MARINE ACCIDENT
INVESTIGATION BRANCH

MAIB

SAFETY DIGEST

Lessons from Marine Accident Reports 2/2010

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Lessons from Marine Accidents

No 2/2010

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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 Mountbatten House, Grosvenor Square, Southampton SO15 2JU.

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

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

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

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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

AB - Able seaman
AIS - Automatic Identification System
ARPA - Automatic Radar Plotting Aid
ASD - Azimuth Stern Drive
C - Celsius
Cable - 0.1 nautical mile
CCTV - Closed Circuit Television
cm - centimetre
CO_2 - Carbon Dioxide
CPP - Controllable Pitch Propellers
ECDIS - Electronic Chart Display and Information System
ECS - Electronic Chart System
EN - Equipment Number
ERRV - Emergency Response and Rescue Vessel
GPS - Global Positioning System
GT - Gross tonnes
kg - kilogram
m - metre
"Mayday" - The international distress signal (spoken)
MBL - Minimum Breaking Load
MCA - Maritime and Coastguard Agency
MGN - Marine Guidance Note
mt - metric tonne
OCIMF - Oil Companies International Marine Forum
OOW - Officer of the Watch
PTW - Permit to Work
RIB - Rigid Inflatable Boat
Ro-Ro - Roll on, Roll off
rpm - revolutions per minute
RYA - Royal Yachting Association
SOLAS - International Convention for the Safety of Life at Sea
SPM - Single Point Mooring
TSS - Traffic Separation Scheme
UTC - Universal Co-ordinated Time
VHF - Very High Frequency
VTS - Vessel Traffic Services

Introduction

In this, my first introduction to the Safety Digest, I must pay tribute to my predecessor, Stephen Meyer, who retired in August. Stephen's vision and commitment during the last 8 years has led to MAIB developing into one of the world's most respected marine accident investigation organisations. The MAIB owes him a huge debt of gratitude and we will miss him.

Regular readers will be aware that this issue of the Safety Digest is published later than was originally intended. Concern over the actions of some elements of the press did raise questions about the continued viability of the Safety Digest in its current form. However, after careful consideration, I have decided that the Safety Digest is too important a safety tool for it not to be published. This decision was made easier by the many strong messages of support MAIB received and I would like to thank everyone who wrote to us. The Safety Digest is not, and never will be, an instrument of blame. Its sole purpose is to enlighten the marine community of what can, and does, go wrong and to provide guidance on how accidents can be avoided in the future.

The UK, along with many other countries, is trying to cope with the consequences of one of the worst economic downturns in living memory. The MAIB is not immune from the general process of belt tightening that is percolating through government departments and one of my first tasks has been to use the recent publishing hiatus to re-assess the way in which we produce the Safety Digest. As a consequence, I have decided that the number of editions produced annually will be reduced from 3 to 2. I trust you will understand the reasons behind this decision.

This edition of the Safety Digest contains the usual unwelcome mix of accidents and incidents. Indeed, Stephen Meyer would have encountered many of the same safety issues when he wrote his own first introduction in 2002. Seafarers need to re-discover the habit of inwardly asking themselves "what could possibly go wrong?" before embarking on any task, no matter how routine or simple the task may appear. By continually posing this question and planning accordingly, many of the accidents that occur in our industry, such as the ones described in this Digest, can be avoided.

Keep safe.

Steve Clinch
Chief Inspector of Marine Accidents
November 2010

Part 1 - Merchant Vessels

I am very grateful to Stephen Meyer in asking me to contribute a foreword to the MAIB Safety Digest. In the Port of London Authority, we place great emphasis on reading each safety digest and distilling those lessons learned applicable to port operations and then feeding them into our safety management system. Quite a few of the PLA's procedures have changed over the years as a result of various safety digests. There's a lot to be said for learning from other people's experiences.

Reading through the reports for this digest, I was struck by how fallible we humans are! Like many of you, I suspect, I have been through that awful pit of the stomach feeling when I realised that something I had just done could have been done differently and the risk just taken, avoided.

But how do we counter our fallibilities? There are all sorts of well established processes such as adequate professional training and the practising of emergency procedures and drills. But underpinning these measures there needs to be an understanding of how human fallibility can undermine these measures. We all know that a nice routine repeat of something we've done a thousand times before can turn into a crisis because we were complacent and didn't check the basics.

And this is where a recently published book by the MCA; "The Human Element; a guide to human behaviour in the shipping industry" comes in. It is an excellent description of the sort of human fallibilities I've been talking about - and written specifically in the context of our industry. I would urge you to get hold of a copy and digest the lessons of how we humans can let ourselves down but also how we can counteract these weaknesses. And then, just maybe, at 0300 whilst working on a boring repetitive task and you are thinking "Oh I don't need to get out of the chair and check that – it will be fine", the alarm bell in your brain might go off and an accident will be avoided.

Have a look at a copy and share it with the people round you – I am sure you will find it useful.

We also, in my opinion, have some of the most committed and talented people in any industry, working in what can be a very hostile environment. Because of all these things, we owe it to ourselves, our colleagues and our families to "get home safely."

David Snelson

David Snelson was appointed to the post of Chief Harbour Master of the Port of London Authority in December 2006 after a seagoing career in the Royal Navy.

As the PLA Chief Harbour Master he has responsibility for operational and navigational matters including pilotage, vessel traffic services, hydrography, harbour services and port security over an area from Teddington in west London to the Thames Estuary outer limits north of Margate. The port is the second largest in the UK, moving over 45m tons in 2009.

During his naval career he was an aircraft controller, bridge watch keeper and commanded 3 ships, including the aircraft carrier HMS ARK ROYAL.

Admiral Snelson is a Fellow and past Council member of the Nautical Institute, a member of the Honourable Company of Master Mariners and a Younger Brother of Trinity House. He was appointed a Companion of the Bath in 2003 and is a holder of the United States Legion of Merit. He retains an interest in defence matters as a specialist adviser to the House of Commons Defence Committee.

It's Behind You!

Narrative

A specialist offshore wind farm construction vessel carried a large alignment tool which was used to align the intermediate section of the wind turbine tower to the bottom section of the tower that was driven into the seabed (Figure 1).

The tool was carried on board the vessel in a dedicated stowage (Figure 2). The stowage had a working platform from which the riggers could access the top of the alignment tool to connect the slinging arrangements when it was to be deployed. The platform perimeter was fitted with guardrails. The grating deck had two openings, the smaller of which accommodated the alignment tool's guide rails. The larger of the two openings was fitted with a removable grating to allow for another specialist tool to be stowed. When the tool was in the stowed position the small opening was effectively filled with the tool's steel guide rails, so there was insufficient space for anyone to fall through it. The risk was also minimised because there was no need to access the platform until the tool was in place and the small opening filled with the guide rails.

The riggers were very familiar with deploying and re-stowing the tool as it had been used for approximately 80 wind farm installations.

On completion of the construction contract it was intended to offload both the tool and its stowage. The tool was removed to the quayside, which left the small opening on the working platform open. Because there were no guardrails around the hole, the riggers covered it with a large section of thick plywood, and before completing their shift they secured plywood to the platform grating to prevent anyone falling through the opening.

The following morning, the riggers attended a "tool box" talk given by their supervisor. They were reminded of the need to wear their safety harnesses when working at height. On completion, all those involved in removing the tool's stowage signed the Tool Box Talk Register to confirm that they had understood the supervisor's requirements.

The shift supervisor then instructed two of the riggers to go onto the stowage working platform to remove any loose items before it was craned ashore. A number of items were lowered to the deck using the ship's 40 tonne crane. The two riggers, who were not wearing safety harnesses, then removed the plywood sheet covering the smaller of the two holes in the deck grating. The plywood was lowered to the deck. The two riggers then turned their attention to removing the grating covering the larger of the two holes. As one of the riggers used his radio to discuss the options with the crane driver, he stepped back from the platform guardrails and put his left foot through the smaller hole which was previously covered by the plywood. He lost his balance, struck the opening with his left hand and fell nearly 7 metres to the main deck below (Figure 3).

On hearing the thud, the supervisor looked around and saw the - still conscious - casualty lying on his back. He immediately instructed the casualty not to move and contacted the ship's medic. An ambulance was also called, and this arrived a few minutes later. The casualty was transported to hospital, where he was diagnosed as having two broken ribs, a punctured lung and minor cracks in two of his vertebrae. Fortunately his injuries were not life-threatening.

Figure 1: Wind turbine tower alignment tool

Figure 2: Alignment tool secured in its stowage

Figure 3: The deck grating from where the crewman fell to the main deck

The Lessons

The casualty was extremely lucky not to suffer more severe or even fatal injuries. Neither of the riggers wore a safety harness despite the requirement being covered during the "tool box" talk. They rather naively felt safe because of the guardrails fitted to the perimeter of the working platform. However, a momentary lapse in concentration caused the casualty to fall through the unguarded opening. Had he worn a safety harness, his fall would have been arrested and he would have escaped injury.

The following lessons can be drawn from this accident:

1. "Tool box" talks are an excellent way of advising the crew and contractors, when appropriate, to the work procedure, associated dangers and precautions. However, it is no good signing off that the instructions are understood if the safety precautions are not implemented and enforced. In this case, the use of safety harnesses was covered, but they were not used, and the supervisor did not check to ensure that they were.

2. It is all too easy to become distracted when working aloft, so personnel should wear a safety harness or other arresting device; in some cases a safety net may also be appropriate. Chapter 15 of the Maritime and Coastguard Agency's (MCA) publication – Code of Safe Working Practices for Merchant Seamen provides more detailed guidance.

3. Where possible, access hatches in working decks should be designed to be closed off using hinged covers where practicable. Where this is not possible because of operational reasons, consideration should be given to fitting removable guardrails. Had they been fitted after the alignment tool had been removed, this accident would not have occurred.

CASE 2

Bad Luck Comes in Threes - So Do Avoidable Accidents

Narrative

In a period of less than 3 months, three separate accidents occurred when cargo ro-ro vessels of the same class were transiting a lock in a busy port, with tugs attached. Each accident resulted in either the ro-ro or tug sustaining damage following contact with a lock gate or the gate recess.

Case 1:

The first accident occurred when a ro-ro vessel was exiting the lock in force 3 winds, with a Voith Schneider tug fast forward and an Azimuth Stern Drive (ASD) tug fast on the starboard quarter. A combination of the cargo vessel's large stern ramp and aft mooring deck layout meant that she did not have an aft centreline fairlead; the port quarter fairlead was aligned athwartships, with the starboard fairlead angled aft on the quarter (Figure 1).

As they began to leave the lock, the cargo vessel was using her engine, with the forward tug pulling ahead. Meanwhile, the aft tug's stem was pushing on the cargo vessel's stern, with the aft towline tight. The pilot twice asked the aft tug to tow right astern, but the tug remained in push mode. On being asked a third time, the tug master put weight onto the towline, resulting in the tug's bow immediately swinging to starboard and making contact with the lock wall. Although the bow came clear following an emergency manoeuvre, the starboard quarter fender fouled a lock gate, resulting in significant damage to the gate and minor damage to the tug's fendering and steelwork.

Case 2:

Two months later, the same Voith Schneider tug was assisting a ro-ro vessel through the lock. On this occasion, the tug was connected to the port quarter to counter winds gusting to force 5 and also the vessel's inoperative stern thruster. A plan had been agreed by the pilot and the master of the cargo vessel for using the tug to assist with getting into the lock and onto the berth. However, the transit through the lock had not been discussed in detail.

As the two vessels began to exit the lock, the pilot requested the tug to favour the port side with minimal weight. Although the pilot envisaged this would be achieved by the tug pulling, the tug master's interpretation was to push his vessel's stern onto the port side of the cargo vessel's transom (Figure 2). Poor visibility aft meant that the ro-ro vessel's bridge team were unaware of this, and were thus also unaware that the tug had slipped off their stern. The vessel's wake immediately caught the tug's skeg and, as the towline, with a high lead angle, became taut, the tug's stern sheared towards one of the lock gates.

An emergency manoeuvre failed to prevent the tug from making heavy contact with the lock gate recess, causing the towline to part as the vessel continued into the dock. The tug was able to manoeuvre off the recess, and continued to assist the vessel berthing, but had sustained significant damage above the waterline (Figure 3). The lock gate and gate recess also sustained minor damage.

Case 3:

The third accident involved a ro-ro vessel entering the same lock; this vessel was moving astern and had an inoperative bow thruster. A Voith Schneider tug was attached through the forward centreline fairlead, with the (now repaired) ASD tug from Case 1 pulling on the vessel's port quarter to try to counter a strong cross-tide and force 6 winds. However, neither the cargo vessel's stern thruster nor the aft tug could prevent the cargo vessel's port quarter making heavy contact with one of the lock gate recesses. A 60cm by 20cm hole was punctured above the waterline in way of a ballast tank.

The aft mooring party on the cargo vessel had not been able to convey distances to the bridge; they were standing well clear of the towline following a previous incident when a bollard had been torn out and the towline had parted while attached to a tug! Given this lack of information, the pilot and master had assumed that the aft tug would assist in keeping the port quarter clear; evidently this did not occur.

Figure 1: Stem view of cargo vessel showing fairlead positions

Figure 2: Tug pushing onto cargo vessel's transom

* Footage courtesy of Associated British Ports

Figure 3: The damage sustained to the tug

The Lessons

Although this series of accidents might suggest a number of specific problems with this class of ro-ro vessel, operating with tugs in the lock, many of the lessons are in fact applicable to all close quarters towage operations:

1. The cargo vessels' stern ramp and aft fairlead arrangements were certainly contributory to these accidents. In each case, a combination of the lack of a centreline fairlead, and poor aft visibility due to the ramp, resulted in the aft tug not operating as the ro-ro vessels' bridge teams had expected, and also struggling to control the ro-ro's stern.

2. Effective planning between the cargo vessels' bridge teams and the tugs, together with clear communication throughout to monitor progress, would not only have helped prevent all of these accidents, but they are also essential to all successful towage operations. Details of relevant defects should also be effectively conveyed during the planning stage to ensure that all parties are fully aware of any limitations that may affect the towage.

3. Each case clearly demonstrates that the effectiveness of aft tugs towing through quarter fairleads, especially in a confined lock, can be severely restricted. Two of the tugs involved were pushing on the ro-ro vessels' transoms in an attempt to exert a steering force. However, this will only be safe if the tug can remain constantly in push mode. As soon as the tug comes off the vessel's transom, it will be particularly susceptible to the vessel's wash and helm movements. Depending on the lead of the towline, the tug's directional stability will be potentially compromised, with resulting loss of control. Again, careful consideration should be given during planning to ensure the safest and most effective tug position and the most appropriate engine power for the vessel.

4. The second accident in particular highlights the use of towing winch emergency release systems as a preventative rather than an emergency action. All of the tugs involved in these accidents had such systems fitted, and if this had been used proactively to release the weight from the towing gear, the tug might have regained position, thus eliminating – or at least reducing – the resulting damage. Such safety devices are there to be used, and should be regularly drilled when practicable. They should not be seen as a last resort, or as a sign of failure if they are used.

Shocking Connections - That Could Have Been Terminal

Narrative

A passenger ro-ro ferry was undergoing maintenance in a shipyard overseas. During the night shift, shipyard workers brought on 450V electrical supplies and distribution boxes from the yard to provide power to the ship. Early in the morning, the crew noticed that one of the distribution boxes appeared to be live, and that the terminals on the shore supply cable were not insulated, were bundled together and were hanging close to a metal grating above the deck.

They evacuated the area and prevented anyone from approaching the distribution box while they contacted shipyard representatives. Power to the supply cable was isolated and the terminals were reconnected in the correct way.

The sequel

A few days later, the crew heard an explosion in the shipyard, following which shore electrical supplies were lost and the vessel suffered a blackout. Investigation showed that this time, one phase of the shore power had failed due to a poor mechanical connection, causing the remaining two phases to overload, resulting in significant damage to the supply cables before the breakers operated. Electric motors on board the ship were found to have been single phasing, and some were damaged as a result.

Figure 1: Shore services box

The Lessons

1. **Trust no one: safety standards can vary enormously in different parts of the world.**

2. **Always ensure that appropriately qualified staff have properly checked connections on shore electrical supplies before they are made live.**

Figure 2: Shore services supply cable

Figure 3: Damage to the supply lines

Figure 4: Close-up of the damaged cables

CASE 4

When Starboard Was Not Right

Narrative

A 10,000 tonne vehicle carrier grounded while departing from a port in poor visibility when the pilot incorrectly ordered the helm to starboard after the vessel had rounded a right-handed bend in the river.

As the vessel cleared the bend the pilot, who was navigating by eye and without reference to the radar, gave an initial order of "starboard 10". When this failed to stop the turn as expected, he ordered hard to starboard and full ahead. The vessel's rate of turn now accelerated to starboard and, by the time the pilot realised his error, the vessel was swinging rapidly towards the right-hand bank of the river.

The engine was then put astern and both anchors were let go. However, in the narrow river there was insufficient room to prevent the vessel from grounding.

Checks were made of the vessel's spaces which confirmed that, fortunately, she had not been damaged by the grounding. Harbour tugs later assisted her to refloat and she was able to resume her passage to sea.

The Lessons

1. **The fundamental requirements of planning and executing a safe navigational passage must be clearly and fully understood and implemented by all bridge officers, including pilots. SOLAS Chapter V, Regulation 34 and Annexes 24 & 25 to the MCA's relevant guidance clearly define the requirements for the planning and conduct of a safe navigational passage, the key elements of which are: Appraising, Planning, Executing and Monitoring.**

2. **In poor visibility, the pilot struggled to identify visual marks, and in concentrating on this failed to realise that he had ordered the helm to be placed in the wrong direction. The allocated roles and responsibilities of the vessel's bridge team should have been such that an order to place the helm in the wrong direction was immediately questioned. This would have enabled the pilot to realise and correct his mistake in sufficient time to prevent the grounding.**

3. **The International Chamber of Shipping's Bridge Procedures Guide states, inter alia, that: effective bridge resource and team management should eliminate the risk that an error on the part of one person could result in a dangerous situation. Bridge officers have a duty to support the pilot and to monitor his actions. This should include querying any actions or omissions by the pilot (or any other member of the bridge management team) if inconsistent with the passage plan or if the safety of the ship is otherwise in any doubt.**

I Didn't Touch It

Narrative

A coastal tanker was berthed 150m ahead of a lock gate while waiting to enter port to discharge her cargo. The master was alone on the bridge until he was joined by the berthing pilot. The controllable pitch propeller (CPP) was turning at full manoeuvring speed of 130 rpm in neutral pitch, as was usual on this vessel when manoeuvring.

After all the mooring lines had been let go, but before the master could move the controls, the propeller pitch indication moved to 'full astern'. In quick succession, the master operated the bridge wing engine control lever ahead, the centre console lever ahead, and then the override pitch control button ahead; all without success. During this time, the ship accelerated astern.

The officer at the aft mooring station attempted to stop the vessel's stern motion by sending a mooring line ashore, but it parted as soon as the load came on.

The master used the intercom in the control room to direct the chief engineer to take control. However, he too was unable to take control, so the master hit the engine emergency stop button. The engine stopped with the ship making 3.5 knots astern.

The vessel hit the lock gate at around 3 knots, significantly damaging her stern and causing minor damage to the lock gate.

The subsequent investigation found that the most likely cause of the accident was the failure of the CPP servo unit control board, located below the engine room plates next to the propeller shaft. The control board, in situ for 17 years, showed some indication of heat damage.

Figure 1: Damage sustained to stern of vessel

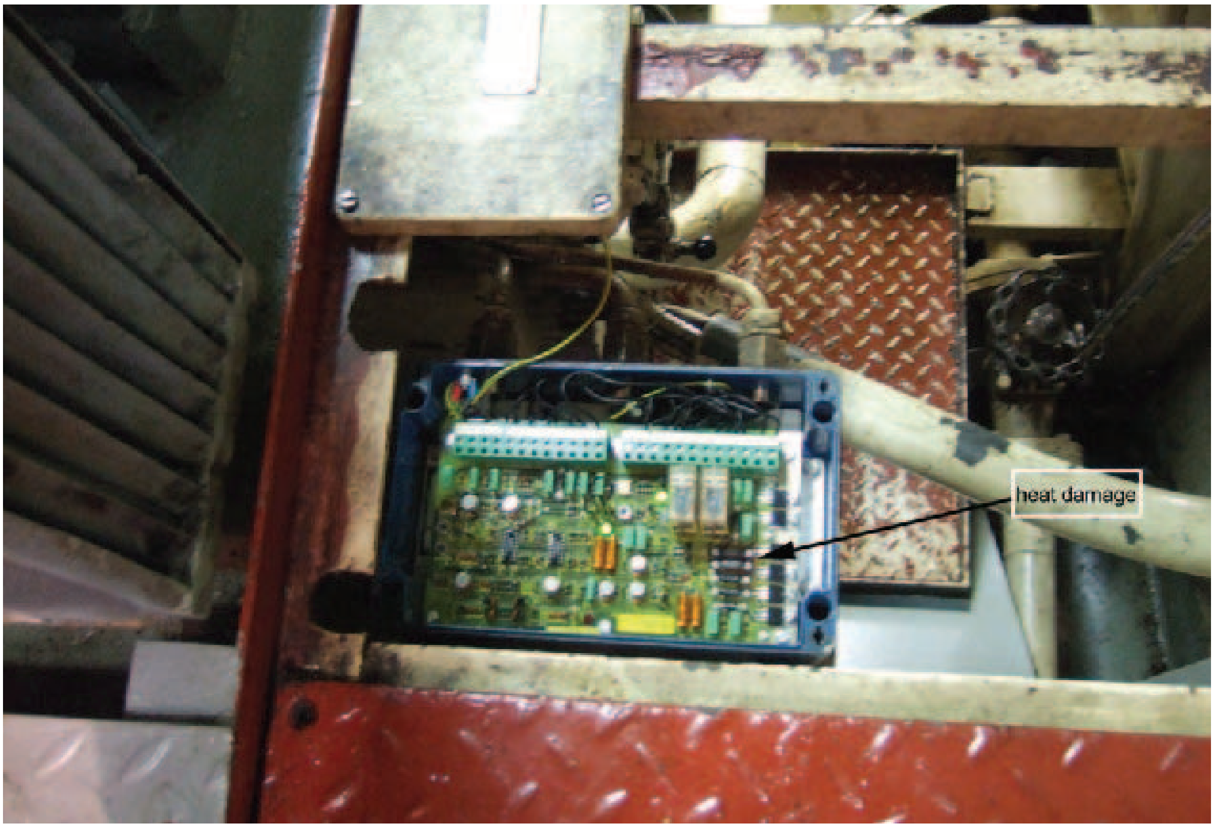


Figure 2: CPP Servo unit

The Lessons

1. The master was very familiar with the vessel's manoeuvring system. He acted swiftly to operate ahead propulsion using all the modes available, and his speed in activating the emergency stop reduced the damage to both the vessel and the lock gate. *Familiarity with all engine control modes, and having the confidence to use the emergency stop button are invaluable; how well do you understand your engine control system?*

2. The CPP system servo unit was a single point of failure within the CPP system. *Critical systems such as these should be identified and the potential effects of their failure carefully considered.*

3. The master was the only member of the vessel's crew on the bridge at the time of the accident. Additional personnel would have allowed him to delegate critical tasks, so reducing his workload. *Manoeuvring in port is no time to be short-handed on the bridge because any emergency situation can quickly overwhelm the lone watchkeeper.*

4. Being alongside for around 30 minutes with the propeller turning at full manoeuvring speed left the vessel vulnerable to any accidental pitch application. *Propulsion systems should be shut down if they are not required for protracted periods.*

5. The officer on the aft mooring station passed a mooring line ashore, which then parted, and could have injured a crewman. *This accident is a reminder of the risks of working with mooring lines and the need for clear communication between the bridge and mooring stations.*

Freefall Workboat Injures Two

Narrative

The crew of a coastal bulk carrier, berthed starboard side alongside in fine weather, were tasked with painting the hull boot topping. It was decided to use the starboard workboat for the job. The senior AB unhooked the workboat from the forward hand-operated davit and connected it to a smaller electrically-driven stores davit.

Two of the crew boarded the workboat and it was hoisted and swung over the ship's side, prior to lowering.

After the boat had descended about 2m the wire parted, close to the hook, and the boat and both occupants fell around 8m to the water. Both suffered serious injuries, but were able to climb out of the boat and up the vertical ladder on to the dockside, from where they were taken to hospital by the emergency services. Both required a lengthy time off work to recuperate.

Figure 1: The vessel involved in the incident

Figure 2: Stores davit hook and parted wire

The Lessons

1. The stores davit was unsuitable for the task of lowering the workboat to the water with personnel embarked. The task had never been assessed, either formally through risk assessment, or informally; no permit to work had been raised; and using the stores davit in that manner had not been identified by company internal or external inspection or audit. *Only if a vessel's procedures are correctly identified can their risks be assessed.*

2. The senior AB's decision to use the stores davit went unchallenged by the officers and crew on deck, and the operation was allowed to continue unchecked. Had anyone stopped the operation to consider the task in hand, it could have been delayed until the risks of the operation were made apparent. *An effective Safety culture relies on all individuals challenging and preventing unsafe acts, even when they are apparently endorsed by senior officers.*

3. The wire was heavily corroded and was incapable of supporting the weight of the workboat and the crew.
   a) The stores davit was not included in the list of maintainable items, so effective maintenance and testing was not carried out.
   b) The grease that had occasionally been used to lubricate the wire was too viscous to penetrate to the wire core.

4. Lifting equipment should either be effectively maintained or should be removed.

5. Equipment suitable for personnel use should be clearly marked.

No Margin For Error

Narrative

At 0115 UTC, a general cargo vessel embarked a local pilot for her intended passage to a UK river port. Pilotage was not compulsory, but the information shown on the British Admiralty chart of the area lacked detail and was not up to date. The vessel was carrying a cargo of wheat and the chief officer had re-configured the ballast arrangements during heavy weather in the North Sea.

During the master pilot exchange of information, the master declared that the vessel's fresh water draught was 4.1m. On completion of the exchange, the pilot took the con and navigated the vessel upstream on a flood tide. He was aware that the shallowest part of the passage occurred directly above a gas pipeline buried 2.5m beneath the riverbed, and adjusted the vessel's course to ensure that she passed over the pipeline at about high water.

As the vessel approached the pipeline, port control advised the pilot that the reading on a nearby tide gauge was 4.3m. The gauge indicated the depth of water above the riverbed in the vicinity of the pipeline. Therefore, the pilot calculated that the vessel would pass over the pipeline with an under keel clearance of 20cm, which was the minimum required by the port. Speed was reduced to 3 knots to minimise the effect of squat, and the vessel's course was adjusted to keep her in the deepest part of the navigable channel. However, as the vessel passed over the gas pipeline, at 0300, she grounded.

No one was injured, there was no pollution and the vessel was refloated at the following high water without sustaining any damage. It was only following the accident that the consequences of vessels grounding over the pipeline were fully researched, and it became evident that the tide gauge required re-calibrating.

The Lessons

1. **This was not the first time a vessel had grounded over the pipeline, yet neither the pipeline's owner nor the port authority was aware of the potential consequences this would have on the pipeline's structural integrity. There are numerous pipelines crossing tidal rivers used by sea-going vessels, and it cannot be taken for granted that vessels grounding over them will not result in any damage. The risks must be properly assessed through detailed structural analysis before limiting factors such as maximum displacement and minimum under keel clearance can be determined.**

2. **Although the commercial viability of some ports is threatened by their inability to accept some vessels, due to their draught, the application of a minimum under keel clearance is a crucial aspect of navigation safety. It must be established through a port's risk assessment process, taking into account factors such as the predictability of the tide, fresh water effect, the accuracy of a vessel's reported draught, and the changing nature of the river or seabed.**

3. **Inaccurate aids to navigation, such as tide gauges, are dangerous. Therefore, it is essential that all such equipment is properly maintained and periodically tested.**

4. **The information shown on nautical charts is vital to ensure that vessels can navigate safely. Within harbour limits, the responsibility for ensuring that the information is accurate and up to date rests firmly with the port authority, regardless of whether or not pilotage is compulsory.**

CASE 8

Testing of CO_2 Fire Extinguishing Systems – A Close Shave

Narrative

A high speed ferry was being prepared for a seasonal charter after a period of winter lay-up. The master, two chief engineers, a second engineer and a number of engineering and deck ratings were on board as the Classification Society and Flag State surveyors attended to carry out the annual safety inspection and survey.

A survey plan was agreed, and during the early part of the day the survey proceeded in accordance with the plan. However, while in the forward engine room, one of the surveyors asked the accompanying chief engineer to activate the engine room CO_2 alarm. This was definitely not in the plan and, although caught unawares, the ship's team wanted to show willing and agreed impulsively to the request.

The chief engineer in the forward engine room was familiar with the system, however the other chief engineer, who was on the bridge, was not as well versed in it. The two stage CO_2 systems, supplying the forward and after engine room and the emergency generator room, could be activated from the bridge and also locally in the CO_2 room in accordance with the instructions posted at the control positions (Figure 1). The first stage required the glass panel to be broken, and depressing the button activated the selected space visual and audio alarm, stopped the ventilation fans and shut the ventilation dampers; it also stopped the fuel pumps. The push button also activated a solenoid pilot valve. This opened the CO_2 gas bottle valves which then pressurised the manifold up to the main distribution valve. When the second stage button was depressed the appropriate distribution valve (Figure 2) opened after a 90 second delay, allowing CO_2 gas to enter the selected space.

Figure 1: Safety instructions at the control positions

Figure 2

On receiving the request to test the alarms, the chief engineer on the bridge broke the glass and depressed the stage one button. The alarm sounded to the satisfaction of the surveyors. No reference was made to the maintenance system, which specified the correct test procedure or to the precautions detailed in the CO_2 room (Figure 3).

After lunch the survey group entered the CO_2 room. They found that a number of the gas bottles had frosted up and there was a gas leak from a pipe-screwed connection on the pilot valve, and the line up to the distribution cylinder was pressurised.

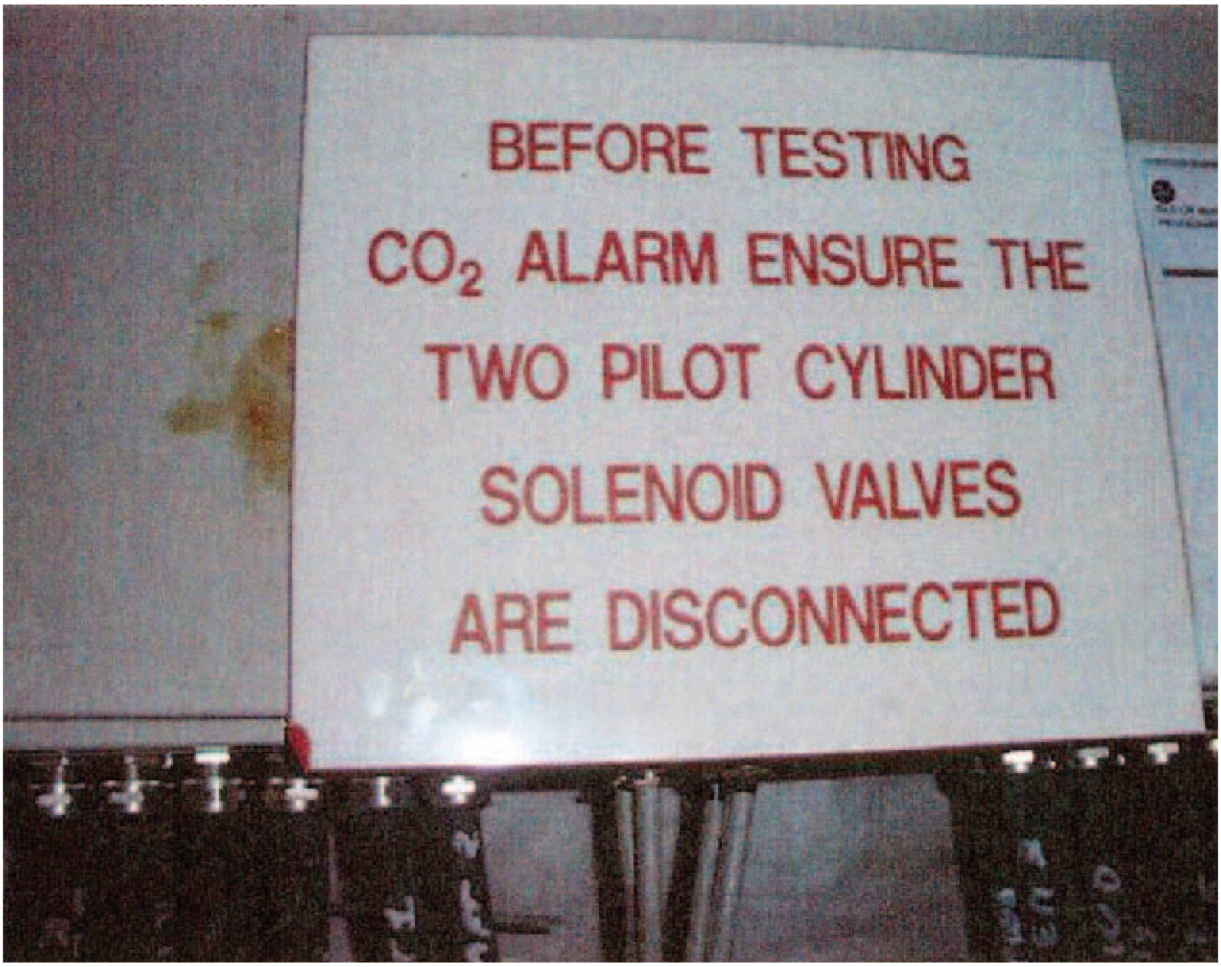


Figure 3

The service engineer was contacted, and it was agreed that the safest way of relieving the pressure was to discharge the CO_2 into the forward engine room after evacuating all non-essential personnel from the vessel. This was done, the engine room fans were left running, and the following morning a chemist confirmed the space was safe to enter.

The Lessons

There have been a number of accidents relating to the inadvertent discharge of CO_2 because of unfamiliarity with the system, inadequate warning signage, poor maintenance procedures which did not follow the manufacturer's instructions, and non-compliance with the ship's Permit to Work procedures.

The signage indicating the need to isolate the pilot cylinder solenoid valves was only posted in the CO_2 room and not on the bridge where the alarm activation took place.

Luckily, in this case there were no injuries, but the outcome could have been far different if one of the manifold valves had leaked, allowing the asphyxiating CO_2 gas to enter a manned engine room or the emergency generator room.

The following lessons can be drawn from this accident:

1. Always refer to the correct system maintenance instructions when testing CO_2 gas systems. It could well save your life and that of others.

2. Ensure that warning notices, such as the need to isolate pilot cylinder solenoid valves, are posted at all operating positions from which the system can be tested.

3. Utilise the Permit to Work system when conducting system maintenance – it has been developed to help safeguard against accidents.

4. Staff should familiarise themselves with the system – do not assume that all CO_2 gas systems are the same; they most definitely are not!

5. Avoid being pressurised into carrying out tasks impulsively purely to appease requests. This all too often leads to dangerous shortcuts which compromise safety.

Are You Sitting Comfortably?

Narrative

A 1,700 tonne general cargo vessel was on passage in the buoyed channel of an estuary as she approached her loading port. The bridge team consisted of the master and a pilot who were seated in the enclosed wheelhouse, either side of the central control console. Both men had extensive experience on similar vessels in the estuary.

In a strong tidal stream and with near gale force winds the vessel was rounding a turn in the channel when the bridge team noticed that she was being rapidly set onto a steel navigation light float, which marked the edge of the channel.

The master and pilot observed the light float from their chairs until it passed out of their view down the side of the vessel. Although they realised that the vessel was very close to the float, they assumed that it would pass clear, but did not leave their chairs to confirm this.

A short time later the vessel began to develop an unexpected list. A visual inspection revealed a hole in the hull, which was attributed to the vessel having made contact with the light float. The pilot reported the contact to the harbour authority.

Repairs to the vessel resulted in her being out of service for several days. The light float was inspected and, although found with minor cosmetic damage, was still on station and operating as normal.

Figure 1: Damage sustained to the hull of the vessel

The Lessons

1. Due to the restricted view from their chairs, neither the master nor the pilot witnessed the contact with the light float. They remained seated throughout the incident and erroneously assumed that the vessel had passed clear of the float. Anyone who has been at sea for some time will have memories of masters who strictly forbade the bridge watchkeeper sitting down when on watch. Time and technology have moved on since then, but the basic requirement of keeping a proper lookout still requires watchkeepers to regularly leave their chairs and move around the wheelhouse, especially in confined waters.

2. Vessels should avoid passing too close to navigation marks. However, if a contact or close quarters situation occurs, the mark should be monitored to ensure that it has not been damaged or moved from its assigned position. The vessel should then report the occurrence to the harbour authority or nearest coastal state, as appropriate.

3. The master and pilot were experienced ship handlers, but they did not adjust the vessel's course sufficiently early to counter the effects of wind and tide in order to keep the vessel safely in the channel. Navigating within a buoyed channel, with regular alterations of course, requires the bridge team to closely monitor the vessel's position so that the effects of set and drift on differing headings can be assessed and appropriate action taken to ensure the safety of the vessel.

Pilotless Port Entry Ends in Heavy Contact With Quay

Narrative

During the evening before a coastal vessel arrived at a small UK port, port control instructed her master that the vessel was to arrive at the pilot boarding position at 0400, and he was then to await further instructions. The pilot would be on a ship leaving the berth intended for the vessel and, once clear of the port entrance at about 0430, would transfer from the departing ship.

At midnight, the master left instructions for the chief officer to call him 30 minutes before pilot embarkation. No further discussion took place and no plan was developed for after the vessel had reached the pilot boarding position. The chief officer called port control 1 hour, and the master 30 minutes, before arrival. The chief officer asked port control on which side the pilot ladder should be rigged, and was told “on the best lee side”. The chief officer did not understand, and several minutes later he repeated his question to port control. He was again told “on the best lee side”, which he acknowledged but still did not understand. With 1 mile to go, the chief officer called port control again and was instructed to keep east of the outer approach channel buoy.

At 0355, the master arrived on the bridge, took the con, and instructed the chief officer to take the helm and alter course for the channel entrance. The master expected to see the pilot boat close by, and asked the chief officer where it was. The chief officer replied that he had been instructed by port control to stay east of the approach buoys. By this time, the ship was approaching shallow water at the entrance to the port, and the master decided that there was insufficient sea room in which to turn the ship around.

Meanwhile, the pilot, who was on board the departing ship and still alongside the berth, saw that the vessel was close to the port entrance. After confirming her position, he realised that the vessel had no choice but to continue to proceed down the narrow channel to the inner basin. He pointed out the leading lights to the master and sent the pilot boat to guide him to the intended berth, while the pilot manoeuvred the departing ship to the opposite side of the basin.

The inbound vessel inadvertently deviated to the south side of the basin before altering course to starboard and then approaching the berth at a higher speed and at a larger angle than necessary. The pilot advised the master to slow down, to which the master applied full astern propeller pitch. However, this was too late to prevent the vessel making heavy contact with the quay.

The chief officer had been in rank for less than a year, having spent most of his time at sea as an able seaman. The master had been serving on coastal vessels for 9 months; he had always taken a pilot when entering or leaving port. The master and chief officer, who were of different nationalities, had served together on board for about 8 days, most of which were spent on opposite watches.

The port control operator was a non-mariner and had no radar with which to monitor traffic movements.

Figure 1: Damage sustained to the vessel

Figure 2: An aerial view of the damage sustained to the quayside

The Lessons

1. When serving with inexperienced and newly acquainted officers, masters should never assume that they will necessarily carry out a course of action as they would expect. In such circumstances, it is always wise to discuss a plan of action with them, no matter how obvious it may appear, so as to reassure themselves that they understand what is required.

2. Management companies should take into account the nationality and lack of experience of particular officers when appointing them to their ships, especially when vessels are minimally manned with only two deck officers.

3. The passage plan, which should extend from berth to berth, should be discussed between the master and his officers and, importantly, should allow sufficient time and sea room for proper pilot/master exchange, and take into account aborting port entry in the event of problems arising. Further guidance of best practice is contained in the International Chamber of Shipping's *Bridge Procedure Guide*.

4. When the opportunities arise, masters should practise ship-handling so as to become competent in manoeuvring the vessel in circumstances where a pilot is unavailable or where intervention under pilotage is deemed necessary.

5. Port authorities should consider the hazard of an inadvertent pilotless port entry in their risk assessments, and should develop appropriate subsequent control measures as may be required.

CASE 11

What a Drag

Narrative

While waiting for orders, a ro-ro vessel had been drifting clear of the shipping lanes. The master had attempted to anchor close to the coast, but the vessel dragged anchor twice and returned to drifting. Eventually, the vessel entered a nearby port to undergo a charterer's inspection and, while there, was detained for anchoring in territorial waters without permission.

The vessel was sent to an open anchorage in deep water, but a few days later the wind increased and she dragged anchor twice more. The master requested a more sheltered and shallow anchorage, and was allowed to re-anchor as requested closer to the port. The ship remained there without incident for the next 2 weeks.

With a deteriorating weather forecast, the master became concerned that his ship would drag anchor again. As the wind increased, he went to the bridge and put the main engines on immediate notice. The vessel was light draught and had a large windage area, and was yawing substantially. An hour later, the master noted the distance to a Single Point Mooring buoy (SPM) downwind from the ship's position was reducing. The vessel was dragging her anchor again, so the master called the anchor party and ordered the anchor to be heaved in. Although the main engines were available, he did not use them for fear of damaging the propellers and rudders either on the SPM or the floating pipeline attached to it.

The master called the pilot station by VHF radio requesting assistance, and a pilot and a tug were despatched from the port. Meanwhile, he tried using the ship's bow thruster to relieve the strain on the cable. This had little effect, and the ship drifted beam on to the wind, eventually striking the SPM buoy aft of amidships. The pilot and tug arrived shortly after the contact, and were able to manoeuvre the vessel clear of the buoy and into port.

Underwater surveys showed that the buoy had suffered only minor denting, but the ship was holed in two places below the waterline in way of a void space.

Figure 1: Monobuoy

Figure 2: Ship's starboard bow

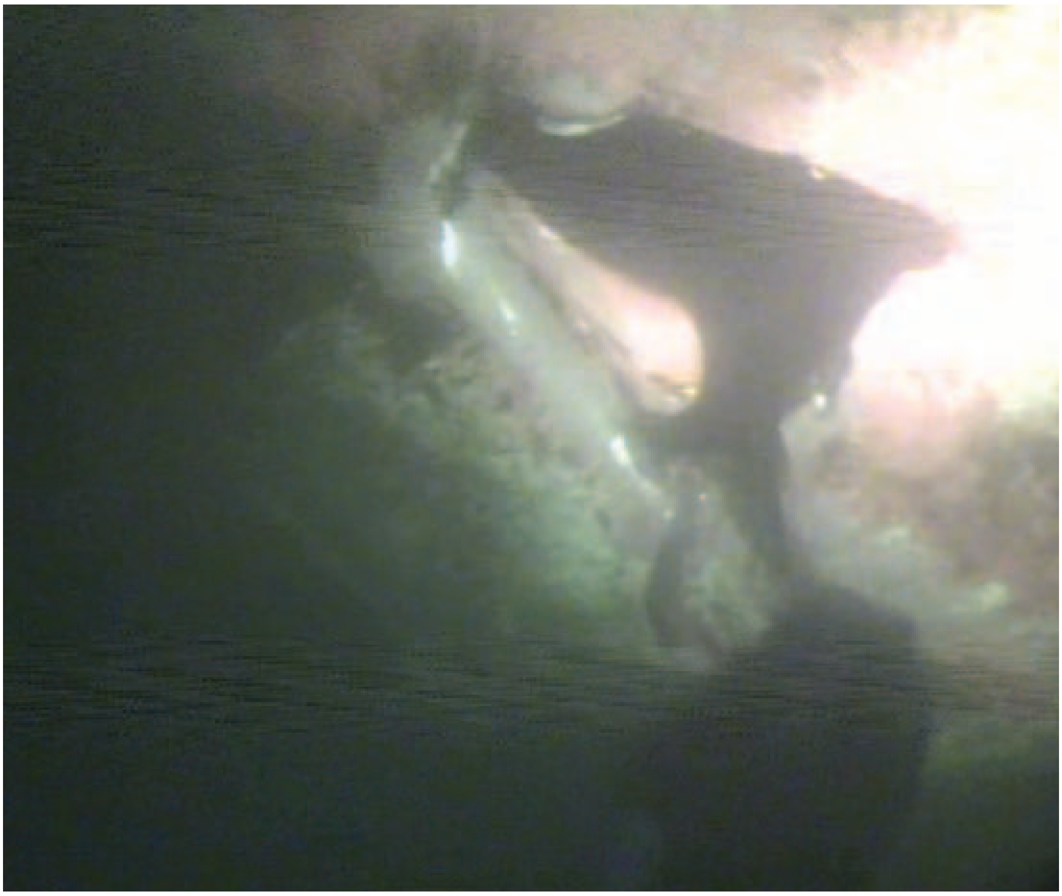


Figure 3: Underwater damage to ship's void space

The Lessons

1. The master always used the same length of cable when anchoring. He did not adjust the length of cable for depth of water, forecast weather, or length of stay, and seemed surprised that his ship kept dragging anchor. There are some well tried rules for assessing the length of cable to use. Once the appropriate equation has been chosen, taking into account the vessel's cable type and anchor holding power, it takes only a few moments to calculate the appropriate amount of cable to use for any given depth of water.

2. When it was first noticed that the ship was dragging anchor, her stern was still 2 cables from the SPM buoy. Had the master used the engines at this stage, he could have reduced the rate of, or halted, the dragging, thereby easing the strain on the cable so that the anchor could be recovered and allowing time for tug assistance to arrive.

Too Busy to Look

Narrative

A 5500 teu container ship was on a coastal passage off southern China. The planned route intentionally avoided busy traffic separation schemes, with the master preferring a slightly longer passage which took the vessel further away from the coast and through a small group of islands. However, dense concentrations of fishing vessels, some very small, were likely to be encountered throughout the night.

During the evening, the master calculated that he had some time in hand, so in order to save fuel decided to stop engines and drift for about an hour while in open water. Passage was then resumed at a speed of 21 knots. The master's night orders instructed the bridge watchkeeping officers to call him if they required his assistance.

When the chief officer came on watch at 0400, he reviewed the charts to be used and noted the potential danger areas. Traffic density at that time was fairly light, but it gradually increased. The vessel was being steered by auto pilot and the chief officer was accompanied on the bridge by a lookout.

By 0600 the number of small fishing vessels had increased substantially, causing the chief officer to make a number of course alterations in order to avoid a collision. The master visited the bridge briefly at around 0630, but with the chief officer apparently in control of the situation he soon went below for breakfast. The chief officer was kept busy avoiding small fishing vessels until shortly before 0700, when the numbers encountered started to reduce. By this time, the vessel was approaching the most navigationally constrained part of the passage, with submerged dangers lying 8 cables either side of the planned track. Her speed was still 21 knots and she was to the south of her intended route. The vessel's position had been plotted on only two occasions between 0600 and 0700, each based on a single radar range and distance. An ECS was fitted, but was only monitored occasionally.

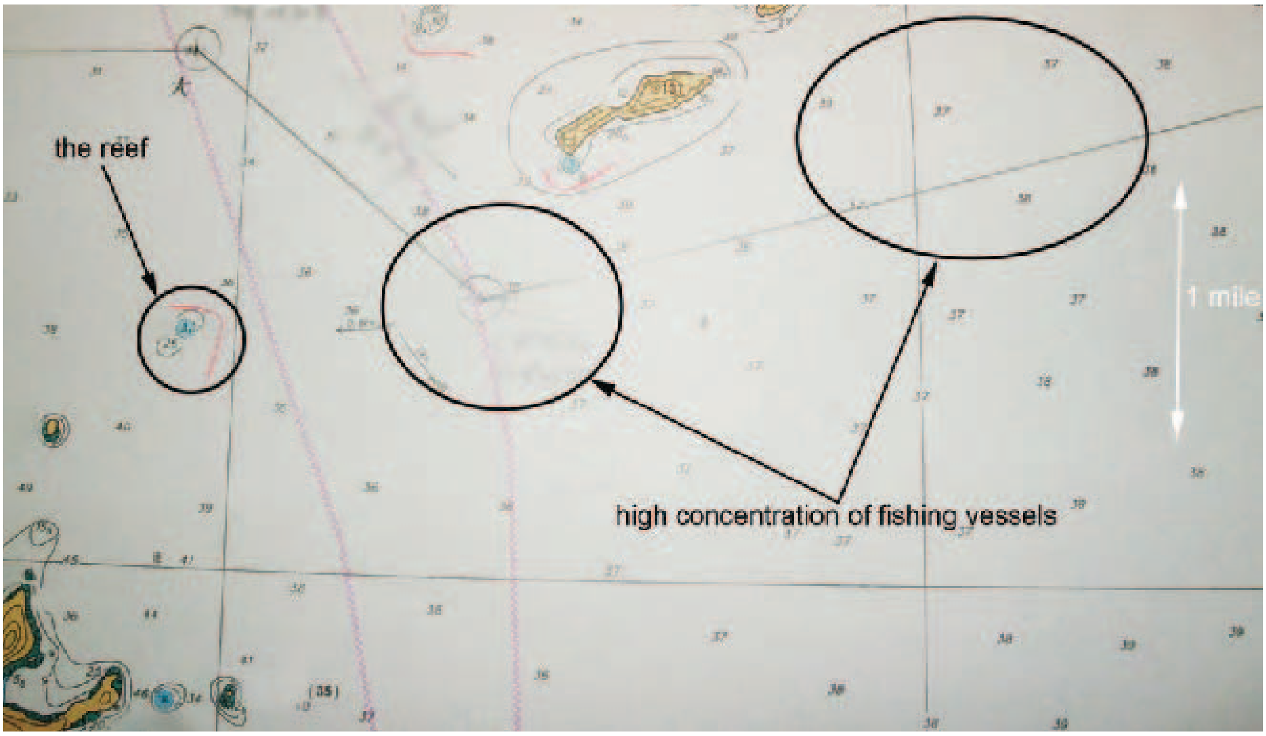
Just when the chief officer thought that he had negotiated most of the traffic in the immediate vicinity, a very small fishing vessel accelerated towards the container ship's starboard bow. Constrained by other vessels on the starboard side, the chief officer altered course to port towards a charted reef, which had been highlighted as a danger on the paper chart in use, but which the chief officer had forgotten about.

About a minute later, at 0708, the container ship passed over the reef. This resulted in the breaching of five of her ballast tanks.

Figure 1: Damage sustained to the hull of the vessel

Figure 2: The extent of the hull penetration

Figure 3: Hull penetration



The paper chart used to plot the vessel's intended course around the reef

The Lessons

1. There are occasions when traffic is so dense that an OOW has very little time to do anything but concentrate on collision avoidance. In such situations, asking the master for help, or reducing speed, can usually make things more manageable. Such actions are not a sign of weakness or incompetence, but are sensible precautions which help to keep vessels safe - and need to be encouraged.

2. When constantly altering course to avoid other vessels in restricted waters, things can happen quickly, and it can be very difficult to accurately monitor a vessel's position unless radar parallel indexing and/or ECS/ECDIS are fully utilised. The occasional fix - with limited reliability - is far from sufficient.

3. A basic ingredient of a safe passage is a plan which takes into account points on the route which might merit enhancements to the bridge organisation. It should also include other precautions such as a reduction in speed - due to factors such as the proximity of dangers, the likelihood of dense traffic or poor visibility. Passage planning requires thought, and involves far more than putting lines on charts.

4. Using up time in open water at the start of a passage tends to reduce flexibility later. Time in hand is a good thing to have when busy waters with hidden dangers lie ahead.

CASE 13

Stand Clear Below

Narrative

A recently overhauled 280 kg turbocharger was secured on a pallet by two plastic bands which had been used during road transportation of the unit.

It was planned to move the turbocharger from its engine room stowage, through the engine room stores access hatch, and onto the vehicle deck above using a chain block attached to the deckhead of the vehicle deck. Before the work started, the supervisor carried out a "toolbox talk" for those involved. The individual jobs were allocated and the equipment to be used identified. However, a risk assessment was not carried out as required by the company's Safe System of Work instructions.

All the equipment to be used was checked to make sure it was in good condition, was adequate for the task, and to ensure that the test dates were valid. Two webbing strops were then passed through the pallet and attached to the chain block.

Two of the engine room staff remained in the engine room and two went to the vehicle deck. The lift was going well, and as the turbocharger neared the hatch one of the staff on the vehicle deck pushed against it to make sure it cleared the access hatch surround. This caused the load to become unstable and the two plastic bands to snap. The load then fell 3 metres onto the engine room floor plates, narrowly missing the two engine room personnel who were watching the lift from below.

The Lessons

Those involved did not appreciate that pushing the turbocharger made the load unstable because of the way it had been arranged. While the light plastic bands were adequate to secure the turbocharger when it was being transported by road and moved by forklift truck, they were inadequate when the load was being moved within the ship.

Fortunately, the two engine room staff who were under the hatch escaped injury. Nevertheless, there was significant cost in further overhauling the turbocharger because of the damage it sustained as it hit the engine room floor plates.

The following lessons can be drawn from this accident:

1. Carry out a risk assessment before the start of dangerous jobs so that identified control measures can be put in place. In this case a risk assessment might well have identified that the plastic bands were inadequate for the task of securing the turbocharger during slinging operations.

2. Do not rely on transportation banding or packaging to secure heavy items on a pallet during slinging operations.

3. Slinging heavy loads can be very dangerous – wear the appropriate personal protection equipment and always stand well clear. And of utmost importance *do not stand directly under suspended loads*.

4. If equipment is fitted with lifting eye bolts, use them. But make sure they have collars and are fully screwed home.

5. Chapter 21 of the MCA's publication – Code of Safe Working Practices for Merchant Seamen, which is available on the MCA's website, provides detailed guidance on lifting operations.

Watch Out

Narrative

A general cargo ship was on loaded passage in coastal waters, steering a course of 184°(T) and making a speed of about 11.4 knots. The bridge watch consisted of the lookout and the chief officer, who was sitting on the starboard chair in front of a radar which had ARPA and guard zone facilities. The visibility was good, the wind was force 4 from the south-west and the sea state was slight. There was a tidal stream of 0.1 knot setting to the south-west.

The lookout reported the lights of a vessel ahead to the chief officer, who interpreted them to be of a power-driven vessel heading in a north-westerly direction. Shortly afterwards the lookout went below, leaving the chief officer alone on the bridge.

The lights were those of a fishing vessel, which was trawling in a northerly direction. The skipper had seen the lights of a ship ahead and was concentrating on maintaining a steady speed of 2.6 knots to optimise the spread of the net. When the ship's echo appeared on his radar at 3 miles, he interpreted it to be an end-on situation and expected her to keep out of the way. However, as it became apparent that the ship was not taking avoiding action, he altered course to starboard to show her his port sidelight. Shortly afterwards, he turned on the deck lights and shone a large bright torch at the ship. Finally, he put the helm hard to starboard. But this was too late to prevent a collision.

The fishing vessel heeled over considerably, throwing one of the crew out of his bunk. The vessel was not taking water, there was minor damage to the gallows and there were no injuries. This was reported to the coastguard, who decided to launch two lifeboats to escort the vessel back to port. The conversation was overheard by the cargo vessel's chief officer and master, who had been called to the bridge. The cargo vessel, meanwhile, had been proceeding on passage. The chief officer went forward to determine what damage had been incurred, and when he arrived back on the bridge made a report to the coastguard.

As the cargo vessel was deemed surplus to the search and rescue requirements, the coastguard gave permission for her to continue on passage.

Figure 1: Damage sustained to port bow bulwark on cargo vessel

Figure 2: Damage sustained to gallows and trawl block of fishing vessel

The Lessons

1. The chief officer made an erroneous assumption that the vessel ahead was on a north-westerly heading and would pass clear. After his initial observation, he was complacent in that he did not monitor her movement by visual or radar bearings, and made no use of the available ARPA or radar guard zone facilities. Therefore, he did not appreciate that there was a risk of collision.

2. It is likely that the chief officer's apparent lethargic approach to collision avoidance was due to a lack of stimuli: he was seated; the lookout was absent from the bridge; the watch alarm was not operational; the radar guard zone was not set, and an onboard practice of infrequent and rudimentary position monitoring was permitted. MGN 315(M) provides guidance on keeping a safe navigational watch.

3. It is possible that the chief officer was fatigued. However, this could not be determined from an assessment of the hours of rest records or the deck logbook as both were inaccurate and/or lacked sufficient detail. Management of fatigue relies not only on assessing the total daily/weekly number of hours of rest attained, but also on other factors such as the quantity and quality of sleep, the nature of work, interrupted and irregular working patterns and the working environment.

4. Following the collision, neither the chief officer nor the master made any attempt to contact or assist the fishing vessel. This showed a lack of precautionary thought and contravened Article 98 of the United Nations Convention on the Law of the Sea, which requires the master to render assistance and, when possible, to inform the other vessel of the name of the ship, port of registry and the next port of call.

5. Although the fishing vessel was a stand on vessel, the skipper could have taken earlier avoiding action as permitted by Rule 17(a)(ii) of the COLREGs. In this case, delay was influenced by his experience of ships normally altering course at the last minute and passing at a close distance.

It Pays to Follow Procedures

Narrative

While a vessel was alongside, a shore contractor started work on the clutch unit of a bulk cement compressor that was driven from the port main engine shaft via a gearbox and clutch assembly. Shortly after the work had commenced, the master called the chief engineer in the engine control room and asked for the engines to be made ready because the vessel was required to shift berth. The chief engineer mentioned to the contractor that the vessel would be shifting, but did not inform him that the port engine would be required. Engines were made ready, and after about 30 minutes the chief engineer called the master and told him he could transfer control of the engines to the bridge.

As the vessel departed the berth, the chief engineer heard a noise emitting from the clutch unit that the shore contractor had worked on. The chief engineer went to investigate the clutch unit, and it shattered. He was struck on his right temple by a metal shard. By the time he managed to return to the engine control room, the area of impact had started to swell extensively. Fortunately, the chief engineer sustained only a minor injury and was released from hospital that day.

A chain block (see figure) and sling that the contractor was using were found to have wrapped themselves around the shaft as the port engine started. This in turn stopped the shaft while the clutch and gear box were still running, and caused damage to the clutch, gearbox, shaft guard and associated wiring and piping in the immediate vicinity.

Chain block

The Lessons

1. The chief engineer was not specific in his communications with the shore contractor to suspend work. This was contrary to the requirements of the permit to work (PTW) which required the authorising officer to sign a certificate of closure. The contractor was not aware that the port engine was going to be used for shifting berth, and consequently left the site in an unsafe condition.

2. Inspection of the site after the accident revealed that no warning signs were posted, and the site was not secured and not cordoned off in accordance with the requirements of the PTW.

3. Although a toolbox talk and risk identification card had been completed, no mention was made of the lifting gear (chain block and sling) that was going to be used. Such knowledge should have prompted a more detailed review of the risks involved.

4. The port engine had been started without the site being properly checked. A detailed inspection, especially where work had been stopped before completion, would have identified the chain block still in position.

5. A PTW system provides an effective control measure for particular operations. However, it relies on certain principles being adhered to. These include:

   - Making a permit as relevant and accurate as possible.
   - Ensuring the measures specified as necessary have in fact been taken.
   - Taking responsibility for the work as an authorising officer.
   - Ensuring procedures for initiating, monitoring and completing the PTW are strictly adhered to.

Squally Weather Eases Tension

Narrative

In two separate incidents, large vessels were blown off their berths when subjected to sudden, unexpected squalls. Both incidents to some extent involved the use of self-tensioning winches. A contributory factor was a lack of appreciation of how mooring winches, lines and brakes should be considered as an integrated mooring system[1].

The first incident involved a large container vessel, the other a large passenger vessel. Both vessels were securely moored alongside using self-tensioning winches. When the squalls struck, some lines rendered; others parted. The container vessel made contact with a shore container gantry crane (Figures 1 and 2) and the cruise vessel lost two passenger gangways into the dock. Fortunately, no one was injured in either case.

A mooring system should always be adjusted so that the winch or brake will render before the line parts. However, on board one of the vessels, some of the mooring lines were in poor condition (Figure 3) and failed before the brakes rendered. On the other vessel, lines were on drums on common shafts, and the self-tensioning system was unable to clutch in and out fast enough to render all the lines before they parted. Although most winch manufacturers recommend that auto-tension is used only on breast lines, on one of the vessels all the lines were operated in auto-tension mode.

When the components of the mooring systems were evaluated, one vessel was found to have mooring lines with a Minimum Breaking Load (MBL) of 104 mt when new. However, the self-tensioning mode selected would render at only 24 mt and the brake was set to 83.2 mt. This meant that lines in auto-tension slackened well before those secured on the brake, which quickly added to the load on lines that held.

Neither vessel had comprehensive records covering the mooring equipment, and routine brake tests or adjustments had not been made. OCIMF guidelines recommend brakes are set to 60% MBL, so for a rope of 104 mt the brake should have been set to render at a load of 62.4 mt.

[1] MGN 308 (M+F) refers.

Figure 1: The container vessel made contact with the shore container gantry crane

Figure 2: Damage to the container gantry jib

Figure 3: The mooring lines were in poor condition

Figure 4: Damage to the bridge of the container vessel

The Lessons

1. The winches were not being used according to the operating instructions, and the relationship between brake settings and the mooring line MBL was not fully understood.

2. Self-tension winches are not recommended for use on head or spring lines.

3. Some ropes were heavily worn and would not have had their original strength, and there was no formal procedure for monitoring the condition of ropes in use. Furthermore, ship's staff did not consider the ropes were in need of renewal.

4. There was no procedure in place to regularly test the brake holding and rendering loads; crew were unaware if equipment was on board for this task.

The following points are reminders for companies' and ships' officers:

- The mooring outfit on any vessel should be considered as an integrated system; the winch will be supplied during the new building based on the vessel's equipment number (EN) or Classification Society rules. The brake rendering setting should then be verified during commissioning based on the MBL of the rope to be fitted, and these settings should be checked regularly thereafter (OCIMF suggests annually).

- Ropes should be inspected regularly and end for ended, or renewed, when showing signs of wear. Companies should implement procedures in their SMS to guide ships' officers on how and when to conduct these inspections. Guidance should also be given on when a rope should be replaced.

- Detailed records of testing, maintenance and adjustment – including dates when ropes or brake linings are replaced – should be kept. All ropes or wires supplied to the vessel should be accompanied by an individual certificate stating the breaking load (MBL), and after fitting a new rope the winch brake should be checked to ensure that it will render at 60% MBL.

- Although the OCIMF publication "Mooring Equipment Guidelines, Third Edition" has been produced mainly as a guide to owners of large oil tankers, it is a valuable work of reference and most of its content is equally applicable to the maintenance of the mooring equipment on any large vessel. The Nautical Institute has also recently produced a two volume guide to moorings.

Part 2 - Fishing Vessels

Many industries seek to achieve a zero level of accidents or incidents. Is this a real goal or are they just words? The fishing industry is quite unique but we aren't special. We must not use the dangers attached to our job as being an excuse to accept that accidents happen. The MAIB in their new safety digest highlight to our industry that we need to work harder to make our jobs and vessels safer. As a Federation we continue to see vessels with poor risk assessment folders and bad working practices. So how do we achieve a safer industry? Well, there is no magic wand but as an organisation we believe there are things we can do.

We firmly believe that the skills gained through the education and training of fishermen can give them the tools to be better equipped to safely maintain their fishing vessels and to set up safe working practices. However, training will still leave us with a piece of the jigsaw missing.

There is a theory which is becoming more accepted in many industries called Behaviour Based Safety (BBS). BBS has a few major parts to it but there is one area that we can all change without listening to fancy seminars or reading hundreds of books - our attitude. Health and safety studies from around the world have shown that the biggest factor in safety is our attitude. What and how we choose to be will always determine the outcome.

Often in accidents there will be a catalogue of errors that lead to the incident but if our attitude is correct we can break the chain that will or could lead to an accident. Management are often told they should "lead by example" but when it comes to safety it is all of our responsibility.

Winter is coming upon us very quickly and with that comes extreme weather and difficult conditions. This makes our job even more dangerous and as fishermen we are being pushed harder and harder by the restrictions on quotas and days. Let us continue to keep the attitude that preserving life at sea is still the most important thing. If we see a shackle, a wire, a pipe or a working practice that will cause harm let us remember that prevention is better than reacting to incidents after they occur.

Derek Cardno

Derek has worked as a fisherman since 1987 and is currently a mate on the pelagic fishing vessel, *Forever Grateful FR 249*. From 2005 until the present day, he has been a part-time lecturer in Nautical Science, primarily teaching fishermen. Since 2009, Derek has been the Marine Safety Officer for the Scottish Fishermen's Federation, responsible for safety and training, working as part of the team that represents the largest percentage of fishermen in Scotland. He attends the Fishing Industry Safety Group (FISG) and the Fishing Industry Training Advisory group (FTAG) on behalf of the Federation.

CASE 17

Drum Roll – But No Fanfare

Narrative

A skipper was on deck tidying and stowing the nets after a day's trawling. As he walked past the winch his oilskin coat became caught in the warping drum of the trawl winch, which had been left running once the gear had been brought inboard. Unfortunately, the stop lever was out of the skipper's reach as he was pulled around the drum end and thrown heavily onto the deck.

Fortunately, there was a crewman on board the vessel that day, which was unusual as the skipper normally worked single handed. The crewman was able to stop the winch before the skipper was taken around the drum again. However, the skipper was already badly injured, having fractured his leg in three places as well as injuring his back and thigh.

The crewman summoned help via his mobile telephone, which led to the coastguard co-ordinating the skipper's medical evacuation to hospital by a rescue helicopter.

Figure 1: View of the working deck where the accident occurred * Photograph courtesy of MCA

Figure 2: The skipper's injured leg

* Photograph courtesy of MCA

The Lessons

1. Although the skipper - a very experienced fisherman - was badly injured, the outcome could have been far worse. He normally worked single handed, and it is possible that had he been alone on the day of the accident he would not have survived. This accident demonstrates the potential dangers of single handed operation.

2. The nets had been recovered before the accident, but the winch had not been stopped before the skipper began to tidy up the deck. Do not leave a winch turning unnecessarily.

3. The skipper was wearing a full length oilskin, the back of which caught in the drum end. To avoid entrapment accidents, ensure the clothing you wear is not unnecessarily loose.

CASE 18

Where Is That Water Coming From?

Narrative

A 22m wooden twin rig trawler was shooting her gear when the skipper returned to the wheelhouse to find the engine room bilge alarm sounding. He shouted down to the engineer, who was already en route to the engine room for a routine check, to go and investigate. Although the engineer discovered water already above the gearbox, he was not too concerned initially: the pumps had previously coped with similar flooding, and they had only just bought a new submersible portable pump. He started the auxiliary generator bilge pump and informed the skipper, who decided to continue shooting while they waited to see if the situation improved. Fifteen minutes later it had not. The skipper therefore decided to haul and get the portable and main engine bilge pumps running. He had also been in contact with a nearby fishing vessel and they had agreed to bring their portable pump.

Despite all three of the vessel's own pumps running, the situation continued to deteriorate, and the skipper issued a "Mayday" on Channel 16 about an hour after the flooding was discovered. He also decided to evacuate the three deckhands due to concerns over their wellbeing if the situation suddenly deteriorated. The three donned their survival suits and got into a liferaft, then onto a daughter craft from an emergency response and rescue vessel (ERRV) that was now on scene. The other fishing vessel's portable pump arrived not long afterwards, but the skipper and engineer were not able to start it owing to problems with its spark plug cable.

The flooding continued to increase, spreading to the cabin, and when the lub oil low pressure alarm sounded they decided to stop the engine, still hopeful that the vessel might be saved once salvage pumps arrived in a coastguard helicopter. With water up to the engine top, the skipper and engineer noticed an apparent ingress through hull planking in way of the starboard fuel tanks. Generator power was lost not long afterwards, and with only their portable pump running, they abandoned, about 3 hours after discovering the flooding. All five crew were later safely airlifted ashore. Around 10 minutes after abandoning the vessel, she capsized to starboard and then sank by her stern.

Figure 1: Vessel sinking by the stern

The Lessons

1. Unfortunately this is an all too familiar story for the MAIB; the good news is that all the crew got off safely. Furthermore, there is much to commend about the well ordered evacuation and the crew's valiant efforts to save the vessel. The bad news is that this is another loss to add to the statistics and, more frustratingly, the cause can not be determined with any certainty.

2. Most of the lessons from this case are already covered in *MGN 165 (F) Fishing Vessels: The Risk of Flooding*, which is available on the MCA's website at www.mcga.gov.uk.

These include:

- Immediately try to find the cause of the flooding. Always try to identify the flooding source as early as possible; this might allow the ingress to be stopped, rather than just throwing more and more pumps at the problem.

- Position sea valves where they can be easily and quickly closed, with extended spindles if necessary to allow remote operation. If it had been possible to remotely close the sea valves from above the level of the flood, the source of ingress might have been isolated and the vessel saved.

- Do not concentrate on other matters, such as recovering the fishing gear: deal with the flooding first. During the early stages, time and manpower were devoted to shooting and then hauling, rather than more pressing matters. Is hauling really the best option? The lower freeboard when the gear is back on board could worsen the flooding.

- Fit a secondary high level bilge alarm to reinforce the main alarm which, when alarming, are both visible from outside the vessel. This vessel's two engine room bilge alarms were not audible or visible outside on deck. Given the level of water first discovered, it seems that the alarm must have been sounding for some time. Bilge alarms are best when they alarm throughout a vessel; wheelhouses are best when they are manned!

- Carry a portable salvage pump. Although the vessel did carry one, it was not able to help deal with what was obviously a significant rate of water ingress. The crew were, however, very impressed with its performance; under different circumstances these powerful pumps can save the day.

3. Seafish has recently introduced free damage control workshops, during which attendees receive a free box of potentially useful damage control equipment. This includes a sheet for fothering, the age-old practice of keel hauling a piece of material, which gets forced into an opening under water pressure to help stem any ingress. Even in the high tech 21st Century, simple techniques such as this can still save a vessel.

4. Before the start of her voyage, another vessel reportedly hit the fishing vessel while she was alongside; it is possible that the contact might have dislodged caulking or caused a plank to spring, even a couple of days later. Although the skipper was not able to find any damage before they left, it always pays to have any potential damage on wooden hulls thoroughly checked out.

Don't Stop Trying

Narrative

An owner had put a great deal of thought into the layout of his new vivier crabber. It had a good arrangement for when the crew emptied the creels and processed the crabs, and a large hopper was set into the deck beneath the line hauler. This stored the backrope away from the working area, and a safety barrier separated the crew from the backrope as it was shot away. Legs from the backrope led out from the hopper and were stored on poles next to the shooting table ready for the creels to be toggled on. The system worked well. The owner had also produced a safety folder with the help of one of his skippers and a local advisor. The risk assessments were practical and made sense, and the crew had read them.

In the early hours of the morning, the crew recovered part of a broken string of creels. It was hauled up and the backrope stored in the hopper. The other part of the backrope was already on board, and one of the deck crew spliced the ends together. He was worried that the splice might become entangled in the rest of the backrope as it payed out, so he hung the bight over the safety barrier to keep it out of the way.

The skipper gave the signal, and another crewman shot away the marker buoys and end weight. The crewman got the first three creels toggled on and shot without realising his foot was in the recently spliced bight of rope hanging over the safety barrier. The rope tightened around his leg and started to drag him towards the shooting hatch. Other crew held onto him and attempted to cut the backrope using a knife. However, they could not prevent him from being dragged across the shooting table and out of the hatch into the water.

The skipper heard the shouts over the intercom and looked away from plotting the position of the string in time to watch the accident on CCTV. He stopped the boat and threw a life ring with a light and smoke marker overboard. The deck crew gave more slack in the backrope to allow the boat to manoeuvre and get the backrope into the hauler. Everyone looked out over the side, but all that could be seen was a single wellington boot floating nearby. The crew hauled in the backrope, hoping that their colleague was still entangled. But he was gone.

There was an extensive search, but the crewman could not be found.

Demonstration of where crewman was standing immediately before the incident

The Lessons

1. Never stop trying to make fishing safer. A recent MAIB study into fishing vessel safety showed that 1 out of every 3 fatalities from fishermen going overboard, occurs on potters. Even if you consider you shoot pots in a safe manner, check carefully to ensure that one simple mistake does not lead to a tragedy.

2. Wear an inflatable lifejacket. The working deck on this boat was fully enclosed by a shelter, so there was no obvious risk of falling overboard. However, the water was deep enough that the end weight would still have been sinking to the bottom when the crewman was snagged. He was dragged through the hatch and below the surface. Had he been wearing a lifejacket, he would have had a better chance of getting back to the surface once clear of the backrope.

3. Doing a risk assessment can help a lot, but it needs to include all the operational 'what ifs?' eg:

    - What do you do if the backrope needs repairing?
    - Where is the best place to stow the repaired part of the rope?
    - How do you release a creel or a leg that has become snagged while shooting?
    - What actions do the crew take if the backrope tangles and a great bundle goes over the side?

4. Fatigue is a killer. Fishing is hard work, and crew need to keep their wits about them when working with gear; that means ensuring that everyone gets enough rest.

5. On this boat, the skipper had excellent CCTV and a two way intercom to the working deck. Unfortunately, he was plotting the position of the marker buoys and saw what was happening only after hearing the shouts. There is no need to plot a GPS position to 3 decimal places; a better habit would be to plot the position, and then shoot the gear so that the skipper can watch for problems and take immediate action if he sees something wrong.

CASE 20

Steering Into Trouble

Narrative

A 40 year old, 14m stern trawler was fitted with an early version of a propeller directional nozzle. The nozzle steered the vessel and was controlled by a twin ram hydraulic system. Rotation of the steering wheel operated a small hydraulic pump fitted in the wheelhouse steering console hydraulic oil reservoir, which pressurised the steering rams.

The auto-steering arrangement comprised a hydraulic oil header tank located in the engine room. The dedicated auto-steering hydraulic pump was driven from the main engine, and directional flow to the appropriate steering gear ram was controlled by solenoid valves also located in the engine room.

Over the years, the steering rams had suffered from hydraulic oil leakage, and the hydraulic oil reservoir and header tank had been regularly topped to cope with the loss of oil. However, the leaks worsened, so the owner arranged for the rams to be removed and refurbished. On completion of the work the rams were replaced, the oil reservoir and header tank were replenished, air was bled from the hydraulic system and the steering arrangements were proven. The contractor then strongly advised the skipper - who had recently joined the vessel, but was unaware of the high leakage rate - to check the steering functionality before sailing because the vessel was to be immediately laid up for 4-5 weeks over the Christmas period.

After the break the skipper and his four crew prepared the vessel for sailing. Crucially, neither the steering system hydraulic oil levels nor its correct operation was checked.

The vessel slipped from her berth on the ebb tide and made her way along the short, straight, narrow channel to open water. There was little need to use the helm, so the skipper did not identify any steering problems. As the vessel left the channel the skipper selected auto-steering while the crew prepared the trawl gear for what should have been a good day's fishing.

This expectation was short lived! Soon afterwards, steering control was lost and the vessel veered off course to starboard and headed towards a cluster of rocks. The skipper, believing there was a problem with the auto-steering control, selected manual steering and put the wheel hard over to port, but there was still no response. The skipper then tried to take "way" off by going astern, but he was too late and the vessel's momentum caused her to ground on the rocks.

Checks were carried out, and these confirmed that the hull had not been breached. A short time later the local all weather lifeboat managed to pull the vessel off the rocks and tow her back alongside, where she was taken out of the water. Although the sonar housing was damaged, luckily the hull remained intact, although it had been dented.

Investigation of the steering problems found that both the wheelhouse oil reservoir and engine room hydraulic header tank levels had dropped significantly, and the "spongy" feel to the wheel confirmed that air had entered the system, causing the poor response. A hydraulic pipe bulkhead gland was found to be leaking, which had allowed the hydraulic oil to drain away and air to enter the system during the lay up period.

The Lessons

This accident occurred because not enough attention was paid to carrying out checks of the steering system before sailing, despite the skipper having been given advice to do so. The use of the wheel was very limited on leaving the port because the vessel was effectively carried along the channel by the ebb tide, so the problems with the steering did not surface until it was too late.

The following lessons can be drawn from this accident:

1. Attend to leaking systems promptly – they will never be resolved on their own. Leaks from oil and fuel systems are fire hazards which endanger vessels and their crews.

2. Remember that fluid leaking from an enclosed system will be replaced by air. In the case of a hydraulic system, it acts as an accumulator which causes a "spongy" feel to the system and will drastically affect the system's efficiency. In the case of a steering system, this can lead to the vessel grounding, or a collision.

3. Make sure that relieving skippers and crew are aware of the idiosyncrasies of the vessel so that they know what to expect. In this accident, it would have been wise to tell the skipper that the steering gear had suffered from oil leakage, and that the reservoir and header tank had required frequent topping up.

4. It is wise to have a formal pre-sailing checklist to include engine and steering controls. Your risk assessments should identify the need.

5. Guidance on the maintenance of systems and pre-sailing checks can be found in the MCA's publication entitled "Fishermen's Safety Guide". The Guide can be downloaded from the MCA's website at www.mcga.gov.uk and is available by e-mailing fishing@mcga.gov.uk or by telephoning 023 8032 9100.

A Flukey Escape

Narrative

A gill netter was shooting the last of her 10 nets over the stern. It was dark, mid-winter, and a 3m swell was running. A deckhand saw a problem with the net and stepped over the low pound boards into the area containing the rope joining the net to its anchor (figure). He was immediately snagged by the rope and pinned against the port side safety rail and gunwale by the net's anchor as it ran out.

On hearing a shout from the deckhand, the skipper immediately throttled back the engine. The crewman and net anchor were then catapulted overboard. He was dragged underwater and, although injured and not wearing a lifejacket, he managed to free himself from the anchor and rope and surfaced close to the vessel. The deckhand was already exhausted and close to giving up.

The skipper saw the deckhand surface about 4m from the vessel's port side and, having already put the engine astern, he manoeuvred his vessel towards the casualty. Assisted by a second deckhand and the rolling of the vessel, the skipper pulled him back on board, albeit with some difficulty. The casualty was cold and physically exhausted.

The vessel immediately headed for port and the skipper arranged for an ambulance to meet her on arrival. The ambulance controller made the coastguard aware of the accident. A lifeboat was launched and escorted the gill netter into port where the injured deckhand was transferred to an ambulance and taken to hospital. He suffered a fractured rib and soft tissue damage.

The position of the fisherman immediately before the incident

The Lessons

1. Working decks are often cramped, and are potentially dangerous areas, particularly when shooting and hauling. To reduce the risk of entanglement, many vessels try to keep crew away from moving gear by fitting physical barriers such as pound boards. However, these are only effective if they are kept in place and not ignored. Crew must be made aware of the dangers of working on deck, and appropriate practices must be adopted and enforced. Lost or damaged gear can be replaced; a life cannot.

2. It is highly likely that the deckhand would have lost consciousness and drowned had he not been recovered so quickly. Accidentally falling, or being pulled into the sea frequently results in cold water shock, which can cause even the fittest of people and the strongest of swimmers to quickly lose consciousness or the will to continue. When this occurs, lifejackets not only keep a person afloat, they also ensure that a person's head is kept clear of the water. This allows them to breathe, and therefore substantially increases their chances of survival.

3. It was the skipper's quick thinking that kept this boat close to the casualty. And this enabled him to be seen quickly. Many other fishermen who have fallen overboard have been less fortunate. To avoid delays in finding a person who has fallen overboard, not only must a boat be properly equipped with aids - such as man overboard markers - to help locate them in the water, but also crew must be aware and practised in the actions to be taken.

4. The methods adopted for recovering a person from the water vary from vessel to vessel, and depend on the equipment available and a vessel's freeboard. Whatever method is intended to be used, the possibility of a casualty being unconscious or unable to help himself must be taken into account.

5. When you have an emergency on board, it is sensible to let the coastguard know, even if you do not require assistance. Situations can change rapidly, and the coastguard will be much better placed to respond if it has been forewarned.

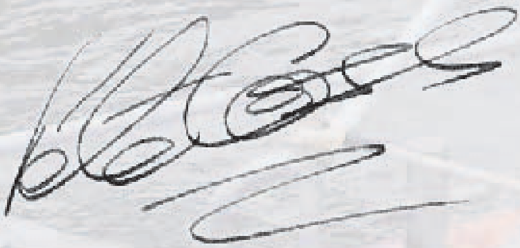
Part 3 - Small Craft

Safety at sea is a state of mind that should be ticking away on land as much as it should be at sea. One of my favourite sayings is that knowledge dispels fear and of course fear and bad preparation work hand in hand to promote panic and irrational action. A loss of control will never promote a happy outcome unless the hand of luck prevails. Don't ever leave safety to chance; put it at the top of your list.

Reading Safety Digest is a great catalyst for sitting down and thinking about what one might do in any given situation that you can come up with, no matter how outlandish it might be. I always believe that 70% of a project's outcome is in the planning, preparation and training; live every possible outcome through visualization and you will know what equipment should be on the boat, where it should be and ensure that the crew are trained to the point where action is instinctive no matter what the conditions. Indeed, you might end up developing your own equipment as we have done in the past.

Try it, take an old life raft and play around with it in the surf for it is a very sobering experience. Have a safety boat on standby and actually do a full man overboard routine at sea. It's fun; pulls the crew together and may well save a life one day, for the best equipment is useless without a strong well trained crew. Talk about safety; it is a subject that should keep coming up.

Never be lulled into a false sense of security; the sea is a lovely vibrant environment but it is also a cold and dispassionate creature with no respect for human life. It can bite at any time, and as Skipper you have to keep your eye on safety – just reading this edition's accident reports underlines how easy it is for things to wrong, and at the same time how easy it would have been to avoid them. Those basic disciplines of seamanship that have been handed down over the years are as relevant in today's high tech world as they were for Nelson.



Pete Goss

I left school at sixteen and served on a salvage tug which, amongst other things, saw my involvement in the 79 Fastnet disaster and sorting out a burning Gas tanker. I have sailed many thousands of miles in all types of craft and conditions, indeed I have rescued and been rescued, but the most sobering experience I have been involved in was when I was knocked down in one of the British Steel Challenge yachts a mile off Plymouth. No one was hurt but it pulled me up short and I have never allowed myself to be lulled as I was that day as I bumbled along on a simple delivery to my home port.

CASE 22

Time and Tide Wait For No Man

Narrative

A keen yachtsman had recently taken delivery of a new boat – bigger and better than his last – and he and a couple of friends were sailing it round the east coast to his mooring. The weather was poor, the voyage took longer than expected, and they had to put into port to land one of the friends who had to leave the boat to return to work. The owner and the remaining friend carried on, struggling through head seas until they were able to seek some shelter by using an inshore route up an estuary.

The area was well known for shifting sands, but the inshore route was commonly used by yachts and the owner had used it before with his old boat. By this time it was dark, and the tide was nearing the end of the ebb. The owner was steering for the buoys marking the channel between two large sandbanks. The yacht cleared the buoys, but was then set further to the south than expected and went aground.

Wind and swell pushed the yacht further onto the sandbank and the boat began to heel. The owner broadcast a “Mayday” call and a lifeboat was launched to respond. On arrival on scene, the lifeboat offered a tow and the owner rigged a bridle to secure the tow line. Unfortunately, as the lifeboat pulled, the tow parted where it joined the bridle. The owner re-attached it using bowlines and the lifeboat attempted to pull again, but by then the yacht was hard aground.

The owner and crew were considering what to do next, when the keel detached and the boat capsized suddenly. Fortunately, it remained afloat with the mast and rigging in the water, and both crew were able to climb up the deck and hold onto the guardrails. A rescue helicopter had been standing by, and it recovered both the owner and his crew.

The yacht involved in the incident

* Photograph courtesy of Dick Holness - East Coast Pilot

The Lessons

1. The new yacht had a deeper draught than the old one. Different boats need different safety margins, whether it is draught or sail area in a storm, and plans must be adapted to suit.

2. Progress had been slow due to the weather. As a result, the yacht reached the shallowest part of the passage close to low water. With the charted depth the same as the boat's draught, and very little height of tide, there was too little clearance under the keel, particularly in the heavy swell. Plan your passage carefully, paying attention to minimum depths, and make additional allowances when there is a heavy swell.

3. The owner was navigating by eye, and did not realise that the yacht was being swept into a dangerous position until it was too late. In fact, the new boat had a good outfit of equipment, but the chart plotter was down below and neither of the crew was monitoring it. Expensive navigation equipment is no use if you do not use it.

4. Although the boat had a liferaft, it was stowed in a locker and was awkward to reach. Once the boat capsized, there was no way of getting the liferaft out, and without the quick response from the rescue helicopter the outcome could have been very different. If you get into difficulty, get rescue equipment out early – you never know how quickly the situation could deteriorate.

Don't Drink and Drive

Narrative

Four friends were using a 6.3m RIB during a diving holiday. The RIB was owned by two of the group, who were experienced RIB coxswains and were RYA powerboat level 2 qualified.

Following the last of three dives on the final day of the holiday, the party decided to divert into a small harbour for drinks and an evening meal. After spending approximately 5 hours ashore, the four men returned to the RIB in order to drive the remaining 20 miles to their accommodation. Once in the boat, the coxswain switched on all of the electrical equipment including a GPS mapper unit.

Shortly after slipping, the craft cleared the confines of the harbour and the coxswain increased the RIB's speed to about 20 knots to get it 'onto the plane'. Between 1 and 2 minutes later, there was a loud bang and the RIB grounded on a rocky outcrop (figure). On impact, the passenger standing behind the coxswain was ejected from the RIB and hit his head on the rocks.

The coxswain was unable to call the coastguard by VHF because electrical power had been lost, but he was able to raise the alarm using his mobile telephone. Although the local lifeboat arrived within minutes, and transferred the injured passenger ashore, he was declared dead shortly afterwards. Subsequent tests indicated that both the coxswain and the deceased were more than three times over the road drink-drive limit.

The Lesson

Alcohol impairs performance and, more often than not results in a greater willingness to take risks, regardless of how experienced, qualified or skilled a boat driver may be. In this case, its consumption led to the RIB being navigated into the darkness at speed, without a passage plan, the use of the GPS mapper or a proper lookout. Ultimately, this cost one of the boat's occupants his life. The principle of a designated driver limiting his or her alcohol consumption is a sensible precaution, which is as relevant to water craft as it is to road vehicles.

The RIB aground on the rocks

Look Out!

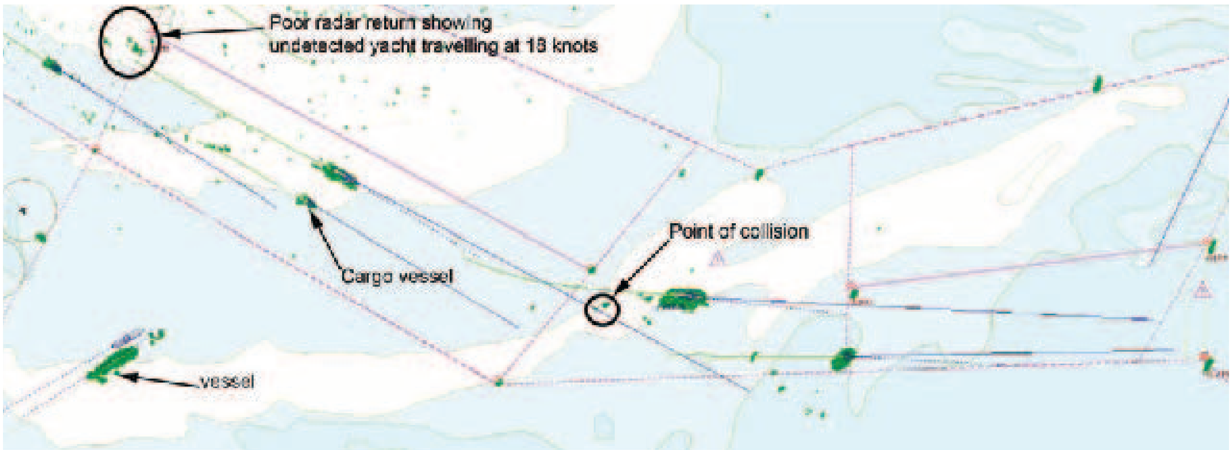
Narrative

A general cargo vessel and a privately owned motor yacht collided at night, in clear visibility while outward-bound transiting a Traffic Separation Scheme (TSS) within a port Vessel Traffic Service (VTS) area. The cargo vessel was travelling at about 11 knots and the motor yacht at almost 18 knots when the collision occurred. Fortunately, there were no injuries and only minor damage to each vessel.

The cargo vessel was following the TSS under pilotage and in contact with the VTS. The yacht did not need to have a pilot on board, however the skipper had decided to follow the traffic scheme, but had not reported his intentions to the VTS operator.

The yacht was not fitted with AIS and only presented an intermittent radar target, so neither the VTS operator nor the bridge team on the cargo vessel noticed its presence. As no traffic was expected in that position, the yacht's approach remained undetected. On board the yacht, the skipper was using his radar for navigation, but was not plotting tracks of other vessels in the area.

The vessels were very close as they entered a precautionary area where the cargo vessel made a planned alteration to port to head towards the next traffic lane. Shortly after this, the yacht skipper was shocked to suddenly see the side of the cargo vessel appear fine on his starboard bow. There was only just time for him to start taking avoiding action before striking the cargo vessel a glancing blow.



VTS shot showing the poor radar return of the yacht involved in the collision

The Lessons

1. The skipper of the yacht had made a passage plan, but this was limited to courses to follow. There was no guidance on how, or if, the VTS should be used, and no consideration given to the reporting procedures. A good passage plan should include these details. As a minimum, a vessel navigating within a VTS area should contact the operator, alerting them of their presence. Depending on local bylaws, instructions to keep clear of the area, or formal reporting procedures to adopt, may be given.

2. Although the yacht was travelling at almost 18 knots, there was no proper radar or visual lookout, so the cargo vessel was not seen until too late to avoid collision.

3. The cargo vessel's bridge team were unaware that they were being overtaken by the yacht until the moment of impact. Vessels participating in a VTS are not relieved of the obligation to maintain a lookout. If a dedicated lookout had been kept, including routinely checking astern, the bridge team might have noticed the yacht. The team could then have either delayed the planned course change or contacted the yacht's skipper to clarify his intentions.

She Was Never to be Named

Narrative

When a skipper collected his brand new motor cruiser, he had no idea that less than an hour later he and his crew would be sitting in their liferaft watching his new "pride and joy" burn down to the waterline.

The skipper had just collected the 34ft motor cruiser from the dealer; he and a friend were looking forward to the delivery voyage home. Anticipating the coastal trip, they made sure that they had a full range of safety equipment on board. As they cleared the river they began to open her up, and as they did so they heard an unusual noise coming from one of the engines. The skipper was an experienced man, both with motor yachts and diesel engines in general, so when he heard a change in engine note and saw blue smoke from the exhaust, he knew it was time to slow down and head back in order to get the problem fixed.

The skipper told his friend to turn the boat around while he went below to investigate. Within moments the saloon had filled with acrid black smoke; clearly something very serious had happened, and they were not just broken down: they were on fire.

The fire disabled the VHF radio, and flames were coming out of the locker next to the lazarette. Fortunately, when the skipper had placed his liferaft on board, he had temporarily stowed it on the aft deck. He dragged the raft to the transom gate. By this time the fire was coming out of the engine compartment and was hot enough to melt the crewman's jacket and singe his hair.

The two friends managed to board the liferaft, but their flares, lifejackets and portable VHF were in the saloon, and inaccessible. As the yacht was still close inshore, they were seen by several people ashore, who contacted HM Coastguard. The survivors were soon rescued, but within minutes the yacht was completely consumed by fire.

The motor cruiser on fire after the passengers had been rescued

The Lessons

The outcome could easily have been very different, and this skipper suggested the following lessons:

1. Lifejackets: Useless unless worn!
   A lifejacket will buy you vital time in the water and could save your life, but only if you are wearing it. Get into the habit of wearing a lifejacket at all times when afloat, because it means you'll be familiar with your particular lifejacket and how to operate it in an emergency. It also means that it won't be burnt before you get a chance to use it.

2. Had this yacht been further offshore, there might have been no witnesses to call for help. It is important to ensure access to a secondary means of raising the alarm - ideally a waterproof portable VHF radio should always be close at hand; perhaps clipped to your lifejacket.

3. Could you reach your safety gear if there was a fire down below? This liferaft had not yet been stowed in its permanent location on the flybridge. Had it been, it would not have been reachable – like the flares and lifejackets. Think about what you might do under similar circumstances. Do you have alternative lifesaving equipment that would still be available?

Preliminary examinations started in the period 01/03/10 – 30/09/10

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

Date of Accident	Name of Vessel	Type of Vessel	Flag	Size (gt)	Type of Accident
18/03/2010	*Safmarine Nuba*	Container vessel	UK	25904	Accident to person
23/03/2010	*Stena Pioneer*	Ro-ro vehicle/ passenger ferry	Bermuda	14426	Grounding
07/04/2010	*Windcat 3*	Windfarm support vessel	UK	Not known	Fire
20/04/2010	*Hendrika Jacoba*	Fishing vessel	UK	454	Accident to person (1 fatality)
06/05/2010	*Girl Jane*	Fishing vessel	UK	15.18	Grounding & subsequent flooding
12/05/2010	*SD Dexterous*	Tug	UK	384	Fire
28/05/2010	*St Faith*	Ro-ro vehicle/ passenger ferry	UK	3009	Contact
08/06/2010	*Lord Rank*	Sail Training vessel	UK	Not known	Grounding
19/07/2010	*Henty Supplier*	Dumb barge	Not known	Not known	Pollution
13/08/2010	*Berge Atlantic*	Bulk carrier	Norway	91962	Collision
	Royal Oasis	*Bulk carrier*	*Panama*	*81058*	
29/08/2010	*CFL Patron*	General cargo	Netherlands, Antilles & Aruba	4106	Machinery failure
23/09/2010	*RMS Queen Mary 2*	Cruise ship	UK	148528	Fire

Investigations started in the period 01/03/10 – 30/09/10

Date of Accident	Name of Vessel	Type of Vessel	Flag	Size (gt)	Type of Accident
01/03/2010	*Llanddwyn Island*	Tug	UK	113	Accident to person (1 fatality)
07/03/2010	*Cormorant*	Crane barge	Netherlands	1505	Machinery failure
26/03/2010	*Ben-my-chree*	Ro-ro vehicle/ passenger ferry	Isle of Man	12747	Hazardous incident
31/03/2010	*Norman Arrow*	High speed catamaran	UK	10503	Contact
21/04/2010	*Ever Excel*	Container vessel	UK	76067	Accident to person (1 fatality)
01/05/2010	*Royalist*	Sail training vessel	UK	83.09	Accident to person (1 fatality)
06/05/2010	*Delta RIB*	Small Commercial RIB	UK	Not known	Accident to person
29/05/2010	*Skandia Foula* *OMS Resolution*	Platform support vessel Offshore tug	Norway Panama	3252 1302	Contact
16/06/2010	*Commodore Clipper*	Ro-ro vehicle/passenger ferry	Bahamas	14000	Fire
02/07/2010	*Yeoman Bontrup*	Bulk carrier	Bahamas	55695	Fire
05/08/2010	*Homeland* *Scottish Viking*	Fishing vessel Ro-ro freight/ vehicle ferry	UK Italy	22.59 26500	Collision
28/08/2010	*Norman Arrow*	High speed catamaran	UK	10503	Contact
11/09/2010	*Princes Club ski boat*	Non commercial craft	N/A	Unknown	Accident to person (1 fatality)

Reports issued in 2010

Aquila – capsize of the fishing vessel, with the loss of three lives, Bo Faskadale Reef, Ardnamurchan on 20 July 2009
Published 15 April

Bro Arthur – fatality of a shore worker in No 2 cargo tank on board the oil/chemical tanker at the Cargill Terminal, Hamburg, Germany on 19 February 2010
Published 19 August

Dover powerboats – collision between two offshore circuit racing powerboats - *Sleepwalker* (A2) and *Harwich 2011* (A89) - in Dover Harbour on 8 August 2009, resulting in one fatality
Published 7 July

Etoile des Ondes/Alam Pintar – collision between the fishing vessel *Etoile des Ondes* and the bulk carrier *Alam Pintar*, 15 miles north of the Cherbourg Peninsula on 20 December 2009, resulting in one fatality and the loss of the fishing vessel
Published 16 September

Ever Elite – uncontrolled descent of an accommodation ladder from the container ship in San Francisco Bay on 10 September 2009, resulting in one fatality
Published 14 July

Ijsselstroom – loss of the tug in the port of Peterhead on 14 June 2009
Published 9 April

Kerloch – grounding and subsequent foundering at Crow Rock, off Linney Head, Wales on 20 February 2010
Published 6 October

Korenbloem – fatality resulting from a man overboard from the fishing vessel, Dover Strait, on 6 November 2009 (part of Trilogy)
Published 19 May

Maersk Kendal – grounding on Monggok Sebarok reef in the Singapore Strait on 16 September 2009
Published 16 March

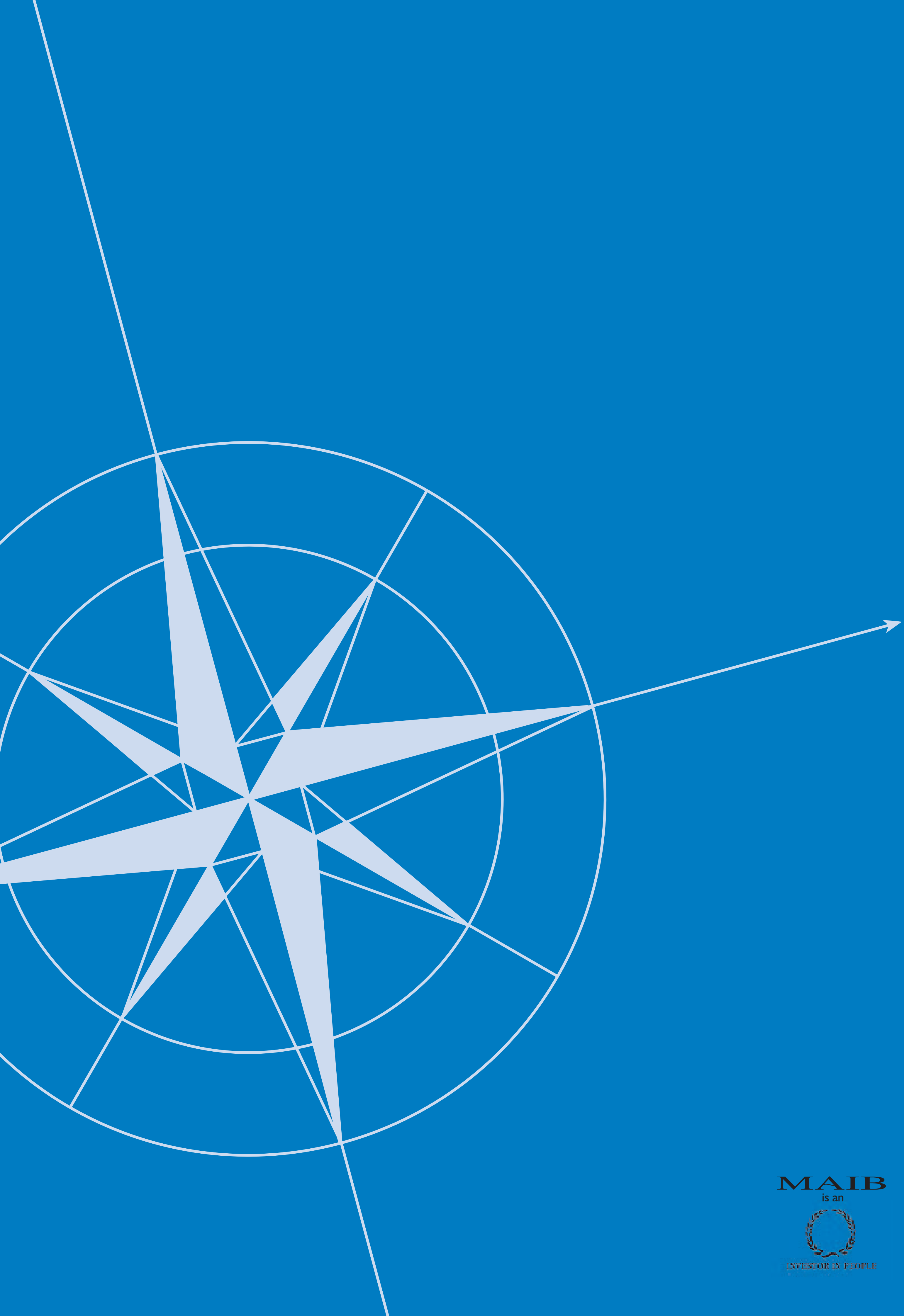
Olivia Jean – injury to a fisherman on board the fishing vessel, 17nm south-south-east of Beachy Head in the English Channel on 10 October 2009
Published 26 August

Optik – fatality resulting from loss overboard of a crew member from the fishing vessel 8 miles south east of Arbroath on 18 November 2009 (part of Trilogy)
Published 19 May

Osprey III – fatality resulting from a man overboard from the fishing vessel in the Moray Firth on 11 November 2009 (part of Trilogy)
Published 19 May

Saetta and Conger – collision between *Saetta* and *Conger* on completion of a ship to ship transfer 9.5 miles south east of Southwold, UK on 10 August 2009
Published 25 March

Wellservicer – fatal accident on the diving support vessel 3 miles south east of Aberdeen, Scotland on 1 April 2009
Published 20 January



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