatriated to Norway. In 1998 he established Holt Maritime Ltd as an independent consultancy and project brokerage company.

He was appointed Secretary-General of **INTERCARGO** in June 1999.

Caution – Seabed Last Surveyed by Leadline in Mid 19th Century

Figure 1: Jack-up barge in position

Figure 2: The tug used to escort the jack-up barge

Narrative

A jack-up barge, towed by a 32m tug and escorted by a second tug, was being moved as part of a project to install a coastal renewable energy installation. The visibility was good, with light, variable winds; perfect for transferring the barge. Although it was the day before spring tides, the barge had been transferred the previous day, within the same area, without concern. The tug skipper used paper charts for planning and navigation together with a chart plotter for monitoring the passage.

The least expected depth for the passage was greater than 20m. Once clear of the port approaches, the barge master and tug skipper agreed to lower the barge legs to a depth of 9m to improve the barge's stability for the anticipated swell.

The tow's progress through the water was slightly reduced as the barge trimmed forward now that the legs had been extended. As the tug and tow approached the halfway point in the voyage the following spring ebb tide, flowing at about 6 knots, set the tug and barge closer to the coast than expected.

The tug skipper discussed the situation with the tow master, and they agreed to change their route to a channel used less frequently by deep draught vessels, but one the skipper had used many times before. This route also had a minimum expected depth of water in excess of 20m. As the tug and tow altered course to run with the ebb tide, their speed increased to around 9 knots.

Following the decision to change the route, the tow master and tug skipper agreed to lower the barge legs further, to 13m, to reduce the expected rolling when they crossed the tidal flow later, and to have the legs at the correct depth for positioning the barge on the seabed.

Shortly after altering course, and half an hour after low water, the barge grounded on the forward two, of her four, legs. The force of the grounding caused some of the barge personnel to fall; however, no one was injured.

The charted depth at the position of the grounding was shown to be greater than 20m, with the closest sounding on the chart showing a depth of 26m.

The tug skipper reacted quickly to the grounding by simultaneously applying astern propulsion and paying out the towing cable. The escort tug promptly connected a tow to the stern of the barge to relieve the strain on the barge legs, and held her in position to wait for the rising tide and a reduction in the tidal flow.

The jack-up barge refloated 40 minutes after the grounding and was returned to harbour. All four legs were found to be damaged, with the damage to the barge costing an estimated £1m to repair. The delay in returning the barge to her destination also resulted in extensive delays to the project when the seabed frame, constructed during the previous installation stage, collapsed in the strong tides.

The tug's echo sounder was running throughout the voyage, although the depth trace prior to the grounding was illegible; possibly due to the turbulence caused by the fast flowing tidal streams in the area.

Following the grounding, the national hydrographic office initiated NAVTEX warnings of the danger. A week after the grounding, the local pilot boat carried out a survey of the area, which confirmed the presence of an uncharted bank with a minimum depth of less than 8m covering an area of approximately 2.5 x 2.5 cables. The published chart correction revised the charted depth of the bank to be 7.1m.

The source diagram for the chart showed the area to have been surveyed by leadline between 1839 and 1848. The original survey record showed that the survey of the grounding area was carried out in 1844, and the findings were correctly transferred to the chart. The 7.1m bank had been missed due to the sampling nature of the leadline surveys.

The Lessons

1. **Ever larger and deeper draught vessels, including passenger ships, are navigating more frequently in remote and infrequently visited areas of the world. This grounding should alert masters and marine managers to the risks of routing their vessels in these areas.**

2. **The tug skipper and the tow master had not appreciated the implications of the source data on the chart they were using. 19th Century source data implies leadline surveys which, by their nature, are not as comprehensive as modern surveys. Prudent mariners must check the source data of their charts to assess the risk to their passage plan.**

3. **When using electronic charts, source data can be hard to find or, once found, interpret:**

   - **ECDIS equipment uses Category of Zone of Confidence (CATZOC) instead of the traditional Source Data diagram shown on paper charts. However, CATZOC might be an ECDIS menu option which is not immediately available to the navigator and so easily forgotten during passage planning. A full description of CATZOC is provided in the Mariners Handbook – NP100.**

   - **Electronic chart systems (ECS) and chart plotters might not display CATZOC or survey source data at all, therefore their reliability should be carefully considered by the prudent navigator. If appropriate, reference should be made to updated paper charts.**

4. **Depths that are significantly less than charted may exist wherever your voyage takes you, and the possibility of their existence should not be ignored. Echo sounders should be used in poorly surveyed regions, even when shallows are not expected.**

One Fire is Unfortunate, Two Fires is…

Figure 1: Fire Service attending to the fire (image captured from CCTV)

Narrative

A 2500gt general dry cargo ship had arrived at a UK port following a passage from the eastern Mediterranean during which the ship had encountered particularly severe weather conditions. While manoeuvring in the locks, a fire occurred inside the upper part of the main engine exhaust uptakes, within the funnel area. Flames came out of the main engine exhaust at the funnel and ignited waste oil that was lying on the funnel top. This produced a spectacular ball of flames and much dense black smoke.

The crew discharged a powder extinguisher to the funnel top, then water from the ship's fire hose. Meanwhile, the shore-side fire brigade had been called, and they responded in force. Initially, the funnel door was open and few significant signs of the fire were seen inside the funnel space. The door was then closed and boundary cooling applied to the outside of the funnel. The engine room was evacuated, closed down and the CO_2 flooding system was operated without any problems. The fire was rapidly brought under control and was soon extinguished. There was some minor fire damage to both the internal and external paint finishes of the funnel and the lighting systems inside the funnel space.

The engine room CO_2 cylinders were landed ashore for re-charging and, although alongside, the ship's crew maintained engine room watches due to the increased risk.

During the evening, there was a second, smaller incident. Increasing amounts of smoke were seen coming from the upper part of the funnel, in the area of the main engine silencer/spark arrestor. The local fire brigade was called again, and returned on board and located the seat of the fire. Hot spots remaining inside the main engine exhaust from the first fire had ignited the oily/greasy

Figure 2: The main engine/silencer arrester – the seat of the second fire

vapour residues in the mineral wool insulation that covered the exhaust uptakes. This second fire was extinguished by breaking open the outer metal cladding and applying water directly to the seat of the fire within the insulation itself. A small amount of water was also put down the exhaust uptake, care being taken to allow this to drain off before it reached the main engine.

Although the vessel was built in 1982, the main engine was an older design more commonly seen on larger vessels. Rated at 1490kW, it was a slow speed two-stroke, direct reversing engine with compressed air starting, and used a scavenge pump in a cross scavenge system. The engine was provided with a simple cylinder lubrication system and operated using gas oil as fuel. There was no economiser or exhaust gas boiler.

The engine had been substantially overhauled during a repair period just before this voyage, during which the pistons had been withdrawn and the piston rings and some cylinder liners renewed. Consequently, the rate of cylinder oil lubrication had been increased for the "running-in" period. There was no system to monitor and control the rate of cylinder lube oil injection, so it is likely that the engine cylinders were significantly over-oiled for an extended period.

After the fire, the main engine was examined and was found not to be damaged; all piston rings were intact. Significant quantities of oily carbon were found in both the scavenge and the exhaust trunkings, however the fire had been in the uptakes only. There were large quantities of fully burnt ash at the after end of the exhaust trunking, beneath the main exhaust uptake. Further areas of insulation were stripped away from the outside of the exhaust trunking, and some areas were found to have been contaminated by oil vapours.

The Lessons

1. The voyage was longer than usual, so the crew had no opportunity to examine or to clean the scavenge air or exhaust trunkings. Also, the bad weather meant that the build up of oily residue on the funnel top went unnoticed. Engineers must always be alert to the dangers of fouling of scavenge and exhaust trunkings/uptakes; the result may not always be a scavenge fire!

2. The local emergency response plan went well, the fire & rescue service responded quickly, and in significant numbers. However, its actions in tackling the initial fire were probably less than optimal; while the boundary cooling technique was effective, it is unlikely that the use of the CO_2 flooding system was the best way to tackle this particular fire. This ineffective use of resources was due to a lack of understanding of the construction and layout of the ship and, consequently, the location of the seat of the fire. The second fire was due to inadequate damping down after the first incident, again due to a lack of understanding of ship construction and layout.

   The port authorities, fire & rescue service and the Maritime and Coastguard Agency are working together to enable local firefighters to increase their knowledge of ships and shipping operations. However, owners, masters and crews should always consider helping those who will be there to help them; please respond positively to requests for familiarisation visits and exercises involving the emergency services.

3. The phenomenon of fires within oil contaminated lagging is well known, and is commonly labelled a *"lagging fire"*. In this case, although covered with thin metal sheathing for mechanical protection, the mineral wool insulation was not vapour-sealed. The oil contamination was probably due to oily vapours inside the funnel space condensing on the outside of the exhaust trunking as it cooled. These owners now have a planned programme of inspection and renewal of contaminated lagging. Do you know what is inside your lagging?

Left a Bit More

Narrative

A chemical tanker had discharged parcels of cargo at a port in the Middle East and was outbound through a narrow channel to sea. With the pilot on board and an escorting tug alongside, all was going well. In good weather conditions and an ebbing tide, the pilot decided to disembark at the port's breakwater, about 3 miles short of the official position. This was just before the channel turned through 90 degrees to port and reduced to a width of 1.5 cables. Despite this, the tug was dismissed and the pilot disembarked.

Once past the breakwater, the vessel turned to port and the master ordered the helmsman to maintain a heading along the dredged channel. The tidal stream was predicted to follow the vessel's course at up to 4 knots, so the passage plan allowed for a speed of up to 10 knots to maintain steerage. The local chart also warned of anomalies due to dredging, and the master ordered a small course alteration to port to account for an offset.

At about the same time, the master noticed a small fishing boat ahead, operating near to a marker buoy on the left hand side of the channel. Meanwhile, the helmsman was having difficulty altering course and increased to 10 degrees of port rudder. Shortly afterwards, the vessel began turning rapidly to port and the master noticed that 30 degrees of port rudder had been applied. He ordered 'hard to starboard' and, 30 seconds later recorded that the swing to port had stopped. However, the swing in the vessel's head meant that the fishing boat was now off the vessel's starboard bow, and the master realised that if he allowed his vessel to swing back to starboard, and follow the channel, he would collide with the fishing boat. Consequently, he ordered full astern power and let the port anchor go.

The tanker came to rest with the forward part aground on soft sand/mud, and the fishing boat passed down its starboard side without making contact. Although the fishermen jumped into the water, they were thrown lifebuoys and were recovered unhurt. The tanker was later refloated with the assistance of a tug. With no damage evident from tank soundings, the vessel was allowed to continue on passage.

The Lessons

1. The pilot disembarked significantly ahead of the official boarding position, immediately prior to a difficult manoeuvre in complex tidal conditions and left without giving any further advice.

2. The master allowed his vessel to move to the port side of the channel, despite the requirements of COLREGs and the presence of the small boat ahead on the port side.

3. The master did not monitor the helmsman's response to his orders and was not aware of the large amount of port rudder until it was too late to rectify the situation. The helmsman applied maximum port rudder without further instructions from the master.

4. Although speed had been increased, the following tidal stream significantly reduced the effect of the rudder.

5. Despite members of the bridge team completing resource management training, the lessons learned were not applied on this occasion.

Too Little, Too Late

Figure 1

Narrative

A 1568gt general cargo ship in ballast was on passage through UK territorial waters on a course of 007° in autopilot, and making good a speed of 7 knots. The wind was from the north, force 7, and the sea was rough with a swell of between 2 and 3 metres. Fifteen minutes after taking over the bridge watch from the master, the chief officer saw a beam trawler off his port bow at a range of 2 miles. The fishing vessel had also been seen by the master shortly before handing the watch to the chief officer, but he had not assessed her CPA or notified the chief officer of her presence during the watch handover. The chief officer saw that the vessel was fishing and, by using the EBL on the radar display, assessed that she was on a steady bearing. The radar display in use (see Figure 1) did not have a gyro input and was not equipped with an automatic or semi-automatic plotting facility.

The beam trawler, which had a crew of three, was on a course of 160° at a speed of 6 knots. Her skipper was in the wheelhouse, but was working on the vessel's chart plotter and did not see the approaching cargo ship. When the vessels had closed to a distance of 5 cables, the chief officer on board the cargo ship altered course to 027°. After steadying on the new course, the chief officer assessed that the trawler was still on a steady bearing. He changed to manual steering and put the helm hard to starboard; he also sounded the ship's whistle.

By now, the vessels were only 2 cables apart and the whistle alerted the mate working in the trawler's forward shelter deck. He ran to the wheelhouse and put the trawler's engine astern, but this did not prevent her bow from colliding with the aft end of the cargo ship's port side.

The cargo ship was holed above the waterline (see Figure 2) and diverted to a nearby port for survey and repair, but the trawler sustained only superficial damage and continued fishing.

Although the two vessels established communication on VHF radio and exchanged details following the collision, neither reported the accident to the coastguard.

Figure 2

The Lessons

1. Encountering and keeping clear of fishing vessels is a routine occurrence for most bridge watchkeepers. However, once in a while this can be complicated by unexpected course alterations by the fishing vessels concerned. This occasional erratic behaviour by some fishermen does not justify a vessel delaying avoiding action. This serves only to confuse the situation further, reduce the margin for error, and it usually necessitates a greater alteration to achieve a safe passing distance.

2. The number of ships fitted with the means for an OOW to visually determine a vessel's bearing movement is decreasing. Consequently, there is an increasing reliance on radar to determine passing distances and CPAs, even when vessels are in sight of each other. However, the technical specifications, performance and functions of the differing radar displays available vary considerably, and some are able to provide only coarse approximations. Therefore, the limitations of the equipment available must be taken into account when assessing the risk of collision and deciding on a safe passing distance.

3. When working a 6 hours "on", 6 hours "off" bridge watchkeeping regime opposite the same person, it is easy for a degree of complacency to set in when handing and taking over the bridge watch. If this is not guarded against by both officers, it will only be a matter of time before the 'handover' is reduced to a 'cross-over' and important information is not passed on.

4. Given the limited manoeuvrability of vessels engaged in fishing, it is in their interests to keep a proper lookout, to ensure dangerous situations caused by other vessels not keeping clear are spotted in time to allow successful avoiding action to be taken. This cannot be achieved unless at least one person is looking out of the window and at the radar display.

5. Even where assistance is not immediately required and there has been no pollution following a collision, grounding, or other serious accident, informing the local coastguard as soon as possible has potential benefits should the situation suddenly change. In particular, assistance is likely to be at hand much sooner if the coastguard has already been able to inform the relevant services of a vessel's situation, rather than starting from cold.

Buoy oh Buoy – Planning the Voyage Would Probably Have Prevented This Grounding

Narrative

A small commercial vessel set out to deliver fish food in bulk to a fish farm located in a small inlet of an island. The skipper was familiar with the general area in which the vessel had traded for several years, but had not made regular calls to this particular fish farm.

The weather was fine and clear and the sea was calm. The vessel set off from her overnight berth at first light but without undertaking any form of planning for the passage. The trip proceeded smoothly until the vessel approached the narrow entrance to the inlet.

As the vessel came close to the entrance the skipper, who was on the bridge alone, noticed two small marker buoys close ahead; he altered course to port to avoid the buoys and, as he did so, the vessel grounded on a rock ledge.

The crew sounded the compartments to check for water ingress, which revealed that the vessel, although having suffered some hull damage, remained seaworthy. She was later refloated, and temporary repairs were undertaken in the shelter of the inlet. The vessel then proceeded to a repair facility to effect permanent repairs, which resulted in her being out of service for several weeks.

It transpired that the two marker buoys at the entrance to the inlet, which the skipper had altered course to avoid, had been laid by the local fish farm workers to mark the edge of the rock ledge on which the vessel grounded.

The Lessons

1. **The principles of passage planning are as relevant for small craft as they are for large ocean going vessels.**

2. **The fundamental requirements of planning and executing a safe navigational passage must be clearly understood and implemented by those in charge of all sizes of vessels. SOLAS Chapter V, Regulation 34 applies to all ships which proceed to sea, and the Annex to A893(21) provides guidelines for voyage and passage planning. The key elements of these are: Appraisal, Planning, Executing and Monitoring.**

3. **The skipper should have realised that the entrance to the inlet, being very narrow, was a critical section of the passage and warranted particular attention. He could have considered telephoning the local fish farmers, to whom he was delivering fish food, to seek their advice and guidance on the best approach to take into the inlet. He might well have been told about the marker buoys which they had laid.**

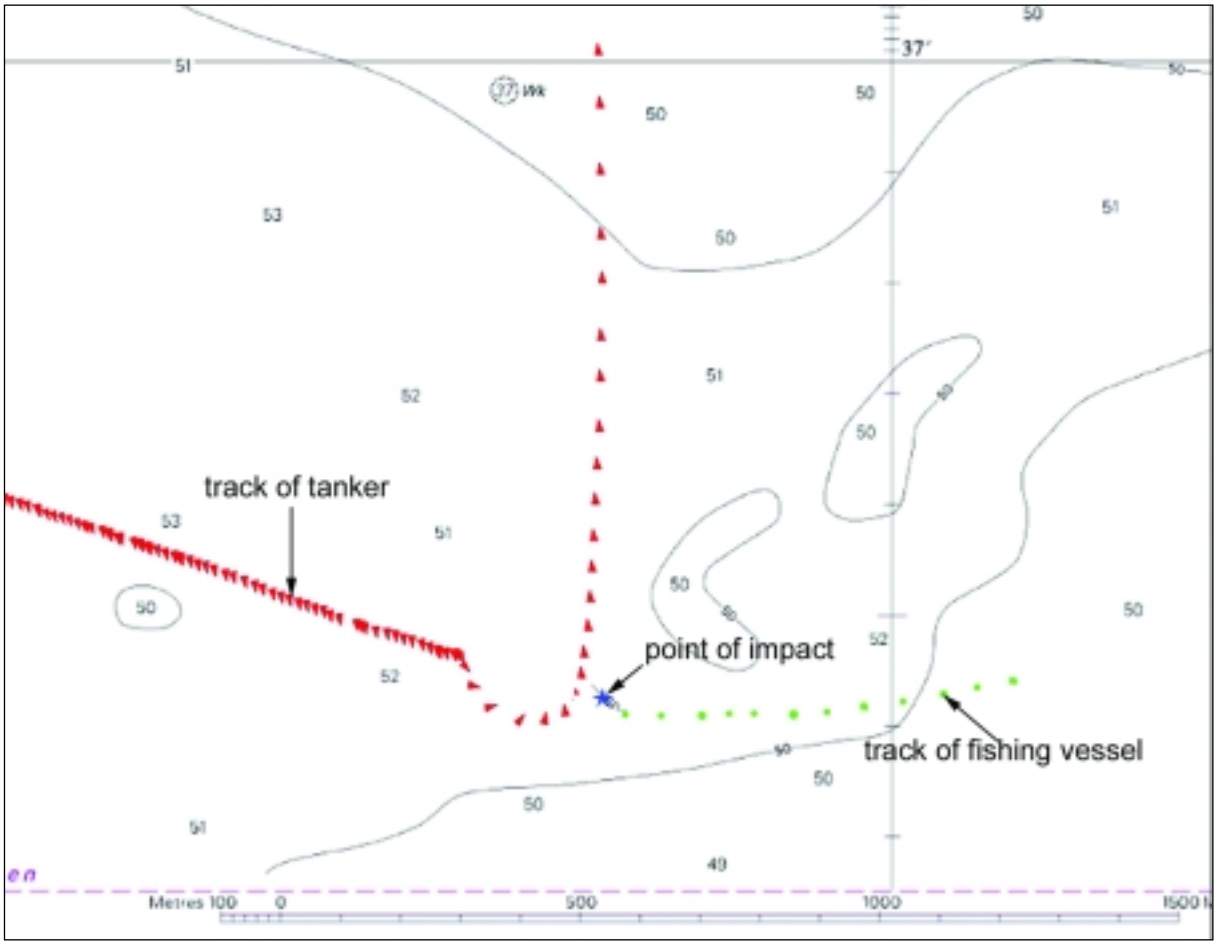
He Was Not Supposed to be There, Guv!

Narrative

A coastal tanker had just picked up her anchor and was proceeding to the pilot boarding area when she was advised by port control to drift off port limits and to wait for the visibility to improve before the pilot could board.

At about the same time, a GRP fishing vessel left the port with the intention of laying her pots in her usual fishing grounds. The restricted visibility was of no concern to her skipper as the vessel was fitted with a multifunction navigational aid, which included a radar. Also, the skipper overheard a broadcast by port control restricting the traffic movements in the port, which he understood to indicate that he would not encounter any traffic within the port limits.

At about 0848 UTC the master of the tanker received a call from the pilot advising him to meet him at a position 2 miles to the north. He plotted his position at 0850 UTC and manoeuvred his vessel to head north with the use of helm and engines, acquiring a speed of about 3 knots in so doing (see Plot). At the time, the bridge was manned by the master and a seaman.



Tracks of the vessels

After laying some of her pots in the eastern approaches to the port, the fishing vessel headed off in a westerly direction at a speed of about 6 knots. The skipper was using a track recorder in conjunction with a separate echo sounder to record the positions of his pots. To monitor the traffic on radar, the skipper had to switch between the echo sounder and radar modes on his multifunction navigational instrument. The range set on the fishing vessel's radar was only 0.125nm which, in effect, gave the skipper 1 minute's worth of view ahead, but he was not fully aware of this fact. He had been switching to monitor the radar occasionally, and was about to do so when the skipper sighted the tanker's hull. By that time it was too late to take effective action to prevent the collision which occurred at 0851 UTC. The precise time and position of the collision are known because the skipper was thrown forwards onto the control console, where he accidentally hit the "save" button on the track plotter keyboard.

The master of the tanker did not notice the fishing vessel on his radar. This is because either the radar was not being monitored, or the auto clutter had masked the target. He did not notice the fishing vessel until the collision occurred. Immediately after the collision, the fishing vessel put her engines astern and backed off into the fog.

Evidence suggests that no fog signals were being sounded by either vessel.

As a result of the collision, the tanker suffered some superficial damage, but the fishing vessel was damaged more substantially and was able only to limp into port with her bilge pumps working (see photograph).

Damage to the fishing vessel

The Lessons

1. All vessels are required to maintain a lookout by sight and by hearing, as well as by using all available means. In this case, both vessels had radars which were not being monitored effectively.

2. The master on the tanker was distracted from his role in collision avoidance and lookout because he was engaged in communications and navigation. He should have called another officer to the bridge to assist with these tasks during the situation that prevailed.

3. This collision reinforces the need to sound the appropriate fog signal. In the absence of an adequate radar lookout, this collision could have been avoided if either of the vessels had been sounding its fog signal.

4. Masters and officers are reminded that after a collision they have a legal obligation to stop and offer assistance to the other vessel. The master of the tanker had no idea whether or not the fishing vessel was safe, especially as it disappeared back into a fog bank soon after the event.

   - Following an accident, it is prudent to alert the authorities at the first opportunity. Once you have confirmed that the situation is under control and no assistance is required, a follow-up call can be made to stand down the alert. By doing this, there will be no delay in providing assistance should you or the other vessel need it. Tragically, when mariners have delayed calling the coastguard, some have left it too late.

Backspring Strikes Leading Hand in the Face

Figure 1: Mooring arrangements at the time of incident

Narrative

In good weather and light winds a ro-ro ship entered a lock. The mooring bollards along the side of the lock were over 100 years old and, unlike more modern designs, did not have 'horns' to prevent ropes from riding up. Therefore, to prevent the eye of a mooring rope from slipping off a bollard it had become an established practice for the lock personnel to hitch the eye when securing high-sided ships such as ro-ro's.

During the locking procedure, the bridge team, which consisted of the master and chief officer, operated the bow and stern thrusters and the variable pitch propeller. The forward mooring party comprised an able seaman and a leading hand; the latter was standing on the stem platform relaying distances to the bridge team as the ship was manoeuvred into the lock at a speed of about 1 knot.

The forward 64mm backspring was passed down to two linesmen. The senior linesman, who was a berthing master and unfamiliar with this specific task, placed the eye of the mooring rope over the allocated bollard, *without* using a hitch. Both linesmen then moved towards the inner gates to operate the machinery controlling the sluices. When the ship was in position, the forward backspring was heaved in to hold the ship. The leading hand took over from the able seaman at the

Figure 2: Position of casualty at controls

winch controls, which were located at the ship's side, next to the fairlead through which the backspring passed. As the ship rose in the lock, the backspring slipped off the bollard, snapped back, and struck the leading hand in the face, causing lacerations and fractures to his cheek bone and nose. He had not been wearing a safety helmet.

The Lessons

1. **It is unlikely that the ship's crew could have done anything to prevent the mooring rope from slipping off the bollard. However, careful consideration should always be given to ensuring crews are not placed in positions of danger during mooring operations. Consideration should also be given to locating winch controls so that they are not in the snap back zones[1] of mooring ropes. If the controls cannot be located away from snap back zones then some form of remote operation or guard should be provided to protect the operator.**

2. **It is essential that all personnel involved in mooring operations are provided with, and wear, personal protective equipment.**

3. **Complacency is a killer, and it is vital that ships' staff keep alert to the potential risks involved in mooring operations at all times.**

1 The Maritime and Coastguard Agency's *Code of Safe Working Practices for Merchant Seamen* includes diagrams of snap back zones

Mooring Failure – Walking a Tightrope

Figure 1: After winch mechanism

Narrative

A ro-ro ferry was allocated a lay-by berth so that stabiliser and main engine defects could be investigated. It was a clear and bright day, and on arrival at 1430 the wind was north-easterly between 30 – 35 knots.

The crew were certainly familiar with routine moorings to load and discharge at linkspans for short periods, as part of their normal routines. However, long term, alongside berthing occurred only 3 or 4 times a year. The mooring arrangements were loosely discussed between the master and the chief officer and were specified as "2, 2 and 2", meaning 2 head/stern lines, 2 breast lines and 2 springs, which was the normal practice. This requirement was passed to the bosun and the deck store petty officer, who were in charge of the forward and after mooring parties respectively.

Both parties used a mix of ropes and wires for the same function, i.e. breast and spring lines. The wires were left on the winch drums with the drum disconnected from the winch drive shaft, the band brakes were on, the control lever in neutral and hydraulic pumps shut down (Figure 1). This procedure was normal and accepted practice.

The forward and after mooring ropes were secured in different ways: the forward mooring party used ropes on bights and left them on the winch warping drum so that rope tension equal to that of the wire could be achieved. The ropes were then backed up on bitts, with figure of eight turns. The after mooring party also used ropes secured on the drum ends, but without using bights. They were backed up with only a couple of turns around a single bitt.

Now that the ship was securely alongside, the

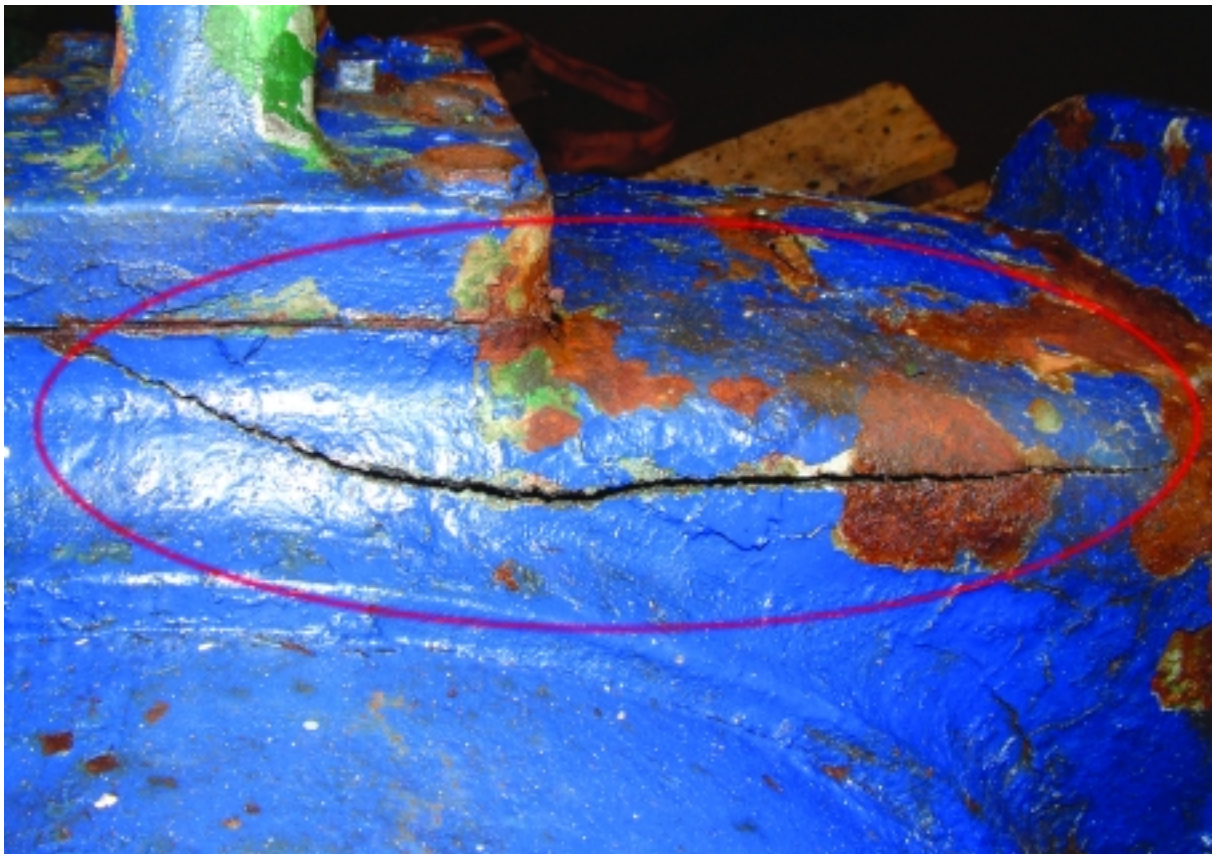


Figure 2: Fractured motor casing

master received reports from the mooring decks that she was "all fast forward" and "all fast aft". There was no positive reporting on the status of the winches or of the types and number of lines used. Unfortunately the practice of having an officer supervising the moorings had also fallen into abeyance, therefore no deck officer checked the moorings despite the very windy and obviously risky conditions. The master was able to view the forward moorings from the bridge, but the after moorings were obscured. There was an assumption that the after moorings were the same as the satisfactory ones forward.

The mooring watch was set, the quartermaster positioned at the gangway and an OOW on the bridge. The engineers set about their defect investigation and the master settled down to tackle his paperwork. All appeared to be normal. Indeed, it was a quiet afternoon, until 1810, when the bridge received a report that one of the stern line wires had "stranded" and the on-watch deck team intended to replace it.

Dealing with stranded wires was not unusual. However, in this case a replacement wire was not sent out before the damaged one was removed. The damaged wire had been removed from the jetty bollard, and work was underway to detach the wire from the winch drum when the chief officer arrived at the after mooring deck. He was happy with the progress and returned to the bridge. Unfortunately the opportunity to check the other moorings, and the suitability of the remaining single stern line to take the load, was not taken.

At about 1835 another ferry entered the port. Shortly afterwards, the inevitable happened. The ship surged about 5 metres up the jetty, the remaining stern line parted and the ship's stern started to leave the quay. The ship pivoted about the forward port shoulder causing one of the forward breast ropes to part. As she continued to move off the quay, the port after winch brakes rendered and the wires were pulled from the winch wire drums.

As weight came onto the after ropes the loose turns were pulled from around the single bitts, and the winch warping drum rotated which, in turn, rotated the winch hydraulic motor backwards. This huge shock loading pressurised the motor casings and they fractured under the excessive pressure (Figure 2), spraying hydraulic oil across the port after winch deck.

By a stroke of good luck no-one was injured.

The ship adopted an angle of about 45 degrees to the jetty before a nearby tug was raised on VHF and came to the ferry's assistance and pushed her back alongside.

The Lessons

Mooring of ferries undertaking short sea trips can become automatic and, it could be argued, somewhat monotonous. This accident clearly demonstrates that complacency can be dangerous. An effective and safe mooring arrangement is fundamental to the safety of the vessel and her crew, and indeed to other vessels. It is an important aspect of ship operation, requiring careful consideration. This is especially the case when unfamiliar moorings take place.

The following points are reminders for safe and effective moorings:

1. **Moorings should always take due account of the existing and predicted weather conditions.**

2. **Short lengths of line (nips) and mixing of wires and ropes for the same service i.e. for breast, head/stern lines should be avoided.**

3. **Masters should encourage positive reporting from the mooring decks, with a clear description of the moorings and status of winches.**

4. **The tie up should be supervised, where possible, by an officer, as laid out in STCW Chapter 25.**

5. **Ropes should be removed from winch warping drums and secured on bitts using figures of eight, using stoppers as appropriate.**

6. **Do not assume that moorings which cannot be seen are as satisfactory as those which are visible – do check; the effort is worth it.**

To Cross or Not to Cross?

Narrative

In the early hours of the morning, a coastal LPG tanker was north-east bound in the Dover Strait Traffic Separation Scheme enroute to its loading port in Scotland. Its passage plan included crossing the south-west traffic lane in the vicinity of MPC buoy. At the same time, a container vessel was in the south-west lane, bound for the West Indies. The weather was fine with good visibility.

The master of the LPG tanker had only joined the vessel the previous day. In his night orders he had asked to be called as the vessel approached MPC buoy and at any other time "if in doubt". As the vessel approached MPC buoy the OOW called him and told him that there was no "dangerous traffic"; this was enough to persuade him to stay in his bed and leave the navigation through the TSS, including the crossing of the south-west lane, to the watchkeeping officers.

A target was sighted on the port bow of the LPG tanker at 10 nm and acquired on the vessel's ARPA radar. When the vector was settled, the OOW performed a trial manoeuvre check which indicated that if the tanker altered course at the MPC buoy, as planned, they would pass 1 mile ahead of the target vessel.

There was a strong tidal stream running from the north-east, so the vessel was a little later arriving at the MPC buoy than expected. At the MPC buoy the lookout took the wheel and, on instruction, altered course to cross the south-west lane. After steadying on the new course the OOW fixed the position using a visual bearing and radar distance, and plotted it on the chart in the chart room. He recalls seeing the target vessel, a container ship, broad on

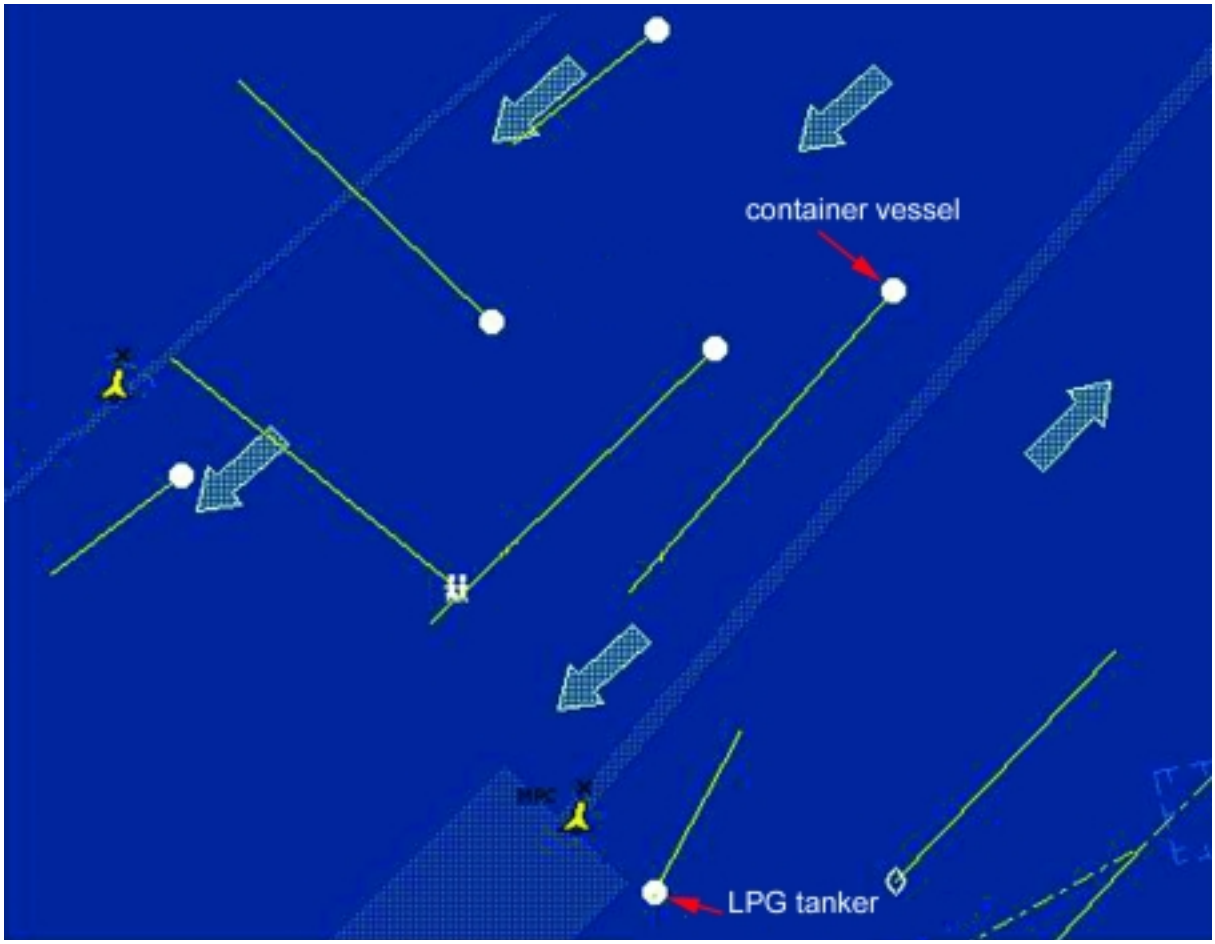


Figure 1: Initial position of vessels

the starboard side, but he did not take any bearings of her or check the new closest point of approach.

He was unaware that his vessel was on a collision course with the container vessel until CNIS called him on the VHF. His first reaction was surprise because he expected to be passing 1 mile ahead of the other vessel. He initially told CNIS that he would alter to starboard, but then he realised he had insufficient sea room, so advised CNIS that he would go to port instead. He asked the name of the other vessel.

Shortly after starting the turn to port he contacted the other vessel to request that they went to port as well; this was declined by the master, who stated that they would alter to starboard.

The combination of these two actions resulted in a collision being narrowly avoided.

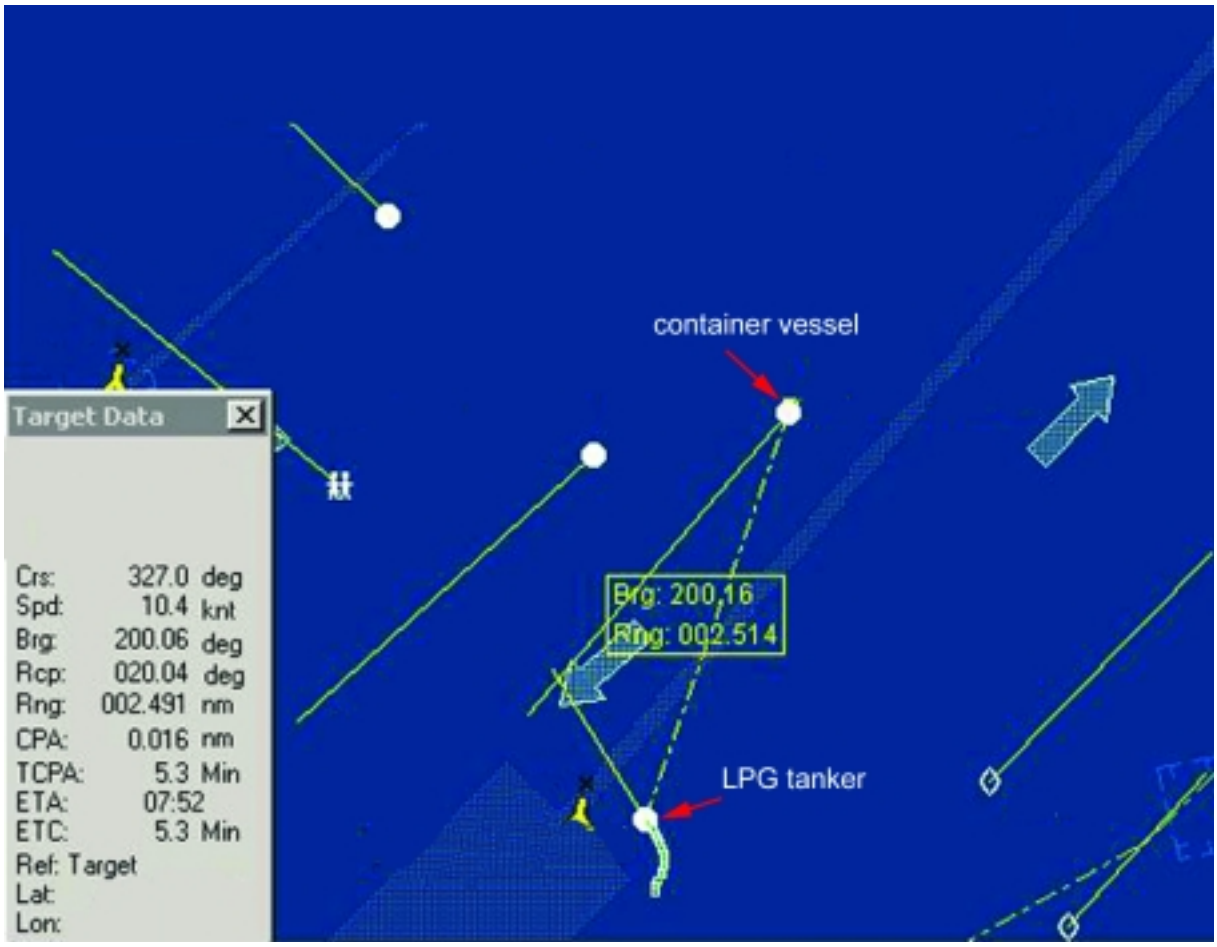


Figure 2: Vessel positions after LPG tanker's change of course

Figure 3: Vessel positions before LPG tanker's turn to port

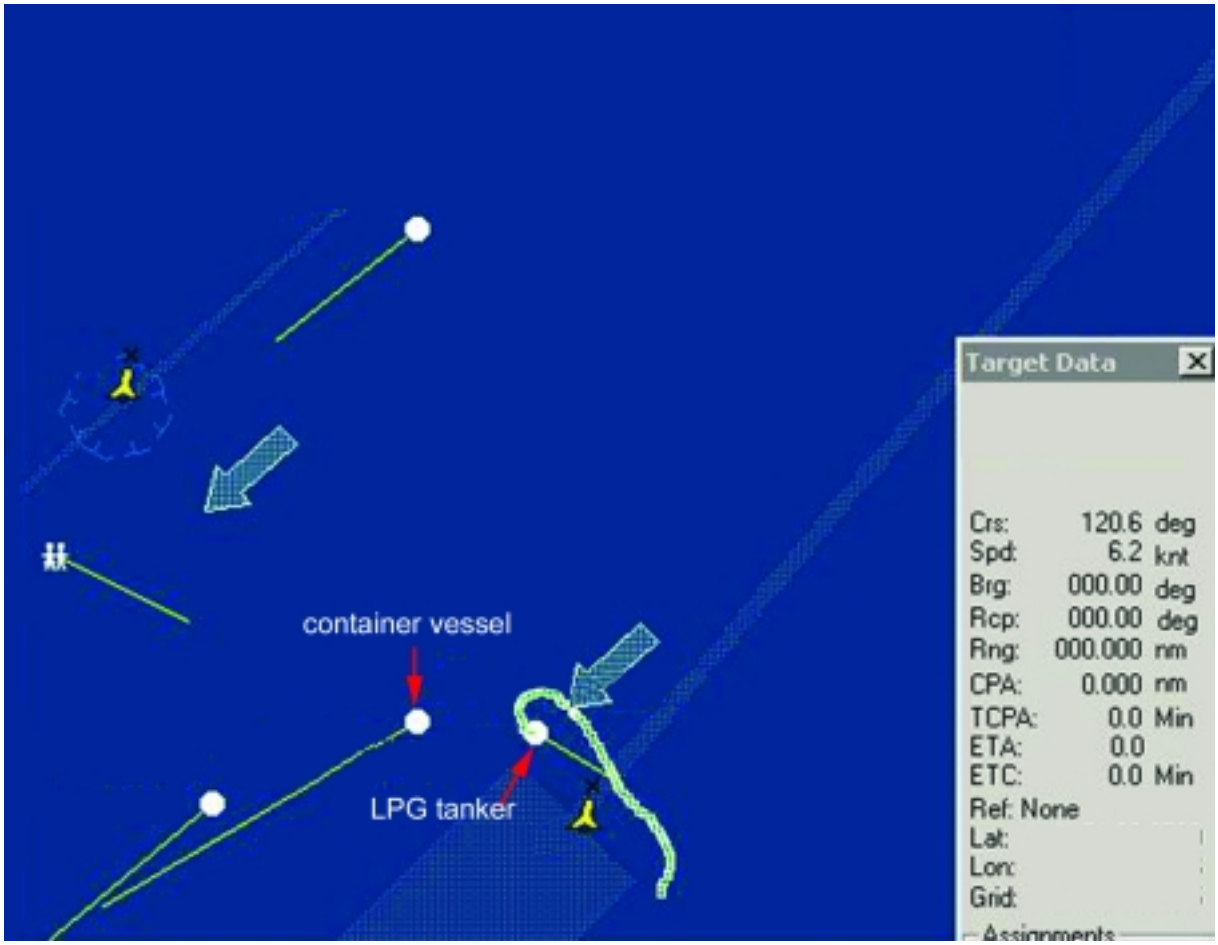


Figure 4: Extent of avoidance action taken by LPG tanker

The Lessons

1. The tanker operated a three watch system which did not include the master. In areas of high traffic density and at times of high risk, like crossing the south-west lane of the Dover Strait Traffic Separation Scheme, the master should have been on the bridge to support the bridge team.

2. For a key period, the tanker had no lookout – the seaman was on the wheel and the officer was in the chart room. This was contrary to the Collision Regulations and good practice.

3. Quite correctly, the radar's trial manoeuvre facility was used to predict what would happen when the alteration of course took place some 9 minutes later. However, the OOW did not appreciate that even a short delay in starting the turn could substantially change the result, especially when two vessels are approaching one another at a closing speed of about 35 knots.

4. After the alteration of course was completed, the OOW should have rechecked the situation to ensure that the CPA was still adequate.

5. When the OOW saw the other vessel broad on his starboard bow he assumed that it would pass astern. This was scanty information; he did not take into account that a fast vessel (this one was making 23 knots) could still be a danger.

6. Good seamanship dictates that crossing ahead of another vessel should be avoided whenever possible. In this case, as there was no traffic immediately following the container ship, it would have been prudent to pass round her stern.

7. The danger of using VHF in collision avoidance is well known. In this case, the master of the container ship was wise to decline the suggested alteration to port.

Don't Try This at Home

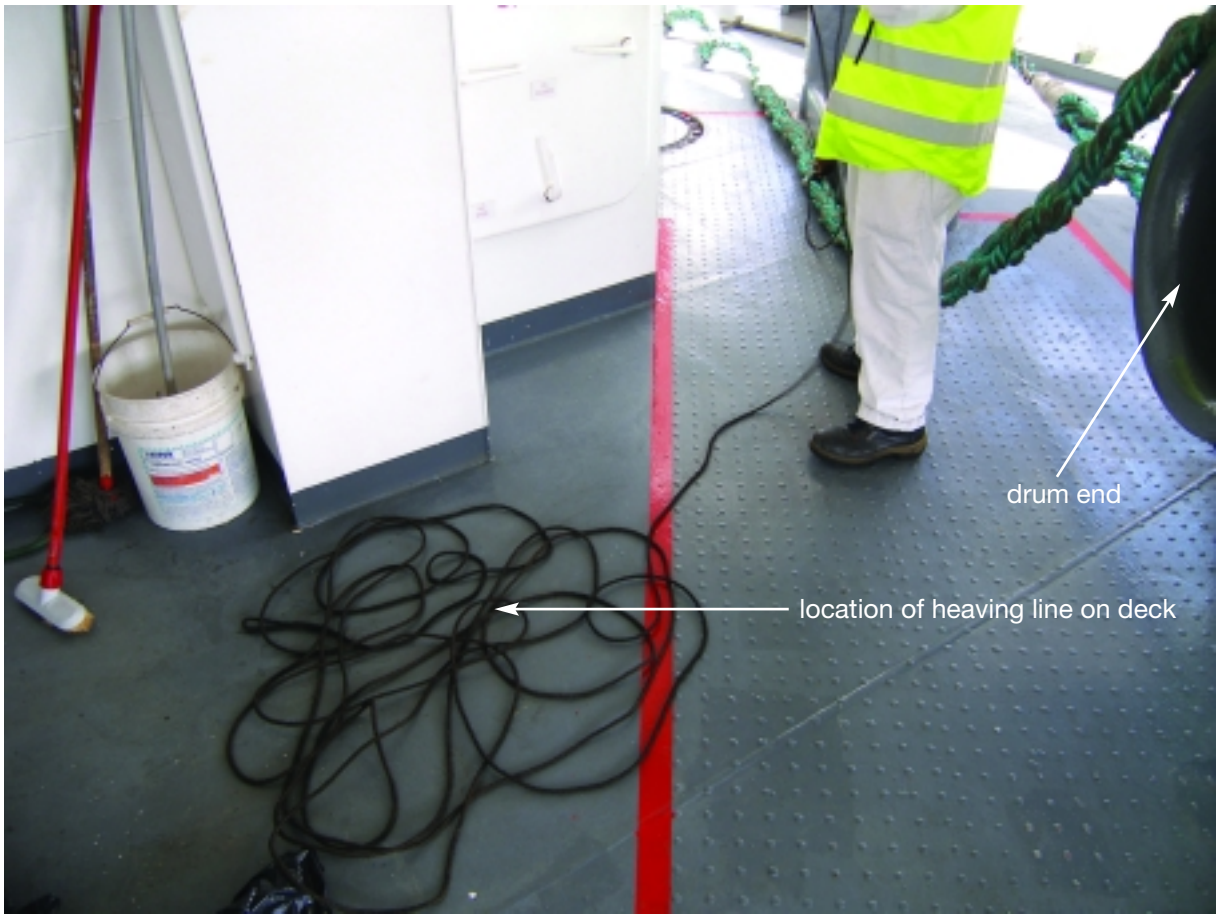


Figure 1: Position of the casualty in relation to the heaving line

Narrative

A container feeder vessel, with a pilot on board, was on its regular weekly visit to a port situated on a river. He took over the ship's controls just off the port. He then held the ship stationary, stemming the 3-4 knot flood tide, with the port's entrance lock on his starboard beam. The weather conditions were good with only a light breeze.

A tug approached stern to stern with the containership ready to make fast a tow line from her aft tow winch, as was normal practice. A heaving line was thrown down from the ship (see Figure 1) to the single crewman on the aft deck of the tug, and the tug's messenger line was attached. The ship's aft mooring deck crew manually heaved the messenger line through the transom panama eye. A seaman then put 4-5 turns of the messenger line onto the drum end of the winch, at which point the officer-in-charge instructed the crewman controlling the winch to start heaving slowly to pull the tug's tow wire on board.

As the tow wire neared the panama eye, the tug unexpectedly started to move off to port and away from the stern of the ship. Although the tug's tow wire was veered by the crewman on the tug's aft deck, and heaving was stopped on the ship's aft deck, the messenger line started to pull off the ship's drum end. The seaman near the drum end saw a riding turn starting to form and he stepped in to clear it, standing on the heaving line which was still attached to the messenger line as he did so. His left ankle became caught in the heaving line and, as the last turns of the messenger slipped off the drum end, he was pulled towards the panama eye.

Figure 2: Position of the casualty before being dragged through the panama eye

The crewman braced himself against the panama eye while his fellow crew members tried to clear the heaving line. Just as the officer-in-charge took two paces to retrieve a knife from the galley, the seaman, concerned at losing his leg, decided to put his feet and legs together and, miraculously, was pulled through the panama eye (see Figure 2).

He landed in the water and managed to swim to the surface and cleared himself from the tangled line. He was very quickly retrieved from the water by the crew of the tug, was taken below and tended to by the tug's crew. The seaman lost the tip of one little finger, and also sustained significant bruising to his leg.

After alerting the port authorities, the tug headed upstream to a landing stage where the injured seaman walked ashore and was taken to hospital.

The Lessons

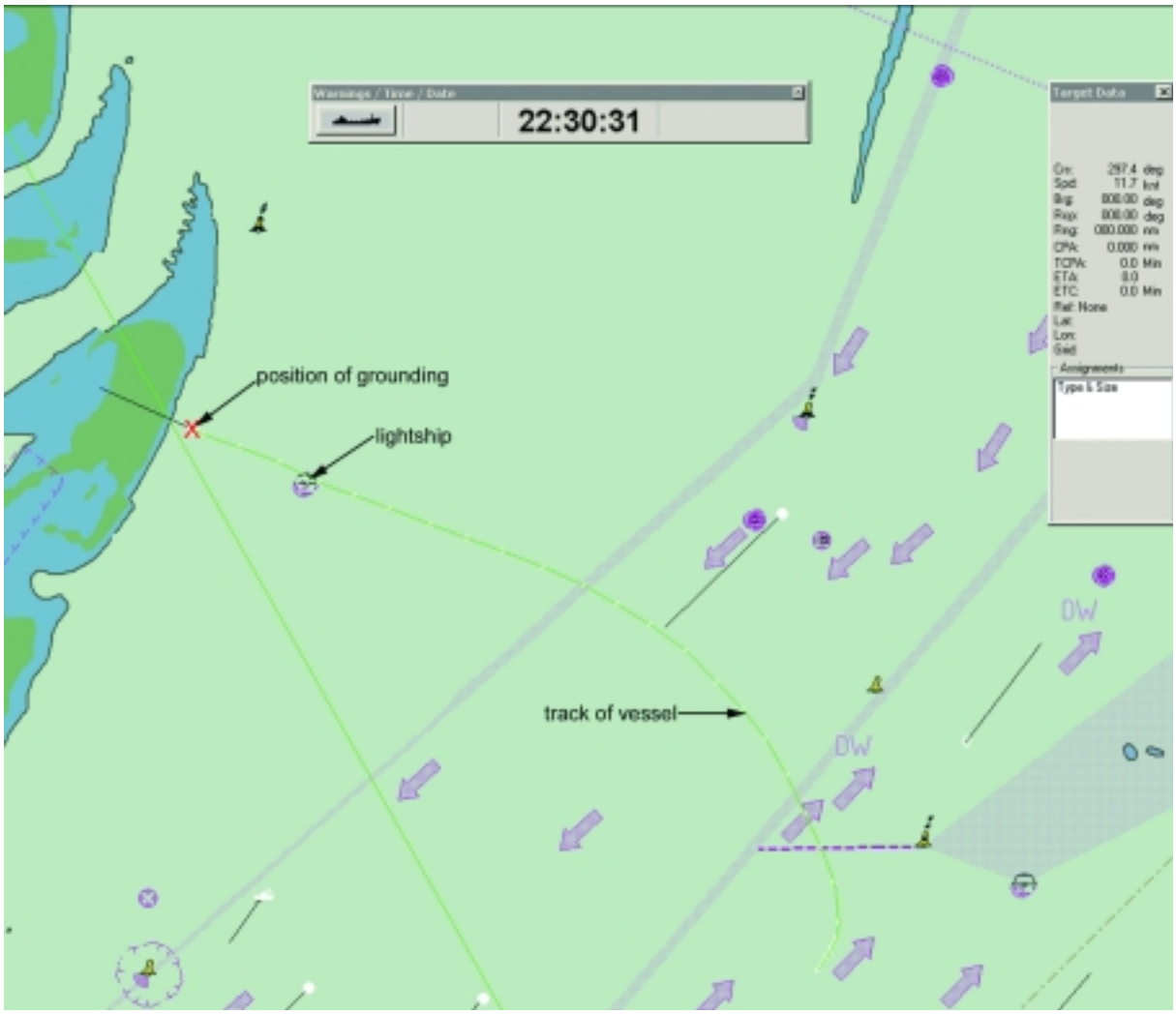
1. The seaman in this incident was lucky to be alive after squeezing through the panama eye and being dragged underwater by the weight of the tow wire! A sharp knife to sever the heaving line would easily have prevented him from being dragged overboard. Make sure that every mooring station has a means of cutting a line in an emergency. Relying on the bosun to carry a knife is not good enough.

2. Making a tug line fast to a ship presents a significant hazard to both ship and tug crews. It is important to remember that tugs, operating in the wash of a ship can, and do, occasionally lose control temporarily, causing them to move off station. Ships' crews must be prepared for this, and must be able to respond quickly and effectively to reduce the risk of serious injury.

3. The single crewman on the aft deck of the tug, who was operating the tow winch, managing the tow wire and, supposedly, in direct communication with the crew on the ship's aft deck, was unable to stay fully aware of the situation. Tug crews' individual responsibilities must be properly defined to ensure they do not become overloaded in a situation such as this Ideally, one crewman should be made responsible for monitoring the safety of the overall operation.

4. Good communication is the key to safe operations between tugs and ships. On this occasion, there was little communication between the tug and the aft deck of the container ship, or between the tug's bridge and aft deck. It is vital that clear visual communications are maintained between tugs and ships, as well as between tug crew members to ensure operations are carried out as safely as possible.

In Command, Inebriated, Incapacitated and in Jail



Vessel track until grounding at 2230

Narrative

A 3000grt combi-freighter was crossing a south west traffic lane at a speed of 11.5 kts. The master was the OOW and he was alone on the bridge. It was dark and the sea was rough. When crossing the traffic lane, the ship passed ahead of two south-west-bound vessels, the closest CPA of which was 6 cables. At 2212, once clear of the TSS, the master went to his cabin for about 30 seconds to fetch some paperwork. When he returned to the bridge, he sat down in a chair and fell asleep. The ship then passed very close to a lightship before grounding at 2230 (see figure).

As the ship took the ground, the chief engineer ran from his cabin to the bridge. The master was standing in the forward starboard corner, looking out of the window, and did not respond when he was told that the ship was grounding. The chief engineer put the ship's engine control lever astern and then went below to change from the shaft to the auxiliary generator. On his way back, he alerted the chief officer, who immediately fixed the ship's position. No VHF call was made to the local coastguard and the ship's general alarm was not sounded. The main engine continued to be manoeuvred astern and, soon after the ship re-floated at 2247, the master left the bridge; he had not said anything following the

grounding, his breath smelled of alcohol and he appeared to be drunk.

Once the vessel had been checked for damage and her DP informed, she resumed her passage, with the bridge watchkeeping duties shared between the chief and second officers.

The master continued to drink alcohol during the passage, and when the ship arrived at her destination 3 days later he was found to be over the permissible alcohol limit. He was later imprisoned for 4 months for the grounding of his ship and for 7 months for the drinking related offence.

The Lessons

1. **Regardless of a person's ability and experience, alcohol impairs judgment, concentration, awareness, and perception of risk. It therefore considerably increases the risk of accidents occurring. In this case, the accident could just as easily have been a collision with another vessel, or contact with the lightship, both of which had the potential to be far more serious. The adverse effect of alcohol on performance is becoming increasingly recognised by national enforcement authorities and ship owners, with alcohol testing following an accident becoming more widespread. The risk of getting caught is therefore increasing – is it worth it?**

2. **Although it was dark, and the ship was in a busy TSS, the master was alone on the bridge. Had an additional lookout been on the bridge as required by international regulation, the master's incapacitation and the close pass of the lightship would have been readily apparent. The use of a bridge watch alarm would also have alerted the crew in sufficient time for corrective action to be effective. Every OOW runs the risk of becoming incapacitated at any time of the day, for a variety of reasons, and a second person and/or a watch alarm on the bridge can be the difference between embarrassment and disaster.**

3. **Following a major accident, such as a collision or grounding, the alerting of the crew by the use of the general alarm, and of the coastguard by radio or DSC, are both important actions intended to minimise the risks to a vessel and those on board. It is therefore safer to ensure these actions are taken as soon as possible rather than to wait and discover that some of the crew are missing or that external assistance is required. It might be too late by then.**

Port or Starboard?

Narrative

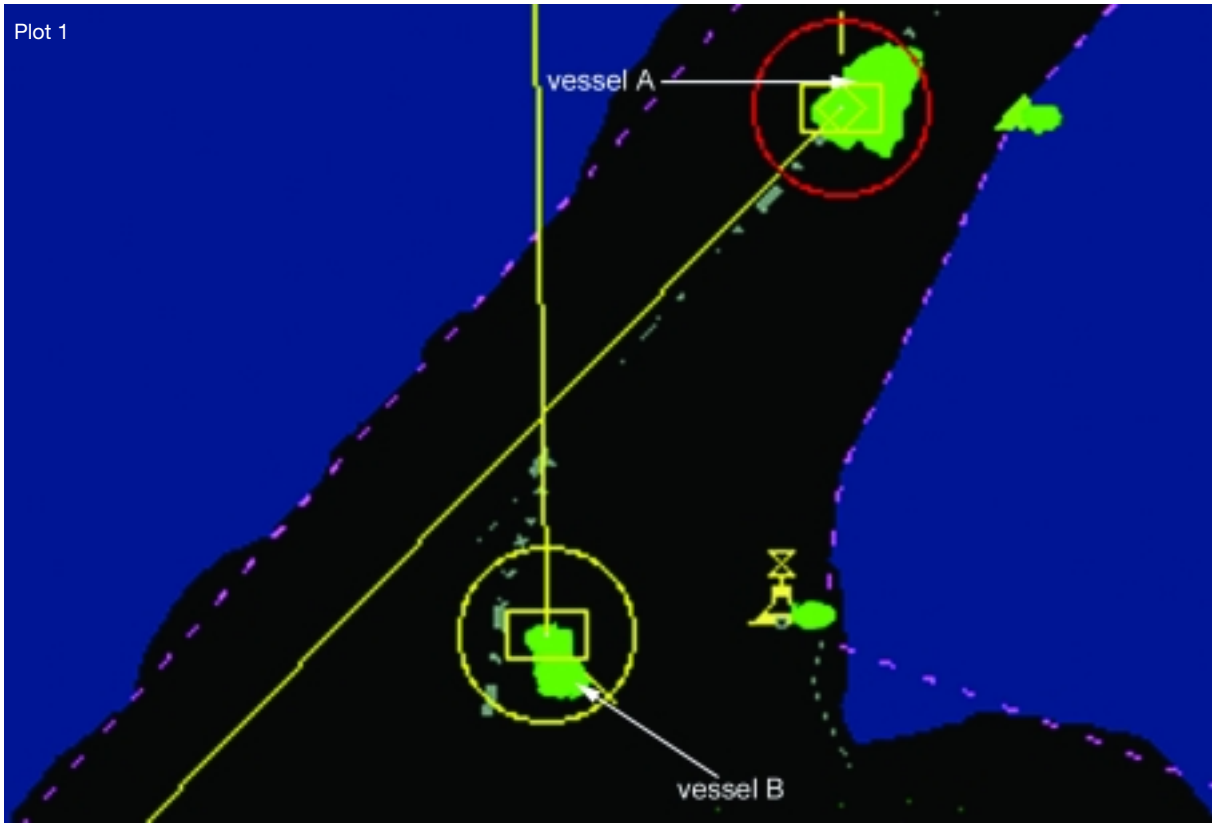
Two vessels collided at the entrance to a channel in a busy shipping area when the visibility was less than 2 cables. The vessels were engaged on routine passages, which their experienced bridge teams executed on a daily basis. Both vessels were being conned by their respective masters, with an AB on the wheel, and were travelling at their normal operating service speeds and sounding fog signals.

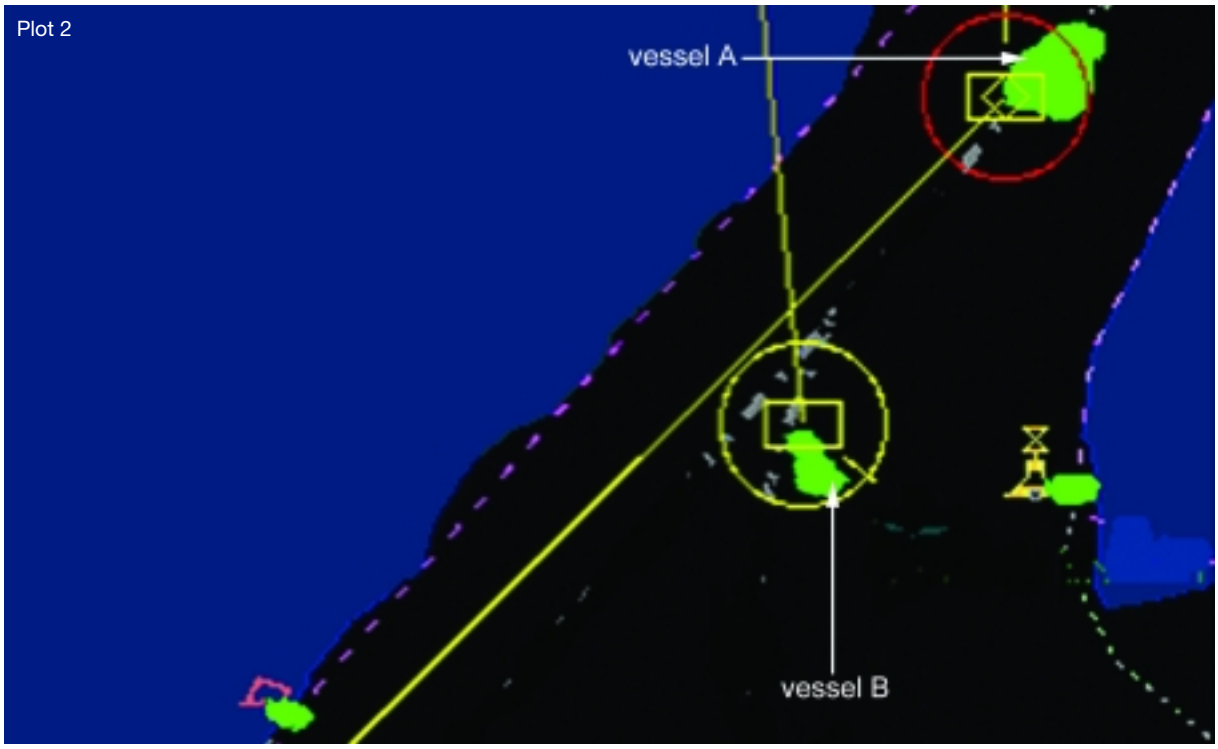
Vessel A was southbound in the channel while Vessel B was approaching the channel entrance on a northerly course. After vessel A informed the local VTS of her position on passing a charted reporting point, she was contacted by Vessel B via VHF radio, and a red to red passing in the channel was agreed. It was intended that Vessel A would keep to the western side of the channel and that Vessel B would alter course to starboard (see plot 1).

Accordingly, the master of Vessel B ordered "Starboard 30". However, the AB on the helm went to port and, as the master was busy trying to see the other vessel he did not notice the AB's error. Moments later, the master saw Vessel A as she loomed out of the fog, and ordered 'hard a starboard' to increase the rate of turn. At this point, the AB realised that the helm was at "Port 30". He put the helm hard to starboard but did not inform the master of his earlier mistake.

Unaware of the actions of the AB and, in view of the relative aspects of the two vessels, the master of Vessel B assessed that Vessel A must have altered course to port. Consequently, he grabbed the helm and went hard to port (plot 2).

The master of Vessel A was also surprised to see a starboard aspect of Vessel B, and used his forward speed and his side thrusters to slide his vessel away to cushion the effect of the imminent collision. Vessel A suffered minor damage to her hull above the water line and there was paint damage and slight indentation to the bow of Vessel B. Luckily there were no injuries or pollution.





The Lessons

1. This is not the first time a helmsman has put the helm the wrong way in pilotage waters, and it won't be the last. However, such a mistake need not result in an accident, providing it is spotted immediately. Regardless of the experience of those involved, this can only be achieved by the good seamanship practice of habitually checking the rudder angle repeater after each helm order has been given. It will often be too late to rectify the error if the movement of the ship's head is relied upon, particularly in restricted visibility where there are no visual references.

2. In this case, both vessels were on their normal service speed. Had they reduced to a speed commensurate with the visibility, there would have been more time available to take avoiding action.

3. Both masters were familiar with the area and engaged in a routine passage. In such circumstances, it is easy to be lulled into a false sense of security. Consequently, the consideration of factors such as a safe speed, and the management and monitoring of the bridge team, can lapse. Complacency is not always easy to detect, particularly where it develops over time. Be alert to the symptoms!

That Was Close – Too Close

Narrative

Two vessels approached one another in gale force winds on a winter's night, such that a risk of collision existed. One of the vessels was engaged in fishing with her trawl gear deployed, while the other was a small cargo vessel which was rolling heavily and yawing as she headed into the heavy sea and swell.

The cargo vessel was the give way vessel and recognised that she would have to alter course to avoid a collision with the trawler. When the vessels were 3 miles apart the cargo vessel altered course by 10 degrees to avoid the trawler, which was now hauling her nets.

As the vessels closed one another, the trawler considered that the passing distance was going to be too close, so called the cargo vessel on VHF radio to alert her to the situation and request that she take further avoiding action. The cargo vessel replied that she was aware of the situation and would keep out of the way of the trawler.

The cargo vessel failed to take any further action and, eventually, passed within 100 metres of the trawler and was observed to be yawing significantly as well as rolling heavily as she passed.

The crew of the trawler considered that this was not a safe distance and reported their concerns to the coastguard.

The Lessons

1. **The cargo vessel was undoubtedly the give way vessel, and recognised this fact from a relatively early stage. However, she failed to take early and substantial action to keep well clear as required by the International Regulations for Preventing Collisions at Sea.**

2. **In this case, the weather conditions were very poor and the cargo vessel was rolling and yawing heavily. In such conditions, it should have made a more substantial alteration of course than might have been required in less severe weather conditions. An alteration of course of just 10 degrees, when only 3 miles from the other vessel, was not enough to avoid a close-quarters situation.**

3. **Mariners should ensure that action taken to avoid collision shall be such as to result in passing at a safe distance. Further, the effectiveness of the action must be carefully checked until the other vessel is finally past and clear. In this case, the trawler had started to haul her nets, which resulted in a passing distance closer than was originally anticipated by the cargo vessel.**

Buried Tow Line Nearly Buries Tug's Engineer

Narrative

A harbour tug was tasked to assist in the berthing operations of a 75,000gt bulk carrier and to pass her tow line from her forward towing winch through a panama lead at the ship's starboard shoulder. The tug came alongside the bulk carrier and the tug master manoeuvred his vessel in such a way that the tug's forward fairlead was directly beneath the ship's panama lead. The ship's crew threw a heaving line onto the tug's foredeck and the tug's chief engineer made it fast to the messenger, which was attached to the tow line. As the ship's crew manually heaved in the messenger, it became apparent that the tow line had become jammed under other turns on the winch barrel. The tow line became taut and the mate, who was at the bridge controls, stopped the winch as he could no longer pay out the line.

Knowing that the jammed tow line meant that the ship's crew would not be able to pull the line on board by hand, the mate went to the bridge door and shouted to them to heave the tow line using one of the ship's mooring winches, so that the buried turn could be pulled free from the winch drum. At first, the ship's crew did not heed his instruction. The chief engineer became aware of the problem with the tow line and he moved forward to inspect the jammed turns on the winch, gesticulating to the ship's crew to slack back the tow line. Believing that the tow line would be slackened back from the ship, he then attempted to free the buried turn by kicking it and jarring it by hand. However, the tow line suddenly jumped free and struck the chief engineer, throwing him to the deck and fracturing his left forearm.

The tow line was made fast and the tug master informed the shore staff and the pilot about the accident. The tug made its way to a berth, where the chief engineer was met by an ambulance and taken to hospital. Another tug was substituted to complete the berthing of the bulk carrier.

Notes:

- The crew normally served on a different tug, and were unfamiliar with the radio equipment fitted to the vessel. Accordingly, they did not follow their usual practice of maintaining direct communication with each other by using portable UHF radio. Had they done so, it is possible that the tug's master or mate could have prevented the chief engineer from placing himself in a position of danger.

- The ship's crew changed from manual hauling to using a winch to heave in the tow line. It is likely that this caused the buried turns of the tow line to suddenly jump free.

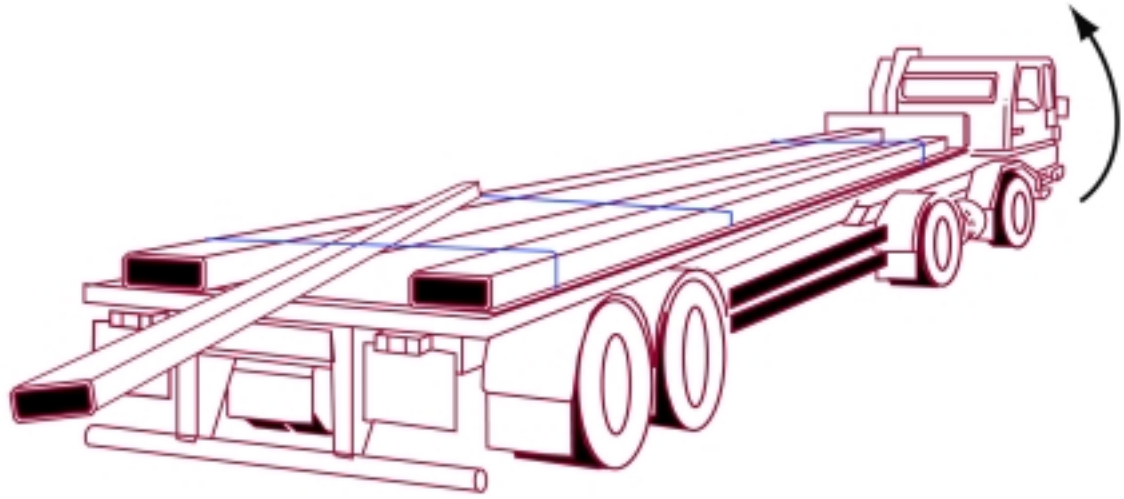
The Lessons

1. **Passing a tow line to or from a ship should be a relatively easy task. However, problems can arise, and it is essential that effective communications are maintained between the tug's crew and ship's staff at all times. The latent energy contained within lines under tension can, when released, cause fatalities and/or major injuries.**

2. **Tug masters should carefully assess the situation before allowing and directing personnel into a high risk area.**

3. **Tug masters should give verbal permission to any personnel entering a high risk area around a winch. It is therefore essential that there are direct communications between the tug's bridge and crew members working on deck.**

Sliding Load



Narrative

An unaccompanied 12.2m HGV flatbed trailer carrying steel box-sections was being unloaded by a tugmaster from a ro-ro vessel. Deck lashings were removed and crew stood by to remove the support trestle at the front of the trailer. The tugmaster connected to the trailer and lifted the front clear of the trestle, tipping up the flatbed slightly.

The crew heard a loud bang and went to see what had happened. Part of the load of steel box-sections had slipped off the rear of the trailer and landed on the deck of the ship. Fortunately, the area immediately behind the trailer was clear, no one was injured and only very minor damage was caused.

The load of steel box-sections was inspected and found to be made up of full and half lengths. It had been secured using several webbing straps across the width of the trailer. Forward movement was prevented by the headboard at the front of the trailer, but there was only the friction from the webbing straps to prevent the steel from sliding rearwards. The sections that slipped off the trailer were half lengths, from the middle of the load where the webbing straps would have had the least effect.

Although there was minimal damage and no injuries, the weight of the steel was significant and the outcome could easily have been far worse if someone had been working nearby.

The Lessons

1. **Crew working on vehicle decks should be aware of the correct lashing methods used to secure common loads to trailers. Advice is freely available from Government Departments and Industry Associations on best practice.**
2. **Trailers should be inspected where possible to ensure that both the load and the trailer are secured when they are loaded on board the vessel.**
3. **Personnel should keep clear of the area around vehicle trailers when they are being lifted or moved, to minimise the hazard should any items fall.**

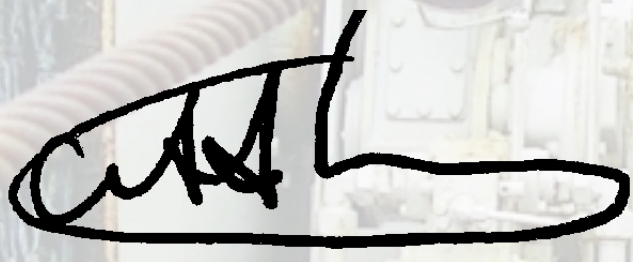
Part 2 – Fishing Vessels

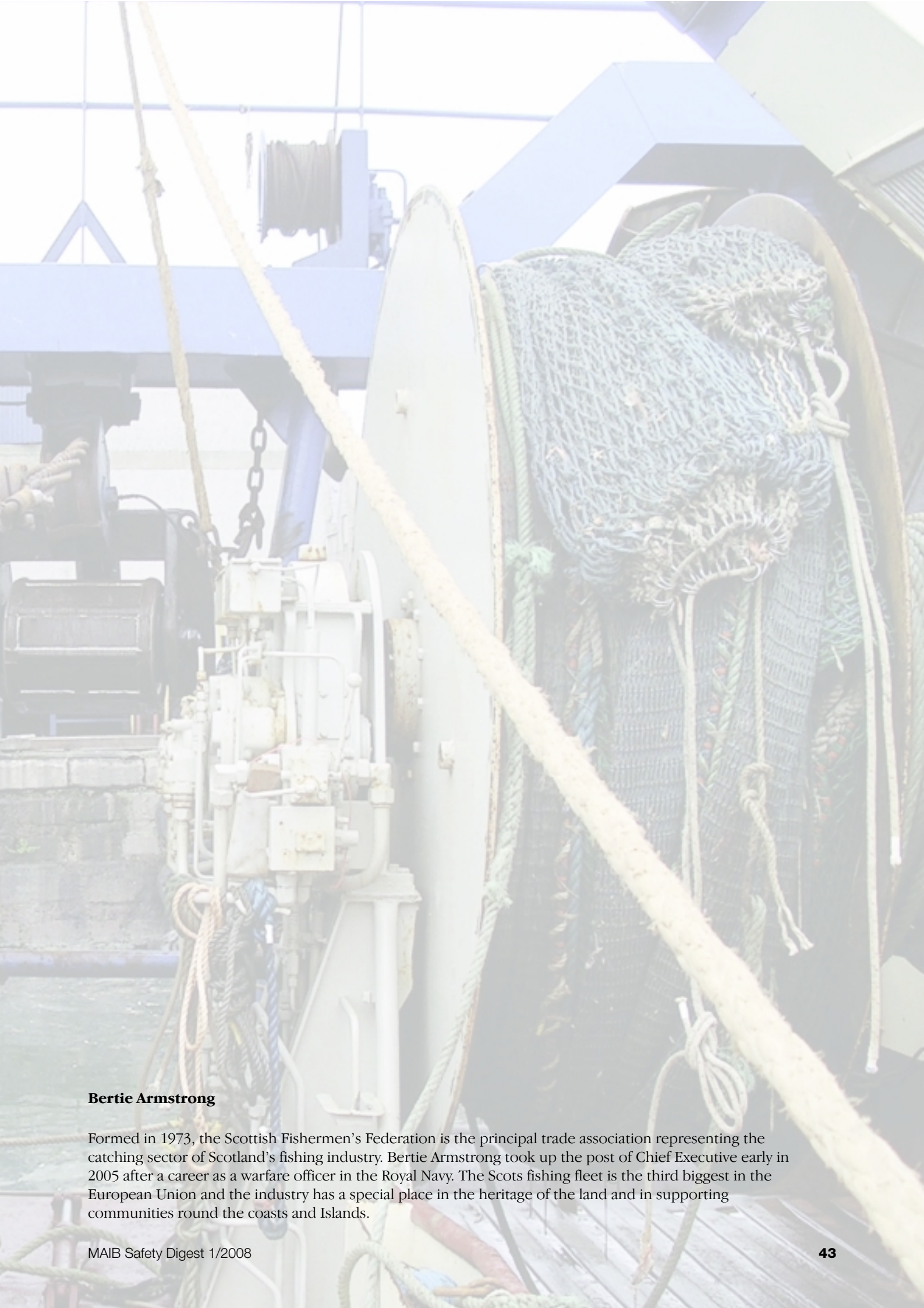
Life in a fishing vessel today, large or small, presents a wide spread of challenges. Before even thinking of leaving the quayside for the first time, those in effective control of the boat must have developed a viable business plan which takes into account the fish quota and the available days at sea to catch the fish. A safe, well maintained vessel will also be required to put the business plan into action. And that's before facing the weather, sea conditions and the risks inherent in fishing operations.

The special sort of people who follow the profession will rise to it all, but it goes without saying that there is a lot to think about; including safety at sea. It is very easy to repeat the mantra: "safety is paramount", but what does that actually mean? Proper certification, in-date training to at least mandatory standards, well-maintained kit and a continuous awareness by everyone in the vessel, in every role, of potential dangers are all important components of safe operation.

However, as the cases on the following pages will illustrate with absolute clarity, no two accidents will be the same. Unguarded moments born of familiarity, underestimation of risk, the old failure to keep a proper lookout or be aware of the real situation, faulty maintenance or accidental damage to equipment can all play a part in creating situations which can (and from time to time will) escalate to dire levels if preparation and awareness are less than complete.

The MAIB is in the business of safety at sea; with the fishing industry's unenvied position at the top of the list of the UK's most dangerous professions, I strongly commend to you this publication and the work of the Branch. Every skipper and crewman plus all of us concerned with safety in the fishing industry would do well to study each case, with a view to recognising lessons that can be applied directly and noting the benefit of good preparation. You know it makes complete sense.





Bertie Armstrong

Formed in 1973, the Scottish Fishermen's Federation is the principal trade association representing the catching sector of Scotland's fishing industry. Bertie Armstrong took up the post of Chief Executive early in 2005 after a career as a warfare officer in the Royal Navy. The Scots fishing fleet is the third biggest in the European Union and the industry has a special place in the heritage of the land and in supporting communities round the coasts and Islands.

CASE 16

Brief Visit to Deck Costs Life

Narrative

A man was lost overboard from an 18m fish farming vessel while returning to port, following a day's harvesting.

During the return passage, most of the crew were in the wheelhouse and were unaware that one of their colleagues had gone on deck and fallen overboard, until they moored up alongside. There, they searched the boat and surrounding area, but were unable to find him. A fast mussel farming boat searched the area where the man was last known to be on board, and during a second sweep of the area he was found in the chilly water. His lifeless body was brought back ashore, where extensive CPR failed to revive him.

Opening in the side railings

It was customary for the casualty to wear a lifejacket while working on deck, but unfortunately at the time of the accident he was wearing no lifejacket or any other form of thermal flotation suit.

Subsequent examination of the vessel highlighted two large gaps in its side guardrails (placed there for ease of access to the salmon cages) which had no means of closure when not in use. Also, large fish pumping hoses created a serious trip hazard in way of these gaps. Directly inboard of one such gap a damaged salmon, which had been kept aside by the deceased, was discovered away from where the crew had seen him place it earlier. It is highly probable that the crewman left the wheelhouse and fell overboard through the gap in the adjacent guardrail while recovering the fish from where he had left it.

The Lessons

1. **The deceased crewman was recognised as being very safety conscious, and regularly wore an inflatable lifejacket when working on deck. On this occasion, however, he had gone on deck for only a brief period, while the vessel returned to port, and had not put on his lifejacket.**

   No matter how brief the trip to deck, the short time taken to slip on a lifejacket may prevent an unfortunate accident from becoming fatal.

2. **The vessel had been operating with unguarded openings for several years. These openings were accepted by the crew and unrecognised by the company managers. Crewmen should not accept unnecessary hazards which, if ignored, can very soon become the norm – until an accident occurs. If you suspect something is dangerous, bring it to the attention of crewmates and the vessel operators. It is possible that others have simply not noticed the potential danger, and if alerted would be more than happy to carry out improvements or change the way of working.**

3. **This vessel had missed two annual Load Line Exemption surveys. It is the owner's obligation to present vessels for survey at the appropriate time. Had the required surveys been carried out on this vessel, the unprotected gaps in the guard rails would likely have been identified, and the necessary actions carried out to make them safe.**

4. **Aquaculture is not just a "close to shore" farming business; it is a marine industry which uses vessels for various activities. Just because these vessels are operating "close to shore" does not make the risks any lower than on vessels going further out to sea. This particular company owned many vessels, of various sizes, yet had no proper marine superintendent to monitor their vessels' condition and operation. Any vessel operator should ensure that a suitably trained and qualified person is either employed or available to them, to ensure their vessels comply with all the required safety standards and regulatory requirements, at all times.**

CASE 17

Look Out or Lose Out

Damage to the vessel's bow

Narrative

On a dark winter's evening, with good visibility and calm seas, two vessels underway off the south coast of England were in collision, even though each had seen the other 30 minutes earlier. As a result of the accident, the fishermen lost over 2 weeks' income at a time when the catches had been excellent.

The two vessels involved were a small commercial vessel and a fishing vessel. The commercial vessel observed the fishing vessel on its starboard bow, and was thus the give way vessel. However, after only a cursory glance the assumption was made that the fishing vessel would in fact pass clear to starboard. The vessel was equipped with a combined track plotter/radar set and a young, inexperienced deckhand had just taken the wheel and was steering by reference to the track plotter. Thus, the radar was not in use and no distance off the fishing vessel was obtained. The skipper initially remained in the vicinity of the wheelhouse to supervise the deckhand. However, assuming everything to be in order he then decided to go below to make a drink. Due to the layout of the wheelhouse, the skipper was unable to see out of the forward windows once he had left the wheel position, and he therefore had not rechecked the position of the fishing vessel before going below.

While the skipper was below, the deckhand saw the fishing vessel coming very close on the starboard side, and he called out for assistance. The skipper returned to the wheelhouse, but only had time to stop the engines before a collision occurred.

On the fishing vessel, during the time leading up to the collision, the crew of three were preparing to haul the trawl; everyone was on

deck for this task. The vessel's floodlights were all switched on. At the start of the operation the skipper, who was on the foredeck, glanced around and saw the navigation lights of the other vessel: a green sidelight and single white masthead light on the port bow. He assumed, incorrectly, that this was another fishing vessel returning to its home port, and he did not look for the vessel again. During recovery and stowage of the trawl net the fishing vessel maintained a relatively steady course and speed which, unrecognised by either vessel, meant that they were on a collision course. With the net safely stowed, the skipper returned to the wheelhouse and increased to full speed on the engine. Unfortunately, he did this without looking out, and thus failed to see the other vessel very close on the port bow. The collision occurred within a minute of the skipper returning to the wheelhouse.

As a result of the collision, the fishing boat suffered extensive damage to its bow area and the repairs took more than 2 weeks; this represented a significant loss of income for the skipper and crew at a time when the catches had been particularly good. The commercial vessel was also damaged by the collision, and was off charter for a day, with a consequential loss of revenue.

The Lessons

1. **Both vessels failed to keep a proper lookout. On the commercial vessel the one person who could have seen the approaching vessel was inexperienced and was unable to appreciate the developing situation.**

2. **Both vessels saw each other at a sufficiently early stage to have taken appropriate action in ample time to avoid a collision. However, both had assumed, at a glance, that no risk of collision existed, and neither vessel then continued to monitor the situation.**

3. **Neither vessel made use of all the means available to them to determine if a risk of collision existed; both made assumptions based on scanty information.**

4. **When training new recruits, ensure that they are never left unsupervised.**

Sea Survival Training – Payback Time

Figure 1: Vessel before alterations

Narrative

After 4 days of poor catches, the skipper of a 9.8 metre fishing vessel decided that the time was right to return to his home port, a passage that would take about 2 days.

On board the vessel was the skipper, who had about 30 years fishing experience, and two young deckhands, each with 3 years fishing experience. The skipper held a Fishing Class 2 certificate of competency, and both he and the two deckhands had undertaken the mandatory safety training courses: sea survival, fire-fighting, first-aid and safety awareness. Four months before the accident, the skipper had purchased a new liferaft for the vessel, fitted it with a hydrostatic release unit (HRU) and, thankfully, decided that the crew would benefit from attending another sea survival course, which they subsequently did.

When the vessel sailed from the fishing grounds the weather was forecast as south-westerly force 3 to 4. About 4 hours into the passage, the alarm on the automatic bilge pump alerted the skipper to unexpected water in the bilge. Investigation showed that water was entering through the stern gland, which had been re-packed the previous day. It was estimated that about 2.5 gallons of sea water were entering the bilge every 15 minutes.

Unfortunately, the situation was made worse by the electric bilge pump operating well below maximum capacity. The crew examined the pump but could find nothing untoward, and commenced bailing by hand. The engine room hatch had been opened, and it remained open while bailing continued.

About 2 hours later, the skipper heard an update to the weather forecast, which predicted south-westerly winds force 5 to 7, gale 8 later. With an ineffective pump, water ingress, and a forecast gale, he chose to divert to the nearest port to effect repairs and take shelter.

These were not the skipper's local fishing grounds, and he did not have paper or electronic charts of the area. Consequently, when he chose to divert he was navigating using a basic track plotter, echo sounder and GPS. He was unaware that his diversion would take his vessel through two areas of renowned confused and steep seas, made worse by the onset of bad weather against the tide.

Shortly after the skipper altered course toward land, he reduced speed because of reduced soundings and, at the same time, the vessel entered an area of turbulent seas. A large wave struck the port quarter, causing the vessel to roll heavily and lay flat on her starboard side. Water flooded along the deck and entered the open hatch of the engine compartment. Both deckhands, one of whom was in the engine compartment, managed to escape by moving aft under the shelter, and they abandoned the vessel over the port side. The skipper remained in the wheelhouse.

It was estimated that the vessel foundered within 2 minutes of the wave striking, only 0.5 mile from the nearest land. It was dark, cold, and both deckhands were dressed in no more than jeans and tee-shirts. After 10 to 15 minutes in the water, they spotted the white canister of the liferaft with the inflated liferaft

attached, albeit upside down. They managed to right the raft, board it, bale it out, administer sea sickness tablets and release one red hand-held flare, which was immediately spotted by a member of the public who contacted the coastguard. A deckhand released a second flare when they spotted the blue flashing lights of emergency service vehicles on the shore, and a third flare on hearing the approach of the local lifeboat.

Both deckhands were successfully rescued and later airlifted to hospital. Regrettably, despite an extensive search, the skipper was not found.

Figure 2: Vessel after alterations (right)

The Lessons

1. The vessel had been significantly modified by the current skipper. The structural modifications included a considerable amount of additional top weight, which probably had the effect of reducing the vessel's intact stability and her ability to return to the upright condition. Before making alterations, or adding additional weight, seek guidance from a qualified naval architect and, if necessary, have the vessel inclined to confirm the condition of the stability.

2. The open engine room hatch allowed immediate downflooding into the engine compartment. Had a second bilge pump been available, the crew could have pumped out the water without keeping the engine room hatch open.

3. Insufficient charts led the skipper to stray into dangerous waters. Make sure that before setting sail, full chart coverage and associated publications for the intended passage are held on board.

4. New lifejackets were available on board, but were not being worn, nor were they in a location where they were readily available for escape. Look around your vessel; identify a readily accessible place for stowing lifejackets and label it; and, if appropriate, place a 'grab bag' containing other emergency equipment close by. If you do not wear lifejackets the whole time, which is the safest option, at least put them on as soon as things start going wrong.

On the positive side:

5. The new liferaft had been fitted using an HRU, which undoubtedly saved two young lives. And importantly, the training undertaken only months before, ensured that ALL the correct actions were taken by the crew, from the time they saw the raft until they were rescued by the lifeboat. If a liferaft is carried, make sure that it is properly fitted with an appropriate HRU, and that it is carried in a position where it can float free without interference from obstructions. Finally, ensure that everyone on board is properly trained in sea survival.

The Flames Were Supposed to Stay Inside the Heater

Damage around the diesel-fired heater

Narrative

A fishing vessel was hauling a catch of scallops when her watchkeeper noticed that the radar had stopped working. He called the skipper, who realised that the battery voltage was lower than normal. The skipper went to the engine room to have a look at the batteries and noticed a loose terminal connection. As he tightened the connection, he heard an alarm coming from the accommodation area smoke detector.

The skipper opened the engine room door, with the intention of entering the accommodation area to investigate. Flames, at ankle level, came through the open door, so the skipper closed it again rapidly. Despite the flames, the skipper opened the door again and ran across the accommodation area to the emergency escape hatch in the opposite corner, where the other two crew members were able to help him climb out.

It was apparent that the seat of the fire was around a diesel-fired heater fitted to a bulkhead in the accommodation area. The weather was cold, and the heater had been running to keep the boat warm. A cheap, domestic smoke detector fastened to the deckhead had activated and this had alerted the crew to the emergency.

The coastguard was informed by VHF radio and the two crew members prepared a fire hose. The skipper took an extinguisher from the wheelhouse and operated it through the emergency escape hatch. Foam from the extinguisher put the fire out and, as the smoke cleared, the skipper was able to turn off the heater's fuel supply.

Once the vessel was safely alongside, the crew and local surveyors started to look for the cause of the fire. The diesel heater was relatively new and had been fitted only 8 months before.

Fuel for the heater was supplied from a tank in the engine room, this came through the bulkhead to a shut off valve and a thermostatically controlled flow valve, to maintain a set temperature in the accommodation. The flow rate of fuel could be checked as it passed through a sight glass.

The exact cause of the fire was not determined, but it was thought most likely that the thermostatically controlled valve had failed, possibly because of the high levels of vibration on the boat when the catch was hauled. Too much fuel had been able to flow and spill from the glass part of the sight glass and down the outside of the pipe, until it was ignited by the flame in the furnace. The fire had then spread as the fuel leaked down the bulkhead and onto the carpet.

The Lessons

1. **This was a "good news" incident, where the forethought of the skipper and crew, and their actions on board, saved the day. A cheap smoke detector, effective fire-fighting and early alerting of the coastguard proved invaluable.**

2. **Early detection and response to fires are vital. This incident was dealt with extremely quickly; less than 5 minutes from the alarm sounding to the fire being extinguished. This undoubtedly limited the damage caused by the fire, and once the heater was removed, the boat was back fishing the following day.**

3. **Although this vessel was fitted with a fixed fire detection system, there was no sensor in the accommodation area, so the owner had purchased a cheap, domestic smoke detector which the crew had stuck to the deckhead in the accommodation area. It was this detector which alerted them to the fire. Engine room fumes and deodorant sprays had caused a number of false alarms, but with hindsight, the crew were very glad that they had not removed the batteries.**

4. **Quick responses rely on everyone knowing what to do, and working together. The best way to achieve this is for crew to practice realistic fire drills regularly.**

5. **Some vibration is inevitable on all boats, but high levels put a greater strain on people and equipment. Where this cannot be avoided, crew should be vigilant of not only the effect on themselves, but also on electrical equipment, pipework and heating systems.**

CASE 20

Eyes Available But Not Used

Narrative

An angling boat was on a pleasure trip, heading north. It was dark with clear visibility, and she was following close behind another boat. Both were on passage and intent on a good day's fishing. The owner was alone on watch, steering and keeping a lookout by sight. The boat was displaying a masthead light, port and starboard sidelights and a stern light.

Meanwhile, a fishing vessel was steaming east-north-east on passage towards fishing grounds. She was exhibiting a masthead light, port and starboard sidelights and a stern light. A radar was operational and a junior crew member was alone on watch.

The fishing vessel watchkeeper did not detect the two angling boats on radar, but saw the lights of the leading boat to starboard and altered course to pass around her stern. However, he did not see the lights of the second angling boat, and the alteration of heading put his vessel on a collision course with her.

The angling boat watchkeeper did not see the lights of the approaching fishing vessel, with the result that his boat then ran into the side of the fishing vessel, damaging the angling boat's port side but, fortunately, insufficiently seriously to cause the intended day's fishing to be cancelled.

No damage was sustained to the fishing vessel, but the watchkeepers of both vessels were later left to reflect on what the consequences of such a collision might have been.

The Lessons

1. **Action can't be taken to avoid collision if a risk of collision hasn't been determined. Likewise, a risk of collision can't be determined if an approaching vessel hasn't been detected. Vessels are required to display lights at night so that they can be detected. All that is then required is a pair of eyes to do the detecting. A pair of eyes was available on both the angling boat and the fishing vessel – the problem was that they weren't used!**

2. **Why weren't they used? Because neither watchkeeper recognized the extent to which they needed to maintain an all round lookout by sight. On board the angling boat, the owner was steering, eyes ahead and focused on the boat he was following, and thinking about his intended day's fishing. In his mind, anything astern was either going the other way or, if overtaking, had the obligation of keeping out of the way. The fishing vessel watchkeeper, on the other hand, had sighted the lights of the leading angling boat but his attention was then focused on avoiding her in the knowledge that the radar was indicating no vessels in the immediate vicinity.**

3. **Navigation and collision avoidance aids are there to do just that – aid. They are not there to replace conventional methods; they are there to enhance them. Consequently, Rule 5 of the Collision Regulations still requires every vessel to – at all times – maintain a proper lookout by sight and hearing, as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision. In this case, the radar gain control was set too low for the angling boats to be displayed on the screen.**

Unguarded Machinery is a Riddle

Figure 1

Narrative

The skipper of a 14m purpose-built, shell fishing vessel (Figure 1) took on a 17 year school leaver to assist with the busy cockle dredging season. The young man joined on a trial basis to see if he would like the job. The skipper told the new crewman what his job entailed, and issued him with wet weather gear and gloves.

The vessel, with its three man crew, left harbour for the cockle beds in the early evening. The cockle dredging went as expected. The skipper manoeuvred the vessel from the wheelhouse, turning her in tight circles over the cockle bed, directing the dredge pipe to the cockle 'hot spots'. The cockles were suction dredged from the seabed and then sorted from the water and mud by a riddle, a hydraulically powered rotating perforated drum, before being transferred via a chute into bags stowed in the hold or on deck (Figure 2).

Later that evening, loaded with the bagged cockles, the fishing vessel anchored, to wait for the next rising tide to enable her to return to harbour. The skipper and senior crewman slept in the bunks in the forward cabin and the new crewman slept in the wheelhouse chair. Early the following morning, after a short passage, they arrived alongside to land the catch.

Usually the cockle dredger remained alongside for a tide unless, due to the changing tide times, an additional trip to the cockle beds was possible. This was such a day, and so, on this morning, the cockle dredger returned to sea.

Figure 2

The boat arrived back at the cockle beds mid-morning and fishing started; it was a partly cloudy day, with light winds.

As the senior crewman directed the cockles from the end of the chute into the hold bags, the new crewman ensured the cockles ran freely from the end of the riddle by scraping the chute clear by hand. This was a right-handed job and the young crewman knew that, if necessary, he could safely rest his left hand on the hydraulic motor that drove the riddle (Figure 2).

After an hour of hectic work the new crewman was still scraping the cockles from the chute. He then moved his left hand to the structural cross member of the riddle to give himself a change of position, believing there was enough space for his hand to grip the support and be clear of the rotating inner drum. There was not (Figure 3). The riddle's rotating drum caught his thumb, fractured his wrist and pulled his arm into the riddle when his left elbow fractured and the skin was removed from his inner arm.

The skipper heard a shout from deck and, seeing the injured crewman, he quickly stopped the hydraulic power from the wheelhouse.

The injured youth was quickly released from the riddle and the skipper contacted the local coastguard for medical assistance. The injured crewman was transferred ashore by the local lifeboat and on to hospital by ambulance.

Figure 3

The Lessons

1. Dangerous machinery like this must have protective guards in place to stop operators unintentionally getting caught in the moving parts. This is particularly important at sea, where the movement of the vessel may unbalance the crewman and cause him to fall into the machinery.

2. The construction and location of the riddle created a significant "shear trap" risk to the crew working adjacent to this unguarded machinery. The usual crew accommodated the risk of personal injury when working close to the riddle in their normal operations, but they had not identified that the shear trap posed a significant danger to an inexperienced crewman on board. While the dangers associated with fishing may be blatantly obvious to experienced hands, they might not be recognised by new crewmen. A risk assessment would have identified the hazard from the riddle earlier, and the machine could have been guarded properly, thus protecting all the crew from the shear trap risk.

3. The new crewman was, by legal definition, a "young person", and there are specific regulations in place to ensure that his working environment is safe. Owners and skippers should take into account the inexperience, immaturity and age of young employees, and also their possible lack of awareness of the possible dangers, in deciding whether their allocated jobs are suitable. In particular, they should be aware that new, young crew might not have completed all the Seafish training courses, and so ensure that briefings and familiarisation, especially on safety equipment, is thorough.

Part 3 – Leisure Craft

This Safety Digest contains two accounts of modifications to pleasure craft, and two of accidental (or uncontrolled) gybes. All resulted in tragedies which could so easily have been prevented but for a momentary lack of attention or want of knowledge or experience. Experience can only be gained by going to sea, watching, listening and learning, and building up a 'database' from which we can draw when things start going wrong or we are faced with a situation which demands quick, decisive actions to bring the situation under control. There is no short cut, and no qualifications or classroom work can substitute for time spent underway.

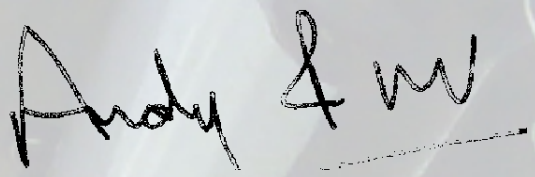
Knowledge, on the other hand, can be acquired ashore, and there is no lack of courses and facilities available where one can learn and brush up on the theory. For example, we should all acquire an instinctive working knowledge of the Collision Regulations before venturing afloat. A dark, wet and windy night is no time to start looking in books to find out what lights a VLCC displays when constrained by her draught or what red-white-red shown vertically might signify!

Occasionally genuine accidents do happen. Despite the most rigorous checks, rigging and engines do fail unexpectedly, the weather does sometimes defy the forecasters, and semi-submerged containers do get in the way. In these circumstances we can only do our best to mitigate the damage and, if necessary, call for help.

Most 'accidents', though, can be prevented by thorough maintenance, careful preparation and a continuously critical eye on the boat, the weather, the crew – and yourself. A tired skipper is unlikely to be an effective skipper, especially when he or she needs to take charge of an anxious crew facing a difficult situation. Any skipper – whether of a dinghy, sailing yacht or power boat – should ask the question '*What if…?*' for all conceivable eventualities: What if the engine dies? What if someone falls overboard? What if that tanker 3 miles on the port bow doesn't give way? What if the visibility reduces? What if the forecast gale arrives 'soon' rather than 'later'? What if …? What if …? As Sir John Harvey-Jones once said: "*Planning is an unnatural process, it is much more fun to do something. The best thing about not planning is that failure comes as a complete surprise rather than being preceded by a period of worry and doubt.*" Substitute 'preparation' (or 'preparing') for 'planning' and it is a quote worth framing and reciting several times a day.

The vast majority of leisure sailors are sensible, knowledgeable people who go to sea well prepared to meet the challenges which make boating so enjoyable and worthwhile. Statistics show that sailing is extraordinarily safe – apparently even safer than playing golf – and so far going to sea in small craft is largely unregulated. I believe it is in our interests to keep it that way, and we should all heed the advice of the MAIB, RYA, RNLI and others following analyses of accidents. If we don't, we run the risk of being made to do so by force of law.

One of the cases in this Digest concerns a man overboard following an uncontrolled gybe in wind Force 5-6 and rough seas. In these conditions all the crew should have been wearing properly fitted lifejackets. If they had been, the man overboard might have been saved. However, this case also illustrates just how difficult it is to recover a crew member from the water, and no amount of MOB drills with a fender can prepare you for the real thing. Unless you are extremely lucky and the weather is benign, the chances of recovering a cold, semi-conscious or heavy person are very slight indeed. The disastrous Fastnet Race of 1979 showed that it is far safer to remain with the yacht (so long as she is not actually sinking under you) rather than take to a liferaft. The same applies to involuntarily falling over the side; a lifejacket only comes into its own when you are in the water. A well adjusted harness (often an integral part of the lifejacket) securely clipped on to the boat will keep you onboard. If we all did that, we might reduce some of the awful incidents which the MAIB investigates so thoroughly.



Andy Du Port

Andy Du Port is one of the two co-editors of Reeds Nautical Almanac. He has been sailing for over 50 years, is an RYA Yachtmaster, and a past Sailing Club Commodore. In 2002 he retired from a 35-year career in the Royal Navy having specialised in Navigation and exercised command at sea. He currently owns a Hallberg-Rassy 34, based at Gosport, which he uses for family cruising in the Solent and English Channel.

Uncontrolled Gybe Leads to Avoidable Death in the Baltic

Rear of the vessel

Narrative

A restored 11.6m gaff-rigged wooden sailing yacht was on passage between two German ports in the Baltic, with four people on board. They were broad reaching on starboard tack in wind force 5-6 and a wave height of between 1.5 and 2m.

Needing to make a course alteration the crew prepared for a gybe. Two crew members were required to pull in the mainsheet so that the boom was close to the centreline. The sheet was then made off on a cleat. At that point, the gaff gybed across to the starboard side and the force of this caused the sheet to break free, and the boom swung violently to starboard. As a result of this, one crew member was swept over the side.

The engine was already running, so the skipper turned the yacht to starboard. After a few minutes they were able to get close to the man in the water, but after repeated attempts with a throwing line, and then a boathook, they were unable to retrieve him. The crew member was now face-down with arms outstretched, and shortly after this the yacht lost contact with him altogether.

In a state of shock, the skipper set course for a nearby port and did not report the missing person to anyone for an hour after their search had been called off.

The body of the lost crew member was washed ashore 5 weeks later.

The Lessons

1. This accident highlighted the importance of being able to carry out a manoverboard recovery manoeuvre under a variety of conditions. The attempts to recover the man who was lost were hampered by the fact that the approaches were made too fast for a line or a boathook to be used properly. When the casualty was still conscious he caught hold of the line that was thrown, but he let go of it under load.

2. The crew were relatively inexperienced and no proper safety briefing had taken place before sailing. Neither the skipper, nor his three crew were wearing lifejackets at the time of the accident. This additional buoyancy would have helped the casualty to keep his head clear of the water, thus substantially increasing his likely survival time. He would also have been able to conserve more strength to assist with his recovery.

3. Safety equipment will only be of any use if it can be deployed immediately. Tragically, this yacht carried a manoverboard retrieval system comprising a rescue harness on a heaving line, but it was stowed below decks under a berth. Had it been fitted as was designed to be, on deck, the crew would have had a better chance of saving the crew member's life.

4. A "Mayday" call should be made as soon as a manoverboard takes place. The yacht was close to shore-based rescue facilities, which might have been able to assist.

Blank Off Ventilation at Your Peril

Narrative

A couple were living on board a 1980s built, 4 berth, 8.2 metre inland waterway cruiser which was moored on a canal. It was winter. The 11kW (15hp) outboard engine was mounted on the transom stern, which was partially enclosed by the structure of the vessel. The engine space was separated from the cockpit above by removable wooden panels, which were not gas tight. The canopy over the cockpit was closed. A large fender had been secured across the vessel's stern and immediately aft of the outboard engine space.

Following concern that the couple had not been seen or heard for some time, police officers entered the boat and found their bodies in the cabin. The post-mortem examinations showed that they had been dead for about a week and had died of carbon monoxide poisoning.

An examination of the boat found the following:

- The three cabin roof plastic mushroom type ventilators had been sealed off with masking tape; only the stainless steel ventilator was found to be open.
- The ventilators at the bottom of the two doors that led from the cockpit to the cabin had been covered with masking tape on the inside.
- The heater and the cooker had been switched off. However, the gas supply to the cooker was leaking.
- The 12 Volt battery, which provided power to the cabin lights through the vessel's electrical system, gave a reading of just over 1 Volt.
- The outboard engine drove a small alternator which provided a trickle charge to the battery.

- The outboard engine's fuel tank was empty.
- The outboard engine's combined throttle and gear change lever was in the neutral position, i.e the engine was being used purely to charge the battery.
- When a fully charged battery was connected to the electrical system, the cabin lights illuminated, so they were on at the time of the deaths.

It would seem that the outboard engine had been left running to charge the battery, due to its poor state. The cabin ventilation had probably been blanked off to prevent cold draughts during the winter period.

On running the outboard engine, gas detection probes indicated that it was producing carbon monoxide, which permeated into the cockpit and cabin. It is probable that the combination of wind direction, the ventilation of the engine space being substantially limited by the fender and blanked off cabin ventilators, allowed dangerous levels of carbon monoxide to build up in the cabin from the continuously running engine.

The Lessons

1. **British Waterways has recorded 20 fatal or serious injury carbon monoxide poisonings on inland waterways' boats over the past 10 years. The Boat Safety Scheme leaflet, *Avoiding the silent threat – Carbon Monoxide*, covers the following main topics:**
   - **what is carbon monoxide, why it is prevalent on boats and how it is a threat to life;**
   - **the symptoms of carbon monoxide poisoning;**
   - **how to stay safe by being aware of wrongly installed, poorly maintained or faulty appliances, and of poor ventilation, blocked or damaged flues and flue terminals;**
   - **the prevention of engine exhaust gases in the living space;**
   - **points on how to prevent the build up of carbon monoxide;**
   - **what to do if carbon monoxide poisoning is suspected;**
   - **who is more prone to carbon monoxide poisoning than others;**
   - **the fitting of carbon monoxide detectors; and**
   - **references for further reading.**

   The leaflet can be found on www.boatsafetyscheme.com.
2. **Taping over high and low level ventilators prevents air from circulating freely in cabin spaces, and could allow inadvertent leakage of carbon monoxide and/or domestic bottled gas to accumulate to dangerous levels. Minimum ventilation requirements are set out in the Boat Safety Scheme Standards.**
3. **Careful thought should be given to the prevailing conditions when running an engine continuously. Exhaust fumes should be allowed to ventilate freely to atmosphere and be prevented, so far as is reasonably practicable, from permeating into living and/or working spaces.**

Short Sailing Trip Ends in Tragedy

Figure 1: 5.5m open sailing boat

Narrative

The owner of a 5.5m open sailing boat intended to sail along the local coast with a friend acting as crew. Preparations for the trip included the testing of the outboard at home and the production of a passage plan. The plan was to sail close to shore from north to south between two local harbours, roughly 10nm apart. The weather forecast predicted east or north-east force 4-5 occasionally 6 for the day of the trip, a wind direction predominantly off the land.

The owner had altered the vessel during his ownership, fitting a small forward locker and some instrumentation. With the aim of making the vessel more stable, he had also added sand bags as ballast and modified the dagger-board to make it heavier.

The boat was towed to a local public slipway and launched at roughly 1100. The sea and wind conditions at the time did not cause any due concern to the two sailors and, with high water due in half an hour, they anticipated a quick passage with the wind and ebb tide behind them. They motored a little offshore and then turned into the wind to hoist the lug sail.

The boat headed south. The wind backed and probably increased a little from that experienced at the launching point. Within 1-2 nm of the departure point the boat capsized and both crew were thrown into the water. Both men were wearing personal buoyancy but, unfortunately, their mobile telephone had been stowed in the forward locker and they were unable to transmit a distress message.

The alarm was raised later that day when the boat, with its two man crew, was overdue. The air and sea search found nothing on the day of the accident. Sadly, the body of the owner was recovered the following day and the other crewman 2 days later. The inverted boat, rudder, tiller and outboard were found over the 2 weeks following the accident.

When the boat was recovered, a line was found secured over the dagger-board slot, indicating the dagger-board, which remains missing, probably dropped out of the bottom of the boat prior to its capsize.

Figure 2: Recovered vessel

The Lessons

1. Take great care and seek professional advice when making alterations to your craft. Although adding ballast to improve stability may appear very sensible, the knock on effects on freeboard and structural strength must be considered.

2. The age of this boat was unable to be determined, and there was no documentation or builder's plate. If you purchase a boat second-hand, make sure you receive this information, if available, so that you can determine the maximum loading and sea conditions for which the boat is intended.

3. This accident demonstrates the need to carry a means of raising the alarm in the event of an emergency. For coastal passages, flares should be considered the minimum requirement. Additionally, a portable, waterproof VHF radio would assist in alerting the emergency services and enable rescue helicopters or lifeboats to locate your position. If a mobile telephone is your only option, at least store it in a waterproof case on your person.

4. Consider the weather and sea conditions carefully in conjunction with your own experience before setting out on a voyage. Plan escape routes and ports of refuge if the weather deteriorates, and be prepared for the weather to be worse than forecast.

Crash Gybe Claims a Life

Figure 1

Narrative

An Elan 333, 10-metre cruiser racer (Figure 1) had been chartered through a yacht club for a week of sailing along the south coast of England. Strong northerly winds had been blowing in the preceding days, and were again forecast for the coming day when the yacht set sail to the east.

The skipper was a qualified RYA Day Skipper, and another member of the crew, who was acting as mate, also had a good deal of experience coupled with an RYA Competent Crew certificate. The four other crew members had very little sailing experience.

As the boat approached a headland, it was close reaching, on a port tack. Until then, it had been a fairly wet and gusty sail. The skipper, who had been overseeing one of the inexperienced crew on the helm for the previous hour or so, needed to go below. An instruction was given to the helm to steer a little further off the headland, onto what was considered to be a safer beam/broad reach. The novice helm had had to contend with a number of gusts up to that point which had meant that the mate, who was the mainsail trimmer, was kept busy 'dumping' the main when the yacht became overpowered. The skipper and mate had an understanding between them that when one was down below, the other was in charge on deck. However, there were no formal discussions about the skipper's sailing intentions before he went below.

A few minutes later the yacht, which was about 2 miles off the coast, featuring at this point high cliffs and surrounding hills and valleys, was hit by a strong gust that caused her to

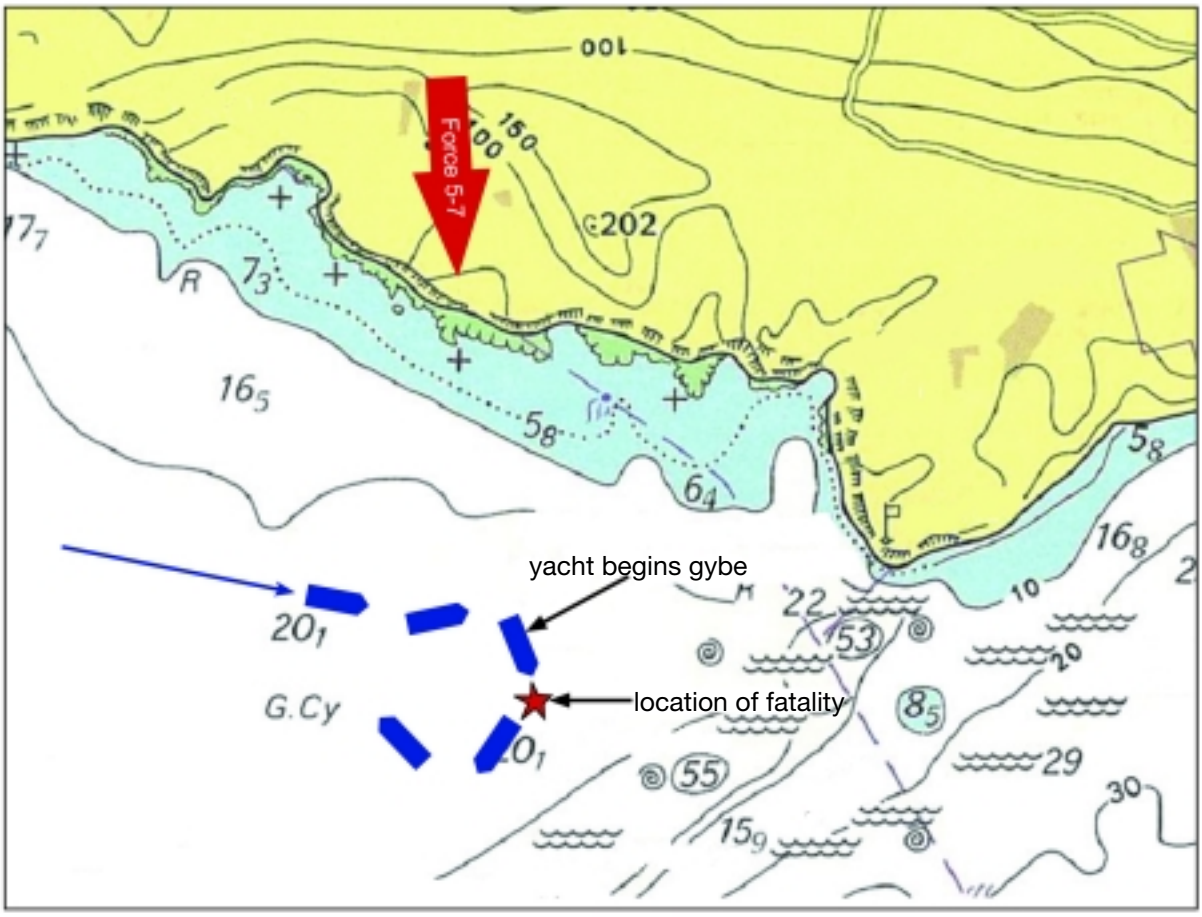


Figure 2: Movement of the vessel through the gybe

broach to windward. The helm was put hard over to starboard to counteract this until it was on full-lock. The rudder stalled and the boat failed to respond to the helm. After a short time the gust subsided, but with the helm still hard over, the yacht quickly came round to starboard and continued into a rapid and uncontrolled gybe until the boat settled close to head to wind (Figure 2).

As the boom crashed across, the sheets caught the mate, who was sitting in the cockpit just aft of the traveller (Figure 3) and threw him forward, against the top edge of the coachroof. He sustained fatal head injuries.

Having felt the attitude of the boat change, and on hearing the commotion on deck, the skipper quickly returned on deck and took control. Immediately after stabilising the situation a "Mayday" was put out on VHF channel 16, and first-aid was administered to the casualty, who was unconscious and bleeding profusely.

A short time later, the casualty was evacuated to hospital by coastguard helicopter, but he never regained consciousness. He died the following day.

Figure 3: Location of casualty when caught by the sheet

The Lessons

This tragic accident serves to remind those who go to sea in positions of responsibility of the need to consider carefully the experience of crews and their ability to cope safely with the prevailing weather conditions. The importance of conveying the passage plan and taking adequate precautions to supervise inexperienced crew on transferring temporary charge of the deck and navigation cannot be over emphasized.

1. In this case, the skipper assessed the risk of going below, with a novice on the helm and, after changing the point of sail, was comfortable with it. However, there were no direct discussions between the skipper and mate with regard to the skipper's intentions. Had there been, the mate might well have suggested that he leave the mainsheet operation to another crew member so that he could adopt a more effective oversight of the inexperienced crew, and in particular the helmsman.

2. When the gust hit, the helmsman was not fully aware of what was happening to the yacht, or the consequences of leaving full starboard helm on after the gust had passed. An uncontrolled gybe in these conditions unleashes huge forces, and, unfortunately in this case, the forces proved to be fatal. The only person who could have controlled the situation was the mate, but he was pre-occupied with managing the sails in the gusty conditions.

3. As well as avoiding being hit by the more obvious hazard of the boom itself during a gybe, crews need to maintain an awareness of the risk of injury from being hit by the mainsheet, and the mainsheet fine tuning blocks where these are fitted.

Safety Digest Survey

Introduction

As you are aware, over the last few months we have conducted a survey of our Safety Digest readership, and received over 1500 responses from individuals and organisations, both in the UK and overseas. We would like to thank everyone who took the time to complete and return the survey questionnaires.

Survey aims

Our main aims in carrying out the survey were:

1. To update our distribution list, making sure that we had complete and accurate contact details for everyone who receives the Safety Digest.

2. To improve the service we provide in delivering the Safety Digest to the public by offering the option of email alerts about the availability of the Safety Digest, as well as other MAIB publications, for download from our website (www.maib.gov.uk).

3. To reduce the number of hard copies of the Digest produced, improving the sustainability of our activities and benefiting the environment.

4. In achieving the above objectives, to reduce production costs and deliver better value for money.

Survey results

Of those who responded to the survey:

- Over 1300 opted to receive one or more hard copies of the Digest (many organisations order multiple copies for all their ships/units/departments).

- Over 1000 opted to receive email alerts about the Digest becoming available to download from our website.

- Nearly 500 opted to receive email alerts about other MAIB publications becoming available to download from our website.

- More than a third provided feedback.

Feedback

We would particularly like to extend our thanks to all those who took the trouble to provide us with feedback about the Safety Digest, for which we are very grateful. The vast majority of comments were very complimentary, and these have been shared with the MAIB staff who produce the Digest.

Around 7% of those who gave feedback provided critical comments or suggestions about how the Digest could be improved. We are constantly striving to improve, so this feedback is particularly helpful. All of your comments have been discussed at length within the MAIB, and we would like to take this opportunity to respond to those comments. In the interests of brevity we have grouped them into areas.

1. A few respondents suggested that our style of printing the section introductions over a photographic background makes it difficult to read. In this edition we have tried to reduce the tone of the backgrounds slightly to make reading easier. We would be grateful for your feedback on this, especially if people are still finding it difficult to read.

2. Several people commented adversely on the style of articles in the Digest. One respondent felt the writing was "too informal", another asked for more descriptive titles to enable readers "to pick and choose which parts to read", and four considered the titles to be "cheesy" or "frivolous". We thought very hard about these points. Ultimately, we are writing for a very wide range of readers, and have to balance the need for serious treatment of the subject matter against the need to engage people and make the Digest an enjoyable read; there are more than enough heavy tomes produced on safety matters! On balance, and in view of the many positive comments on the style, format and presentation of the Digest, we have decided to leave the style largely unaltered, while taking extra care with any frivolity.

3. Ten respondents asked for details of the location of accidents to be included in articles, while three asked for ships to be named. However, this not only goes against our culture of no-blame, but also misunderstands the purpose of the Safety Digest. It is up to the reader to decide if the accident may be relevant to him/her regardless of where it happened, rather than – as one respondent put it – if it happened in someone's neighbourhood it would "make them sit up and take note".

4. For similar reasons, we hope that readers look at all sections of the Safety Digest – there are important lessons for all of us in each section. For this reason, we do not intend to take up the suggestion, proposed by two respondents, to publish the sections of the Digest separately, although we do already publish a compendium of the fishing vessel sections annually, and occasionally produce a similar compendium of leisure craft reports.

5. Most of the other suggestions we received related to the balance of reports by sector, or requests for more reports from harbourmasters, sailing schools, leisure craft and superyachts, for example. However, it is important for readers to recognise that the reports featured in the Safety Digest are based on MAIB investigations, preliminary examinations or, occasionally, administrative enquiries. Therefore the range of articles in the Digest will only reflect the nature of accidents and incidents that occur and are dealt with by the MAIB. Similarly, the balance of articles between the merchant, fishing and leisure sectors will depend entirely on what accidents and incidents are reported to us and that we have investigated.

We hope that these explanations help people to understand what we are trying to achieve.

Returning to the positive comments about our Safety Digest, it is good to know that so many of you find it to be a useful, worthwhile and enjoyable publication. Our inspectors, principal inspectors and publications team write these articles and produce the Safety Digest as an addition to their normal investigation workload, so it is heartening for them to know that their work is so greatly appreciated.

Receiving the Safety Digest

If you returned a survey questionnaire to us, but do not receive the Safety Digest in the format or number of copies that you expected, please let us know as soon as possible so that we can address the problem and ensure that your needs are met.

APPENDIX A

Preliminary examinations started in the period 01/11/07 – 29/02/08

A preliminary examination identifies the causes and circumstances of an accident to see if it meets the criteria required to warrant an investigation, which will culminate in a publicly available report.

Date of Incident	Name of Vessel	Vessel Type	Flag	Size (gt)	Incident Type
19/11/07	*Wizard*	Workboat	UK	6	Grounding
14/12/07	*Viking Discovery*	Offshore supply vessel	UK	1433	Machinery failure
15/12/07	*QE2* *Pride of Kent*	Cruise ship Ro-ro vehicle/pax ferry	UK UK	70327 30635	Hazardous inc.
10/01/08	*Mariella*	Chemical tanker	Norway	41766	Hazardous inc.
11/01/08	*Fisher Boys*	Fishing vessel	UK	152	Flooding/foundering
25/01/08	*Millennium City*	Thames passenger vessel	UK	288	Contact with bridge
31/01/08	*Pride of Canterbury*	Ro-ro vehicle/pax ferry	UK	30635	Grounding
	Riverdance	Dry cargo	Bahamas	6041	Grounding
01/02/08	*Spinningdale*	Fishing vessel	UK	169	Grounding
	Pride of Canterbury	Ro-ro vehicle/pax vessel	UK	30635	Hazardous inc.
03/02/08	*Seven Sisters*	Ro-ro vehicle/pax vessel	France	18425	Contact
18/02/08	*Sea Mithril*	Dry cargo	UK	1382	Grounding
22/02/08	*King of Scandinavia* *Northern Producer*	Ro-ro vehicle/pax ferry Platform	Denmark Cyprus	31788 12577	Contact
25/02/08	*Sichem Melbourne*	Chemical tanker	Singapore	8455	Contact with jetty

Investigations started in the period 01/11/07 – 29/02/07

Date of Incident	Name of Vessel	Vessel Type	Flag	Size (gt)	Incident Type
13/11/07	*Ursine* *Pride of Bruges*	Ro-ro/lo-lo freight Ro-ro vehicle/pax	Belgium Netherlands	16947 31598	Collision
23/11/07	*Last Call*	Pleasure craft	UK	Unknown	Crew lost (3 fatalities)
06/12/07	*Figaro*	Specialised carrier	Singapore	50681	Escape of harmful substance
19/12/07	*Flying Phantom*	Tug	UK	287	Sinking (3 fatalities)
18/01/07	*Sava Lake*	General cargo	Latvia	2030	Acc. to person (2 fatalities)
19/01/08	*Shark*	Fishing vessel	UK	222	Fire
23/01/08	*Royalist*	Fishing vessel	UK	290	Flooding/foundering

Chief Inspector's Note: Appendix A of Safety Digest 3/2007 incorrectly implied that *Condor Express* made contact with another vessel. *Condor Express* was, in fact, secured safely alongside the berth when the other vessel made contact with her. I would like to apologize to Condor Marine Services.

Stephen Meyer
Chief Inspector

Reports issued in 2007

Annabella – collapse of cargo containers while in the Baltic Sea on 26 February 2007
Published 13 September

Aqua-boy – grounding, Sound of Mull on 11 November 2006
Published 4 July

Arctic Ocean and ***Maritime Lady*** – collision between *Arctic Ocean* and *Maritime Lady*, the capsize of *Maritime Lady*, and contact with wreck of *Maritime Lady* by *Sunny Blossom*, and its subsequent grounding in the Elbe River on 5 December 2005
Published 1 February

Brothers – grounding of vessel with the loss of two lives off Eilean Trodday on 1 June 2006
Published 31 January

Calypso – engine room fire on board the passenger cruise vessel 16 miles south of Beachy Head on 6 May 2006
Published 19 April

Danielle – major injuries sustained by a deckhand 17 miles south-south-east of Falmouth on 6 June 2006
Published 29 March

Ennerdale – major LPG leak from the gas carrier while alongside Fawley Marine Terminal on 17 October 2006
Published 25 May

FR8 Venture – loss of two lives, plus one seriously injured person on board the Singaporean registered tanker close to the west pilot station to Scapa Flow in the Orkney Islands on 11 November 2006
Published 18 July

Gas Monarch/Whispa – collision, 6 miles ESE of Lowestoft during the evening of 16 April 2007
Published 21 December

Haitian sloop – capsize of an un-named Haitian sloop with the loss of at least 60 lives while under tow by Turks and Caicos police launch *Sea Quest* 1nm south-east of Providenciales, Turks and Caicos Islands on 4 May 2007
Published 1 August

Harvest Caroline – grounding, Tanera More, Summer Isles, north west coast of Scotland on 31 October 2006
Published 22 June

Hilli – starboard boiler explosion resulting in one fatal and one serious injury on board the liquid natural gas tanker, Grand Bahama shipyard, Freeport, Grand Bahama on 10 October 2003
Published 27 March

Hooligan V- report on the investigation of the keel failure, capsize, and loss of one crew member from the Max Fun 35 yacht 10 miles south of Prawle Point on 3 February 2007
Published 14 August

Lindy Lou – fire on board the canal boat, Lyme View Marina, Adlington, Cheshire, resulting in 1 fatality on 20 January
Published 3 October

Maersk Doha – investigation of the machinery breakdown and subsequent fire, Chesapeake Bay, off Norfolk, Virginia, USA 2 October 2006
Published 6 July

Maersk Dover/Apollonia/Maersk Vancouver – close-quarters situation between the ro-ro passenger ferry *Maersk Dover*, the tanker *Apollonia* and the container vessel *Maersk Vancouver* in the Dover Strait on 17 October 2006
Published 17 May

Meridian – loss of the fishing vessel and her four crew 160nm due east of Aberdeen on 26 October 2006
Published 4 September

APPENDIX B

Octopus/Harald – grounding of the jack-up barge Octopus towed by the tug Harald, Stronsay Firth, Orkney Islands, 8 September 2006
Published 14 August

Ouzo – loss of the sailing yacht and her three crew, south of the Isle of Wight during the night of 20/21 August 2006
Published 12 April

Prospero – loss of control of the product tanker and her subsequent heavy contact with a jetty at the SemLogistics terminal, Milford, 10 December
Published 21 December

Sea Express 1 and ***Alaska Rainbow*** – collision on the River Mersey on 3 February 2007
Published 27 September

Sian Elizabeth – injury to a member of the crew, 3 miles north of Kings Lynn on 14 September 2006
Published 12 March

Skagern/Samskip Courier – collision, Humber Estuary, on 7 June 2006
Published 4 April

Thomson Celebration – fatal accident to person, at anchor in St Peter Port, Guernsey, Channel Islands on 26 September
Published 4 June

Thunder – grounding at the approaches to the Dee Estuary on 10 August 2006
Published 12 June

Annual Report 2006 Published June

Recommendations Annual Report 2006
Published 31 July

Safety Digest 1/2007 Published 1 April

Safety Digest 2/2007 Published 1 August

Safety Digest 3/2007 Published 1 December

Reports issued in 2008

Audacity/Leonis – collision at the entrance to the River Humber on 14 April 2007
Published 25 January

Lady Candida – fire and subsequent sinking off Corsica on 28 July 2007
Published 18 February

Logos II – two accidents during berthing and unberthing, St Helier, Jersey on 20 and 26 June 2007
Published 22 January

Pacific Star – heavy weather damage sustained by passenger cruise ship while on passage in the South Pacific Ocean on 10 July 2007
Published 29 February

Young Lady – vessel dragging anchor 5 miles east of Teesport and snagging the CATS pipeline, resulting in material damage to the pipe on 25 June 2007
Published 1 February