Marine Accident Investigation Branch (MAIB) - Safety Digest 01/00

Contents

About the Marine Accident Investigation Branch

The Marine Accident Investigation Branch (MAIB) is an independent part of the Department of the Environment, Transport and the Regions and is completely separate from the Maritime and Coastguard Agency (MCA). The Chief Inspector of Marine Accidents is responsible to the Secretary of State for the Environment, Transport and the Regions. The offices of the Branch are located at Carlton House, Carlton Place, Southampton, SO15 2DZ.

This *Safety Digest* draws the attention of the marine community to some of the lessons arising from investigations into recent accidents. It contains facts which have been determined up to the time of issue.

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

The *Safety Digest* is only available from the Department for Transport, and can be obtained by applying to the MAIB.

The publications home page contains information on how and where you can obtain publications produced by the Department for Transport.

If you wish to report an accident or incident please call our 24 hour reporting line 023 8023 2527

The telephone number for general use is 023 8039 5500.

The Branch fax number is 023 8023 2459.
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Summaries (pre 1997), and Safety Digests are available on the Internet:
http://www.maib.dft.gov.uk/

Extract from
The Merchant Shipping
(Accident Reporting and Investigation)
Regulations 1999

The fundamental purpose of investigating an accident under these Regulations is to determine its circumstances and the causes with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

Glossary of Terms and Abbreviations

ARPA	Automatic Radar Plotting Aid
CO_2	Carbon Dioxide
CPA	Closest Point of Approach
DR	Dead Reckoning
EPIRB	Emergency Position Indicating Radio Beacon
GPS	Global Positioning System
GRP	Glass Reinforced Plastic
GT	Gross Tonnage
kW	kilowatt
m	metre
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
RIB	Rigid Inflatable Boat
RNLI	Royal National Lifeboat Institution
ROV	Remotely Operated Vehicle
SWL	Safe Working Load
UMS	Unmanned Machinery Space
VHF	Very High Frequency
VTS	Vessel Traffic Services/System

Introduction

The *Safety Digest* series is aimed primarily at the seafarer, regardless of status or discipline. We hope to reach senior and junior staff alike; for those working on deck or below, on the bridge, the machinery spaces, in the wheelhouse or the cockpit. There is material for everyone; accidents are as likely to occur in the galley as they are on the gangway. Accidents reported to us embrace vessels of every size and shape, from the largest cargo carrying merchant ship to the most modest dinghy. We can learn from them all.

We are delighted to find that past editions are reaching a much larger audience than we had dared hope. They are routinely used as training aids by the nautical colleges, some fishermens organisations, a number of shipping companies, some authorities overseas, and by sailing schools. We have been pleased to see that many articles are reproduced in a range of other publications. They are also read by academics carrying out research, by designers seeking feedback after an accident, and by organisations carrying out formal safety assessments. If this increasing interest, in what is one of the only freely available publications of its kind in the world, results in preventing or reducing accidents, then we are making a modest contribution to improving safety at sea.

But we are subjected to two repeated criticisms. The first is that we do not publish enough editions of the *Safety Digest*, and the second is that it reaches too few people. We are, for instance, very aware that very few fishermen have ever heard of it.

To meet the first criticism we are looking at ways of ensuring that we meet our commitment to regularly produce an edition in late spring, another in early autumn, and the last one at the end of the year. We would like to publish more, but the hard-pressed editorial staff is already working flat out.

We are also constantly seeking ways of increasing our circulation, but because it is a free publication and is funded out of my very limited budget, we need to target the distribution very carefully. All we ask is that those interested in receiving the *Safety Digest* contact the Branch and ask to be included in our distribution list. We will do the rest. If any reader knows of anyone, or organisation, who might benefit from receiving regular copies, we hope they can be persuaded to contact us.

John Lang
Chief Inspector of Marine Accidents
April 2000

Part 1
Merchant Vessels

Those of us who drive cars on motorways will be familiar with the road sign that says TIREDNESS KILLS, TAKE A BREAK. Whenever we drive when tired, or indeed do anything when sleepy, we are well aware of it. If it is late at night, or we have been behind the wheel for hours, we become very conscious we are not as alert as we should be. We wind down the window, or turn up the radio in an attempt to stay awake. We know we should pull into the next service station and take the break so wisely recommended. And to be fair to ourselves, we usually do.

Can we say the same about seafaring, particularly if we are watchkeepers? The answer is no.

Seafaring is, by definition, a strenuous job that makes huge demands on peoples stamina. It always will. Yet we keep on demanding more of those at sea. In the relentless pursuit of efficiency, or cost cutting, manning levels drop; the paper mountain grows as weary masters spend hours trying to keep up with the requirements of numerous regulations, and there are no longer enough people to maintain an efficient lookout. All these factors contribute to fatigue. And fatigue leads to mistakes.

If you mention the word fatigue to the ancient mariner he will guffaw, tap his pipe, and launch into happy recollections about how he used to be on his feet for days on end, beating down the Irish Sea or crossing the North Atlantic in mid-winter in an 8 knot convoy. Yes, of course he was tired, and proud of what he achieved. Nobody cared about fatigue. There was a job to do and it was done. But at what cost?

The reality of today is that a mistake at sea can lead to massive environmental damage, huge insurance claims, serious loss of life, expensive litigation and ruined careers. It is the shipmaster, the engineer, the watchkeeper or the able seaman, who invariably take the blame. And yet they often feel very isolated. They rightly ask if anyone is listening. They will argue they are having to work longer hours than in practically any other industry, yet find themselves the victims of a system that fails to provide the necessary personnel to alleviate the problem. If they complain, they could be jeopardising their future. We have heard of instances where drawing attention to overwork and fatigue is a sure ticket to dismissal.

So what can be done? Two things. Try and understand what is meant by fatigue. Note the examples in our many Safety Digests and talk about them among yourselves. Be honest and see what can be done to alleviate the problem onboard. The options may well be very limited, in which case try the alternative; write to us. We will treat any information sent to us in the strictest confidence. Many people have already contacted the Branch with some startling revelations about safety at sea, and their stories often underpin many of the published lessons to be learned. Given more information, we can make changes. Without it, our ability to improve things, or expose the reasons behind the worst examples of fatigue is, sadly, all too limited.

Case 1
Lift Failure due to Poor Loading

Narrative

An aircraft lift on board *RFA Argus* was loaded beyond its safe working load of 18.4 tonnes. There were no injuries to any personnel, or material damage to the ship or its equipment.

During a planned stay in port, 500 compressed oxygen cylinders were required to be landed. These were normally stowed on a lower deck and needed to be transferred to the weather deck before being taken ashore. Before the vessels arrival in port, the planned operation was discussed between various officers and senior ratings, one of whom was to supervise final discharge of the cylinders from the ship.

Once in port, a senior rating gave instructions to three juniors to transfer a number of cylinders to the weather deck. He then left them alone to load the cylinders onto the platform of an aircraft lift. The cylinders weighed 19.95 tonnes, which was greater than they had been instructed to load. In addition to this excess weight they added a fork lift truck weighing 5.5 tonnes. The lift was then raised.

When it reached the weather deck, the lift was unable to stow at the correct level. When investigated it was discovered that the load of both CO2 bottles and the fork lift truck was greater than its safe working load (SWL) and this had prevented the locking cleats at the flight deck (weather deck) engaging. The lift was taken out of service for testing and inspection.

The Lessons

1. The three junior ratings were allowed to work unsupervised with large weights of potentially hazardous compressed gas cylinders. They also operated a large piece of lifting equipment unsupervised. Although senior staff had discussed details of the work at a planning meeting, none of them were present to supervise the task to ensure that the procedures agreed and discussed were followed. The failure was due to not recognising that the total weight of bottles would exceed the SWL.

2. Lifting gear is always marked with its safe working load. Items to be lifted are not always so marked with their weight, and this is often the case with ships stores. If no weighing facilities are readily available, it is essential that whoever is in charge of the task has sufficient experience of the loads, lifting equipment and the overall operation to avoid overloading the lifting gear.

Case 2
The Timing of Trips!

Narrative

P&OSL Provence entered Dover harbour at 2047 with all five generators on load, and both bow thrusters running. When power was applied to the bow thrusters, the overload alarms on the generators sounded, followed immediately by a complete blackout. The emergency generator came on load, the starboard anchor was let go, and tug assistance was requested.

Subsequent checks found only two of the five generators still running. Their breakers were closed and one main engine re-started, with control passed to the bridge. The other three generators were then started, but only two of the circuit breakers would stay closed. Despite this, the remaining three main engines were progressively started and control passed to the bridge.

When attempts were made to re-start a bow thruster, excessive starting currents developed, and the attempt was abandoned. While weighing anchor, the bridge staff reported that they had no control over the propeller pitch of the starboard shaft. To correct this, both main engines driving the starboard shaft had to be stopped. Once the pitch control system had been re-set, both main engines were successfully re-started, and control was transferred to the bridge. No further trouble was experienced and the vessel was alongside by 2132.

The initial investigation found that the aft bow thrust drive shaft had seized although the electric drive motor was satisfactory. The failed breaker was found to have tripped out on over-current and had not been re-set.

A divers inspection found 15 turns of polyprop mooring rope round the aft bow thrust, preventing rotation. There were also 3 turns around the forward bow thrust.

A detailed inspection of the generator and bow thrust breakers preferential trips and relays, listed the sequence of events as:

- a mooring rope caught round the aft bow thrust causing the electrical overload;
- the overload on the bow thrust starter panels were thermal trip relays only, and not instantaneous;
- the over-current trip on one generator operated with overload still present;
- the remaining four generators tripped on low voltage due to bow thrust overload, causing the blackout;
- the main engines stopped when the auxiliary machinery cut out.

To prevent a recurrence, the following was carried out:

- both bow thrust starter panels were fitted with high current instantaneous trips set at 2000 amps in series with the thermal overloads.

The Lessons

1. When machinery is not following commands, use the EMERGENCY stop.

2. Large electric motors MUST be fitted with INSTANTANEOUS overload trips.

3. In this particular case, the incident was caused by a length of mooring rope floating in the harbour, which had been left by another vessel being caught up in the bow thrust. However, it should also be borne in mind that when letting go mooring lines, make sure the shore riggers keep them in hand while the slack is taken in. There are any number of potential hazards for loose mooring lines these days; propellers, voith-schneider blades on tugs, and bow thrusters.

Case 3
Engineer Superintendents Nightmare!

Narrative

The Veesea Eagle, a 622gt standby vessel, was on station in the North Sea. Early one morning, the superintendent received a call saying that No 1 generator had failed due to an exhaust pipe failure. Shortly afterwards, he received a further report saying that because of a damaged piston, No 2 generator had also failed. Back on board, the harbour generator was started to enable repairs to No 2 generator to be undertaken. While the company arranged for a replacement standby vessel, the chief engineer started to replace the damaged piston. Meanwhile, the harbour generator also failed.

Although the main engine was still functioning, and steering was available by using the independently driven Azimuth Thruster, the company decided to tow the vessel back to port for repairs.

The subsequent investigation revealed that:

1. No 1 generator
Had been running successfully following a complete overhaul, including a new crankshaft, earlier in the year. After the vessel re-entered service, the chief engineer adjusted the fuel timing to improve performance. When he left, the relieving chief engineer also adjusted the fuel timing, but had not been told about the last adjustment. The result of the latter was massive after burning damage to a piston head, cylinder head, and exhaust trunking.

2. No 2 generator
Had also been running successfully, when a piston failed for no apparent reason.

3. Harbour generator
Failed because of a lack of lubricating oil and it wasnt monitored.

The Lessons

1. All repairs, adjustments or maintenance carried out on any machinery MUST either be recorded in a work book, or in whatever maintenance recording system is installed on the vessel.

2. If adjustments are to be made to the engine timing, consult the manufacturers handbook for advice. After adjustments have been made, always check exhaust temperatures, take indicator cards or peak pressure readings, and monitor the engine condition closely over the next few hours.

3. If it is necessary to use all the engineering staff to undertake emergency repair work, a competent individual should monitor operating machinery at regular intervals.

Case 4
Alteration of Passage Plan leads to Cargo Vessel Running Aground

Narrative

The 4,426gt Swedish dry cargo vessel *Skagern* was engaged in fortnightly trade between Sweden, Hull and Strood, carrying wood and paper products.

After partly discharging her cargo at Hull she sailed for her next port, Strood, with a draught of 5.95m. The master soon realised, however, that he would not make the tide for berthing if he proceeded to the Medway as planned, to pick up the pilot at the North East Spit. He therefore decided to change the passage plan by shortening the distance and embarking his pilot at the Sunk light vessel. The officer on watch, the second mate, was told to make the necessary adjustments and lay off the new courses.

The second officer had only joined the vessel in Sweden that week, and was making his first voyage as a watchkeeping officer. He made the original plan based on waypoints calculated and entered by another officer. These had been marked on the various charts and had already been entered into the GPS navigator. When he amended the passage plan he used the GPS to calculate a new course from a waypoint off Lowestoft direct to the Sunk pilot station. In doing so, he didnt realise he had missed out a pre-programmed waypoint in the GPS for a position to the *east* of the East Shipwash buoy.

Having determined the new course to steer from the waypoint off Lowestoft, he laid it off on the two smaller scale charts covering that part of the passage, but did not use the larger scale chart, which covered the area of the Shipwash Bank. Therefore, he didnt notice that his course line intersected the 5m depth contour to the west of the East Shipwash buoy.

The master did not check the amended passage plan and *Skagern* continued with her passage.

The second officer came on watch again four hours before the vessel was due to arrive at the pilot station. A lookout was present on the bridge.

One hour before arrival at the Sunk, and now in the vicinity of the Shipwash Bank, the second officer prepared to embark the pilot.

He saw the North Shipwash buoy and passed about three cables to the east of it. Shortly afterwards he saw two more buoys ahead of him, the East Shipwash on his port bow and the North-West Shipwash on his starboard. It did not occur to him that anything might be wrong. Shortly afterwards, *Skagern* ran aground at a full speed of 14 knots. He had found the Shipwash Bank.

Although two tugs were dispatched from Harwich to standby, the master was able to de-ballast his vessel and refloat her successfully with the aid of the main engine. There was no pollution and there appeared to be no damage.

She continued with her passage to Strood, discharged her remaining cargo and was then allowed to sail to Ala, Sweden, for an underwater examination to be made.


Select the thumbnail to view the accompanying chart (93KB)

The Lessons

1. There can be few navigating officers who can look back on their very early days as a watchkeeper and honestly claim that they never made a mistake. Planning a passage while in harbour is usually straightforward. Changing an existing one while at sea should be just as easy, but often isnt. In this instance the second officer used waypoints entered by someone else and failed to double-check each stage of the amended plan to see that it was safe. He didnt use the largest scale chart available and seemingly did not highlight potential dangers.

2. Seafaring is all about acquiring experience. A young, newly qualified officer may have some of the technical skills needed to safely navigate, but he may not necessarily have the experience. He will make mistakes and will, hopefully, learn from them. He will also require monitoring without having his confidence undermined. Masters should remember their early days at sea and do their best to pass on the good practices acquired over many years; such as checking a passage plan. It does not take long to cast an eye over a planned track to ensure it is safe.

3. Over reliance on GPS to calculate courses between waypoints without checking the planned track on the chart to ensure it avoids potential hazards is all too easy. Failure to do so will often have uncomfortable consequences.

4. Whenever taking over a watch, a check should be made that the track drawn on the chart, and entered into the GPS navigator, is safe. If it passes over a shoal or sandbank and the depth of water is less than the vessels draught, you have a problem. Action taken then is better than a grounding later.

5. In this age of the GPS and push-button navigation, it is all too easy to be lulled into a false sense of security and assume the position indicated is correct. The wise navigator will invariably check it against something else, even if it is only a DR, EP or a sounding. As soon as something doesnt add up, a more detailed cross-check will usually reveal the reason for the discrepancy.

6. The navigators most valuable aid remains the human eye. When buoys appear ahead, take a good look at them. Remember they are there for a reason, so identify them. You may not know their names until you are very close, but their shapes, colours, topmarks or light characteristics all mean something. You should know the direction of the main flood stream, so a basic reading of the situation should become instinctive. If you are approaching a buoy that isnt where you expected it to be, there are two possible explanations: either the buoy is in the wrong place, or you are. Of the two, most people would back your judgment to the hilt if you concluded the latter was the more likely. You are, very likely, standing into danger. Do something about it.

Case 5
Misunderstanding leads to a Near Miss in Port Approach Channel

Narrative

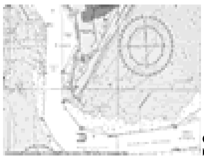
The tug *Vegesack* was towing a barge engaged in stone-fishing in the vicinity of the Beach End buoy in Harwich Channel. Tug and tow were part of a dredging programme. During the dredging contract, the practice was for the dredging craft, *Vegesack*, to nominate the passing side for vessels.

The barge was difficult to control in tidal and traffic conditions, and the master needed to exercise considerable skill and anticipation, as well as having to liaise closely with VTS and passing vessels. The German master had been issued with a pilotage exemption certificate and had been operating in the channel for nearly two months before the incident.

The ferry *Dana Anglia* was outbound from Harwich in daylight and good visibility. When she was close to North Shelf buoy, VTS called *Vegesack* and agreed that *Vegesack*, who was in the middle of the channel, would move to the north side. This would enable both *Dana Anglia* and *Bencomo*, an inbound vessel currently passing No5 buoy, to pass to the south. VTS gave this passing information to the two vessels.

While passing Platters buoy, *Bencomo* called *Vegesack*, requesting her to move to the north. *Vegesack* said she was going to move to the Harwich (or south) side, and instructed *Bencomo* to pass to the north. VTS then intervened and confirmed with *Vegesack* that she wanted both vessels to pass to the north. At this time, *Dana Anglia* was approaching North West Beach buoy and could see *Vegesack* heading south, in contravention to what she had been asked to do and had agreed.

Vegesack then started turning to the north. *Dana Anglia* sounded her whistle and put her engines to full astern. *Vegesack* then passed close down the starboard side of *Dana Anglia*.


Select the thumbnail to view the accompanying chart (106KB)

The Lessons

1. If when reading this narrative the mariner becomes confused as to who was going Harwich side or Felixstowe side, he or she can be forgiven. Although the VTS and both passing ships were clear in their understanding of what was required, *Vegesack*s master had only a limited command of the English language. This led to confusion as to which side he wished other vessels to pass. The misunderstanding was exacerbated by the dual use of the terms Harwich side or Felixstowe side, and south side or north side. He became confused, thought it had been agreed that he was going north and turned accordingly. Those on *Dana Anglia*s bridge cannot have been amused.

2. Clarity of language is everything at sea. VTS operators, pilots, and masters must ensure there can be no ambiguity at all in what they say over the radio. Dont forget the other PEC holder might not be quite as fluent in English as he might have you believe.

3. At the same time it is essential that anyone in charge of a tug manoeuvring a vessel (such as a large and unwieldy stone dredging barge) and has to provide a mini VTS service around his

operation when working in a busy channel, must have a standard of English that is higher than that normally required by a PEC holder on an ordinary vessel.

4. When vessels are expected to deviate from standard navigational procedures in a channel being dredged, it is essential that these are communicated to, and agreed by, all vessels involved well in advance of any encounter and particularly when visibility is restricted (Chart extract attached).

5. Tugs handling large unwieldy barges must have adequate power and bollard pull to meet any unexpected demands.

Case 6
Seaman Lost while Waiting for Pilot

Narrative

In the early hours of a November morning, the fully laden 42,259gt Panamanian registered container vessel *Ambassador Bridge* was inbound to the English Channel, and had closed the south Devon coast to embark a pilot off Brixham.

In preparing to embark the pilot at the port side pilot station situated some 4m above the waterline, a seaman was detailed off to rig the pilot ladder and stand by to receive him. He made a radio check with the bridge when he arrived, but when the bridge tried to contact him again as the pilot boat approached, there was no reply. An officer was sent down to investigate.

The chief officer found the pilot door wide open, the ladder unrigged, water sloshing around the station deck, but no sign of the seaman detailed off to prepare the ladder for embarkation.

The body of a man, later identified as the deceased seaman, was recovered from the sea some four hours later. He was not wearing a lifejacket.

The Lessons

1. Rigging a pilot ladder is a potentially dangerous operation. It can occur in any conditions; in the dark, with the ship rolling, and will at some stage involve opening a side door, or a bulwark opening. Unless the height of the embarkation station above the waterline puts it well clear of the effects of the sea, water can be shipped.

2. Anyone being sent down to rig a ladder or hoist, should be briefed by those on watch about the expected conditions.

3. Because of the risks involved rigging a pilot ladder in circumstances such as this, more than one person should be assigned to the task. One should be an experienced seaman, probably an officer.

4. Anybody working in the vicinity of an open door or rail should wear a lifejacket.

Footnote

Recommendations on pilot transfer arrangements can be found in Merchant Shipping Notice 1716 (M+F).

Case 7
Whirling Crank Handle Hits Crewman

Narrative

While berthed alongside in Tenerife, the cruise ship *Arcadia* was carrying out a lifeboat drill. One lifeboat was successfully launched and as it was being recovered, the winch hoisting it failed. The lifeboat was still connected to the falls and it dropped back into the sea.

To investigate what had happened, the crew had to wind the falls back onto the winch drum. The lifeboat was disconnected while the crew tried to restart the winch. They were unsuccessful because of a fault on the hand crank cutout switch.

The crew then attempted to wind the falls back on using the hand crank, but because of the time and effort involved, the cut-out switch was bypassed and power restored to speed up the operation. The crank handle was left in place.

The winch was started. It began to turn and so too did the handle which hit one of the crew over the head.

The investigation found that the winch failed in the first place because the oil used in the winch gearbox was not one recommended. It was too viscose and would have prevented the coupling locking mechanism from operating correctly.

The Lessons

1. The origins of this accident lay, as so often happens, in something that occurred many months before the incident. At the last oil change, the maintainers applied the wrong oil. Perhaps they failed to check the handbook to see what was the correct lubricating oil. Before changing oil on any mechanism, always check to see what type of oil is needed. The wrong oil can have serious repercussions.

2. Seafaring is all about facing unforeseen situations. There are various procedures in place for handling many eventualities, and practical experience can be a useful aid in deciding what to do. But unexpected developments require a careful assessment of the issues involved, including making an appraisal of the likely consequences of actions taken. Any action taken has to be carefully planned and carefully executed.

3. Do not start lifeboat winch motors with the crank handle in place.

4. Hard hats prevent sore heads.

Case 8
Air Compressor Blows Up

Narrative

A watchkeeping engineer had completed some maintenance tasks on the outboard air start compressor on *RFA Fort Austin*. He then prepared it for use as the duty machine and shut down the other, inboard compressor.

Initially he had some difficulty starting the outboard compressor, but eventually did so locally on manual control.

With the outboard compressor running, he had further difficulty closing its second stage drain valve, but another engineer managed to do so. No sooner had he done this, than the compressors second stage cooler burst to pressurise the water jacket. This then ruptured, throwing debris across the engine room.

The compressors second stage safety valve did not operate.

The largest piece of flying debris was from the water jacket and measured approximately 500mm x 250mm. One engineer was slightly injured by another, smaller piece.

On examination, it was found that the outlet valve from the compressors second stage was closed, and the safety valve on it was fouled with carbon deposits. It could not, however, be established whether these had prevented the valve lifting.

The Lessons

1. Both engineers were experienced in preparing a compressor for duty. The operation had probably become so routine that limited thought was applied to the task; as shown by the outlet valve being left closed. The potential consequences of allowing simple routine tasks to be performed on autopilot are demonstrated by this incident.

2. The safety valve was fitted to the compressor as protection against the consequences of operator errors such as this. Its failure gave the engineers no warning of its over-pressurisation. Had it done so, it is probable that they would have discovered the closed outlet valve and quickly corrected the situation. The importance of routinely testing and properly maintaining safety devices of this type is clear.

Case 9
Another Low-Pressure Fuel System Fire

Narrative

About two hours after she sailed from Aberdeen in ballast, the engine room fire alarm sounded on board the 1696gt tanker, *Authenticity*. The main engine was then stopped, the emergency fire pump started and the fire flaps closed. This sealed the engine room, and fire hoses were rigged.

An initial inspection by the second engineer and a crewman, in conditions of poor visibility, found no flames in the engine room. However, a second inspection by the chief engineer and the crewman a few minutes later, found flames at the forward end of the main engine in the region of the turbocharger.

A decision was then made to flood the engine room with CO_2 . Once this was released, the pump room bulkhead was monitored, and boundary cooling used as required. Monitoring continued until about $3^1/_2$ hours after the CO_2 was released, when another inspection of the engine room found all fire extinguished.

The vessel was later towed to Aberdeen for repair, where a pinhole was found in a low-pressure fuel line at the forward end of the main engine. This had allowed fuel to spray on to the exhaust system. This hole had been caused by part of an exhaust guard coming into contact with the pipe and, over time, wearing it through.

The Lessons

1. This incident is yet another in a series of fires at sea caused by leakage from the low-pressure parts of fuel systems. Many have been caused by poor design, but this incident also emphasises the importance of maintaining the security of piping systems, and keeping them clear of other pieces of equipment, which might cause damage.

2. Fires require heat, fuel and oxygen. Any fuel line running near a heat source is a potential danger. As this incident shows, it doesnt necessarily require a leaking joint to provide the fuel source; a damaged line can do the job just as well. Effective risk assessment should identify likely hot spots in the vicinity of fuel lines, and steps should be taken to remove or minimise that risk before it is too late.

3. Once the fire had started, this incident also demonstrates a logical procedure for handling the situation. But dont be too tempted to re-enter a sealed off engine room too quickly. Remember the oxygen.

Case 10
Power Failure on New Ro-Ro due to Error during Construction

Narrative

Commodore Clipper was a newly built ro-ro ferry in 1999 operating on the Portsmouth to Jersey route.

While on passage in mid Channel at 1155 on 5 October 1999, both main engines lost power and stopped due to lack of fuel pressure. As a shaft generator on the starboard main engine had been in use, main electrical power was also lost.

Loss of fuel pressure was found to have been caused by the blowing out of a fuel rail end cover on the starboard main engine, allowing fuel to flow full bore into the engine room and over machinery. Fuel was thrown around the engine room by the engines flywheel, but was prevented from reaching hot exhaust manifolds by the fuel pumps covers. There was no fire.

The starboard main engine was quickly isolated, and the port engine was started at 1210, which allowed the vessel to continue passage.

Inspection of the fuel rail, and the end cover, found that the cover securing arrangement used a cone/split sleeve design. The cone was intended to be forced into the sleeve, by tightening suitable screws, so expanding the sleeve on to the bore of the fuel rail. Friction then retained the cover in place. The cone on this cover was found to have been assembled inverted, so that tightening of its screws had no effect on the split sleeve and produced a negligible securing effect.

The corresponding cover on the port engine was inspected, but found to have been correctly assembled.

The Lessons

1. The value of baffles and guards, which can prevent fuel oil leakage striking hot exhaust manifolds, is demonstrated. Although the incident caused a power failure, delay to the vessel, and much mess, it did not escalate into a fire.

2. Even vessels fresh from the builders yard can experience difficulties due to errors made in the assembly of important equipment during construction.

3. When dismantling equipment, engineers often note the way it was assembled. However, its assembly at the factory or builders yard might not have been correct. Therefore, during dismantling, it is always worthwhile looking at components and their relative positions with a critical and questioning eye.

Case 11
Explosion in Gas Compressor

Narrative

Linda Kosan was a 2,223gt liquid gas carrier, registered in Denmark, which suffered an explosion and fire while on passage down the English Channel. The Danish authorities investigated the incident and this article is based on their report.

The vessel had loaded 320 tonnes of propane initially, followed by 640 tonnes of butane, at Fawley near Southampton. During loading, the vessels cargo cooling system was in operation. After loading, the vessel sailed for Douglas, Isle of Man.

On passage west down the English Channel, the mate began a planned leak test on the condenser of the starboard cargo-cooling unit. He had previously drained the condenser of liquid butane, which was the last cargo to be loaded.

The intended test method was to pressurise the condenser with air to 15 bar using the systems compressor, and measure any drop in pressure.

To remove butane from the system, he closed the gas outlet from the condenser, opened the inlet of the compressor to atmosphere, and ran the compressor to pump air into the condenser to a pressure of 3 bar. This was enough to allow butane to condense and be drained. The procedure was repeated several times.

Judging the unit to be gas free, the mate ran the compressor and gradually raised the condensers pressure to 15 bar. He then stopped the compressor, and began to close the inlet valve to the condenser. Just as he did so, there was a powerful explosion followed by a fire breaking out in the compressor room, which was on deck.

Seeing these events from the wheelhouse, the master immediately activated the deck sprinkler system. The mate and chief engineer began to tackle the fire using hoses. The remainder of the crew was mustered to assist them, and Brixham Coastguard was alerted.

Fire and medical personnel were airlifted to the vessel, but the crew had successfully controlled the fire. One person needed slight medical treatment.

After the fire was extinguished, the starboard compressor and associated piping were found to be badly damaged by the explosion. However, damage did not extend outside the compressor room.

The Lessons

1. By compressing air to 15 bar, a temperature above the auto-ignition temperature of butane was generated. With traces of butane still in the system such as that remaining in the compressors lubricating oil, an explosive mixture was generated in the compressor.

2. This procedure did not comply with the owners instructions for leak testing, which specified that propane should be the medium used to pressurise the condenser, not air.

3. This explosion resulted from incorrect procedures being followed, and could have caused serious injury or loss of life. Changes to well-established system operating procedures should always be very carefully considered where the consequences of a system failure could be serious.

4. Once the fire had started, the crew acted extremely quickly and resourcefully to contain and extinguish it, so preventing it from developing into a major accident. Prompt and disciplined action paid off.

Case 12
Overheating of Propeller Oil Box Disables Tanker

Narrative

While *Petro Fife* was on passage about 18 hours after loading cargo, the duty engineer began his pre UMS inspection. Although no pressure or temperature sensors indicated any problem, he soon discovered that the oil distribution box of the controllable pitch propeller was hotter to the touch than usual.

The vessel is a 125,457dwt crude oil tanker, built in 1977. Main propulsion is by a 24,800hp slow speed diesel, directly coupled to a controllable pitch propeller.

Efforts were made to cool the oil box by reducing engine speed, applying cooling water externally and altering oil flow. These proved unsuccessful and the engine was stopped. Momentum of the vessel allowed a safe anchorage to be found and the vessel made secure.

As soon as the engine stopped, turning gear was engaged to prevent seizure of the oil box. However, when the turning gear was briefly started the oil box also turned, implying that it had seized on the propeller shaft.

The vessel was eventually towed to a repair port where an inspection of internal and external components of the propellers oil distribution system was made. Although some white metal bearing surfaces were found to be scored, none of this was considered to be associated with overheating. It was established that a valve controlling the flow rate of oil through the oil box had partially closed, probably due to vibration, so restricting the oil flow. General overheating had resulted. When this valve was reset and locked at its correct setting, the system ran with no further overheating.

The Lessons

1. The propellers oil system was fitted with temperature sensors, which although fully functional, did not alert the duty engineer to the overheating. He found this by touch. This demonstrates the value and importance of routine tours of inspection of machinery spaces and the need to use all senses to the full: sight, touch, smell and hearing. Even with comprehensive machinery monitoring and alarm systems, the human contribution remains vital.

2. The system had been running for several hours with a reduced flow of oil. The resulting overheating is a reminder of the vital secondary function of any lubricating oil; namely that of a coolant. As with any coolant, flow rates are important to maintain the desired system or component temperature.

3. When the duty engineer first discovered the overheating, efforts were made to increase oil flow rate to cure the problem. This was seen as largely unsuccessful, probably because of the large mass of metal which makes up the oil box, the shaft and adjacent coupling acting as a large heat sink, which needed to be cooled to bring about any significant reduction in temperature.

Case 13
Supply Vessel Loses Position when Working Cargo

Narrative

During the morning of 2 August 1999 the supply vessel *Putford Worker* was working cargo at installations in the North Sea. She had completed operations at one installation without incident.

At 1110 she approached the second installation and carried out precautionary engine and steering tests. These were satisfactory, and at 1115 the vessel was in position to work cargo. The master was on the bridge at the joystick control; the weather was fine and the sea calm.

The first lift was a 10' x 8' container. The deck crew attached the hook of the installations crane to the container, and moved forward to a safe position. The master then noticed that the vessel was moving forward out of position and moved the joystick to counteract the ahead movement. He then saw that the port propeller was indicating full ahead pitch, so changed from joystick to manual pitch controls and promptly put them to full astern.

This did not prevent the vessel moving ahead so far that the attached container be dragged over the stern and into the sea. Placing the manual pitch controls to zero then caused both propellers to return to neutral. Control of the vessel was regained, and the problem did not immediately re-occur.

Later tests and inspections by specialist control engineers and the propeller manufacturers showed no fault with the control systems or the port propeller. However, some wear was found in the feedback linkages on the control system of the starboard propeller. This was rectified, and manoeuvring tests completed satisfactorily.

The Lessons

1. The testing of engines and steering before working cargo at an installation is an important precaution, and was followed by *Putford Worker*. These precautions can be extended so that once in position below the crane ready to work cargo, a wait of at least 10 minutes is advisable to give both the master and crane driver confidence that cargo work can be carried out safely.

2. The value of moving the deck crew clear once a lift is attached, is clearly demonstrated. Had they not bothered, the consequences could have been very serious.

Case 14
Fuel Starvation causes Loss of Main and Auxiliary Power

Narrative

The *Viking Vixen* is a safety standby vessel operating in the North Sea. It was her normal practice to supply her main engine with fuel taken from a daily service tank, which was, in turn, replenished from double bottom tanks via a purifier. A fuel oil settling tank was available but had fallen into disuse, and was usually empty.

The vessel left port with a new chief and second engineer on board. The chief engineer had spent some time in a sister vessel and had been given a handover by his predecessor. Documentation setting out machinery operating procedures was also available.

The main engine had been operating on full load for several hours, when all main and auxiliary power was lost. The daily service tank level was found to be low and it was concluded that the main engine and generators had stopped due to fuel starvation.

With no fuel in the settling tank there was no alternative fuel supply readily available, but with the assistance of the previous chief engineer who was fortuitously available, it was possible to transfer fuel to the service tank once the harbour generator had been started. Power was restored after 6 hours.

The Lessons

1. Neither of the two newly joined engineers fully appreciated the relatively small fuel capacity of the service tank. Know your ship and its systems.

2. No matter how detailed the handover, system documentation, and discussion with colleagues, nothing can entirely replace a period of operational familiarisation for any newly joined engineer. On first joining a new vessel, work hard to acquire such knowledge as quickly as possible.

3. There is value in having a second tank capable of supplying main engines and auxiliaries with fuel should something fail with the daily service tank supply. Such problems may not always be due to low fuel levels and caused by unfamiliarity with the system. Explanations for fuel starvation or other supply problems might include water ingress, purifier and/or transfer pump problems.

Case 15
Jetty Rammed by Bulker

Narrative

The OBO vessel *Hyphestos*, carrying approximately 56,000 tonnes of coal, arrived at the oil terminal in Malmo, Sweden, at about noon on 16 March 1998. Visibility was about 1 mile, there was no wind and the current was minimal. With an experienced pilot and his apprentice pilot embarked, and three tugs in attendance, *Hyphestos* entered the basin. The intention was to stop the ship, swing off the berth and go port side to, with the bow pointing seawards. The vessel was relatively large for the size of the basin.

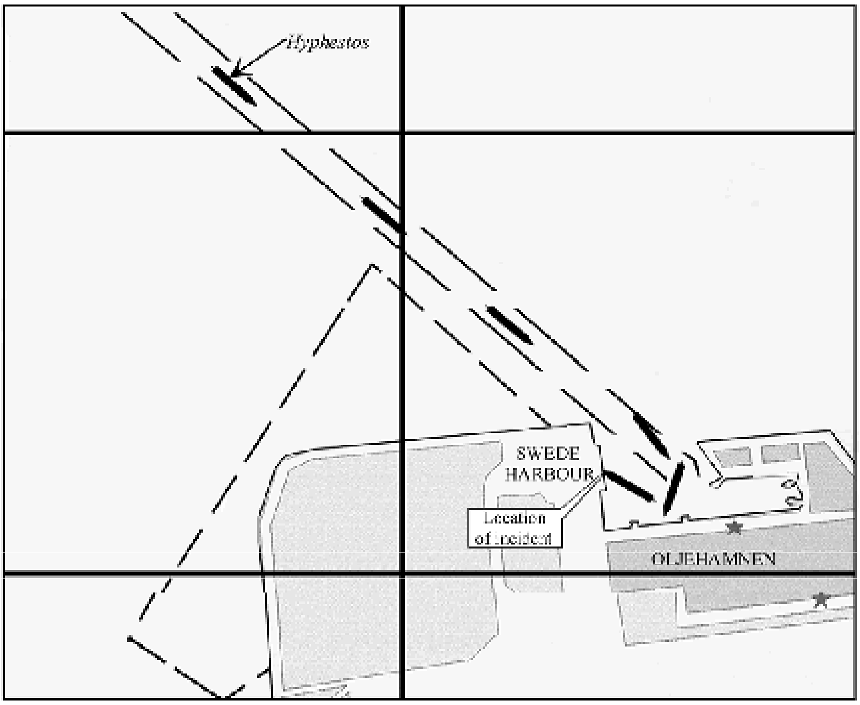
The ships bridge staff consisted of the master, second officer, a helmsman and a deckhand, when entering harbour. There were no technical or language difficulties.

Once *Hyphestos* had stopped off the berth, the swing was started with the head tug pulling the bow to starboard, and the tractor tug aft pulling the stern to port. A third tug pushed on the starboard quarter. Towards the end of the manoeuvre, the stern tug found herself very close to a buoy marking the fairway, and in danger of damaging her towing cable. Her skipper informed the pilot of the problem, and was told to slacken the cable and follow along. He was told to await further orders.

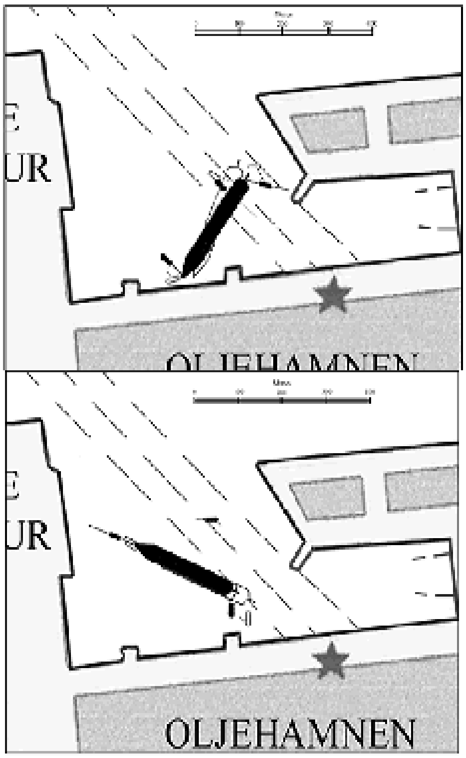
With the turn nearly complete, *Hyphestos* was canted towards the jetty at an angle of about 45° and the bow some 200m off it. To close the distance, the pilot ordered dead slow ahead. For technical reasons the master interpreted this as slow ahead. She began to move ahead and the speed began to build up. The bow tug meanwhile continued to pull ahead, and by the time the vessel was some 40-50m off the jetty, and still heading for it, *Hyphestos* was making good about 2 knots. The predicament was realised, astern propulsion was ordered, the ahead tug changed her direction of tow to broad on the starboard bow. The stern tug which was still following along, was ordered to pull the stern round to port. Nothing happened. The headway was too great, and *Hyphestos* rammed the jetty and two shore cranes.

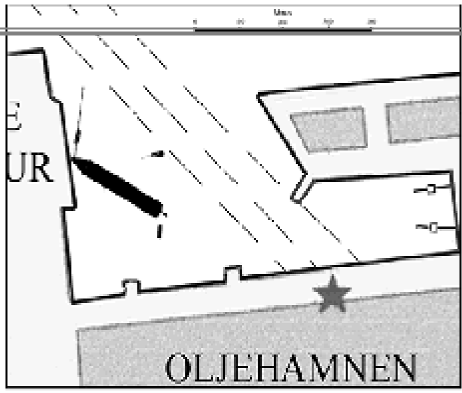
There was substantial damage to ship, jetty fender and cranes. Nobody was injured.

Illustration of events leading to impact with the jetty



Track chart of event overall





First point of turn complete
Head tug pulling bow to starboard

Head tug pulling *Hyphestos* ahead with slow ahead rung on

Headway has built up - *Hyphestos* strikes jetty

The Lessons

1. This was a technically feasible manoeuvre that went wrong despite having an experienced pilot, six people on the bridge and three tugs in attendance. The official report states that in the pilots opinion the whole manoeuvre was performed as planned, but he must have misjudged the distance to the quay.

2. Some scientific research has been undertaken on the stress levels likely to be encountered when handling vessels in confined waters and where the room for manoeuvre is limited. These have shown that stress does exist in such situations, and that normal judgment can be affected. *Hyphestos* was one of the largest vessels to have entered this particular basin, and although no judgment can be made on the actual stress levels experienced, this incident tends to confirm the research findings. The problem can be overcome if everyone involved in the manoeuvre is aware of the intended plan, and is briefed to watch for the anticipated problems.

3. This manoeuvre would have been successful had the vessel been turned completely to parallel the quay before being manoeuvred alongside. But it would have taken time. It would have been just as safe had the vessel closed the jetty at a much slower speed and the turn been more positively controlled.

4. The decision to kick ahead while pointing at the jetty with the bow tug still pulling ahead was unwise. It was predicted on the mental assumption that both bow and stern tugs were turning the ship to starboard. The pilot was unable to see either tug, and none of those present on the bridge or in any of the tugs, saw fit to query the actions being taken. Everyone thought the pilot knew what he was doing.

5. The assumption that all was well, overlooked two important factors. The stern tug was not pulling at all: she was still following along. And the head tug was not pulling the bow to starboard. No matter what anybody assumed, the vessel was bound to start moving ahead

and gather speed. Had anyone realised what the effects would be, and had the gumption to say so, this accident is unlikely to have happened.

6. The lessons to arise from this incident include the importance of the pilot remembering what each tug has been instructed to do, what they are actually doing, and keeping them informed about the intentions and actual execution. There was very little communication between ship and tug.

7. Manoeuvring any large vessel in a confined basin allows little margin for error. Everyone involved has a part to play: to ensure orders are correctly relayed and carried out; to keep an eye on tugs that might not be in the direct line of sight of the pilot; reporting accurate distances to go and speed by log.

8. Human nature dictates that if you are approaching a jetty too fast, your eyes and mind will focus on the inevitability of what is going to happen next. It is unlikely you will think to look elsewhere to see what might be done to either reduce the consequences, or even prevent it happening altogether. The person best placed to do this is the one man with the professional competence to advise the pilot, or draw his attention to something it is known has been overlooked, the master. He is ideally placed to do this and should not hesitate to back his judgment to the hilt.

9. If only one lesson is to be remembered from this incident, it must be the need for good communications between all those involved.

Footnote

This article has been produced as a result of information supplied by the Swedish Board of Accident Investigation (Statens haverikommission, Stockholm) whose co-operation is gratefully acknowledged.

Case 16
Lots of Smoke with No Fire

Narrative

On 1 December 1999, the 4482gt ro-ro passenger ferry *Lady of Mann* was alongside in the port of Liverpool, when white smoke was seen entering the engine room through the open watertight door to the adjacent stabiliser room. The duty engine room crewman closed the door and summoned help. The fire detection system automatically activated, and the duty officer called the fire brigade.

Earlier, the duty crewman had shut down the fuel oil purifier in the stabiliser room, but before he was able to switch off its electrically heated fuel oil heater, the telephone rang and distracted him. He answered it, began another task elsewhere in the machinery spaces, and only remembered the fuel oil heater when he saw the smoke.

Responding to the situation, power to the fuel oil heater was shut off at the distribution board, and ventilation to the stabiliser room shut down. With the assistance of the fire brigade, the space was entered and inspected with a heat-sensing device. No fire was found, but smoke was seen coming from the external surfaces of the fuel oil heater and adjacent piping. The area was cooled using a fire hose.

When the incident was investigated and the heater inspected, a connection on the thermocouple serving the control thermostat and safety cut-out had been damaged and was found to have disabled them both.

Although the fire might have caused the damaged thermocouple connection, the amount of smoke generated suggests that it had been heated to a much higher temperature than normal. This showed that neither the control thermostat nor the safety cut-out had functioned, and had consequently caused the unit to overheat.

The Lessons

1. This incident shows the value of having a high temperature safety cut-out which is totally independent of the control thermostat. Failure of any part of the thermostats system would then have had no effect on the safety device other than to cause it to shut off the power as intended. System safety is therefore achieved.

2. Wherever possible, total independence between operating and safety systems should be a consistent objective. There is no value in having a safety system which fails whenever the operating system fails; it is simply unsafe.

Case 17
Large Container Vessel Grounds while under Pilotage

Narrative

Sealand Mercury, a 49,985gt container ship of 292m in length and maximum draught 12.5m, sailed from Trinity Container Terminal, Felixstowe, at 1343. The tide was flooding. Low water had been at 1104; the height of tide was now 1.8m. She had two tugs made fast, one on her starboard bow and another through her centre lead aft. The visibility was not good and had recently deteriorated to about 0.3 miles. A pilot was on board.

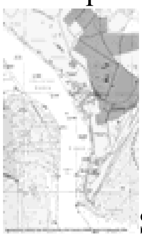
Due to the poor visibility and in accordance with Harwich Haven Authority guidelines, the duty VTS manager had closed up a fog watch pilot in the VTS centre. Other vessel movements were adjusted so that *Sealand Mercury*s passage to sea was unimpeded.

At 1406 she passed North Shelf buoy (**see chart extract**) and was heading 152° with her engines propelling at dead slow ahead. She had already begun a slow turn to starboard having applied starboard helm at about 1403 when the heading had been 137°. The forward tug had been let go but the after one remained attached. Visibility had further deteriorated to about 0.2 miles.

At the same time, the VTS duty manager and the fog watch pilot gave the first of 16 positional warnings to *Sealand Mercury*s pilot. Most of these were acknowledged. At 1408, knowing that the vessel was not turning quickly enough, the pilot ordered slow ahead and, soon afterwards, half ahead.

Sealand Mercury continued to turn too slowly, left the deepwater channel and probably first touched bottom at about 1410. The engines were increased to full ahead at 1411 in a final attempt to steer the vessel to starboard and out of danger. With little or no under keel clearance this was unsuccessful and at 1413 she came to a stop hard aground about 0.1 mile from Fort buoy with the ships head 190°.

The vessel was towed back into the channel at 1610 when the tide had risen sufficiently. Subsequent inspections revealed that she had not been damaged.


Select on the thumbnail to view the accompanying chart (124KB)

The Lessons

1. Manoeuvring large vessels in poor visibility requires a detailed knowledge of the vessels handling characteristics information that may be readily available from the master. A vessels normal rate of turn may be impaired by minimal underkeel clearance and strong tidal sets within a channel. Such conditions require careful monitoring of a vessels position and rate of turn. VTS radar may be able to provide useful assistance, but this requires good communication and co-operation between the pilot afloat and a properly trained radar pilot ashore.

2. Large course alterations based on radar observation of a channel buoy in poor visibility tend to result in overshoot due to delayed action in putting the helm over. The influence of cross-tides when negotiating channel bends should be borne in mind.

3. Vessels should consider delaying their outward passage in the event of imminent dense fog. A weather check should always be included as an important item on the Pre-Passage Plan.

4. The limitations of the assisting tugs in fog must be considered. In particular, a bow or shoulder tug may only be prepared to assist the vessel off berth, and may require to be released as soon as the vessel starts to make headway.

Case 18
Small GRP Fishing Vessel Collides with Large Vehicle Carrier

Narrative

At about 0854 on the 9 March 1999, the 9.96m fishing vessel *Beverley Ann II* collided with the Liberian registered *Cypress Pass*, a 42,447gt vehicle carrier. The wind was east-north-east force 4 to 5 with visibility at 1 to 2 miles but less in squalls.

Cypress Pass was on passage from Amsterdam to the River Tyne, and making good a speed of 15.7 knots on a course of 302° as she approached her anchorage off the Northumberland coast. The master, third officer and a lookout manned the bridge, and preparations were being made to anchor. The engine was on bridge control and the automatic pilot engaged.

The twin hulled, GRP constructed, *Beverley Ann II*, crewed by the skipper and a deckhand, was trawling in an east-south-east direction at just over 2 knots. The skipper saw an echo appear on the edge of his radar screen at a range of about 3 miles. Soon afterwards he saw a very large ship appear out of the murk on his starboard bow heading towards him. Aware that he was in danger of being run down, he stopped, and then reversed his two engines, but was unable to avoid colliding with the port bow of the larger vessel. It was a glancing blow and caused some minor damage.

The skipper of *Beverley Ann II* called the coastguard on VHF radio to tell them of the incident, and then called the ship.

The bridge team of *Cypress Pass* had been totally unaware of the entire incident.

The Lessons

1. Being run down by a larger vessel in poor visibility is every fishing vessels nightmare. The risks are, arguably, greater when fishing in the vicinity of the entrance to a major port. Skippers and masters should be equally alert to the potential dangers, especially in this age when some GRP craft can be very difficult to detect on radar.

2. The more notice a fishing vessel skipper can have of an approaching vessel the more likely he is to avoid a close quarters encounter. The longer-range scales on the radar should be selected at frequent intervals. Although the requirements of fishing will undoubtedly occupy a skippers attention, he cannot, indeed must not, ignore the requirement to keep a good lookout using every means at his disposal. In poor visibility radar will be a primary aid.

3. When another vessel is detected on radar, especially as close as 3 miles, the instinctive reaction should be, must be, to establish whether risk of collision exists. It is pointless to ignore the new contact, because by the time it has closed to the maximum extent of visibility, it might be too late to do anything about it. Without some yardstick in poor visibility, even the most experienced seaman can have difficulty assessing how far he can see things. The inaccuracies grow when the height of eye is low, and many tend to overestimate the range.

4. Having assessed that risk of collision exists, a skipper should bear in mind that the other vessel might not have detected his own. He must make an early decision on what he should do to avoid a possible collision.

5. Watchkeepers on large vessels face slightly different problems. They too must be aware of the possible concentration of fishing vessels as they come closer inshore. They too should

remember that the radar echoing area of some craft can be reduced and they should never, ever forget that a good visual lookout is essential in marginal conditions. Too many worship at the shrine of the radar set and assume it will reveal all the answers. It is a wonderful aid to preventing collisions, but it has its limitations.

6. For some reason the officers and the lookout in *Cypress Pass* never saw the fishing vessel either on radar or visually. They arent the first to find themselves in this situation and they wont be the last. But we can all do better by briefing the lookout, having the radars on different range scales, and as we have already said, by using our eyes. It is too easy not to be using the optimum settings on the radars, perhaps by not having the sea clutter control correctly set. Too high and it will swamp any faint echoes that might be detected, while too low will cause the echoes to be set in the sea clutter.

7. Small craft can be very difficult to see in poor visibility, but the chances of spotting them are greatly improved if their presence is anticipated.

8. Any small craft can enhance its radar echoing area by fitting an effective radar reflector and ensuring it is correctly fitted. It is worth obtaining expert and independent advice on the most suitable reflector for your craft. The salesman might persuade you that his is the best there is, but even if it matches the hyperbolae, its properties can be diminished by not fitting it correctly. *Beverley Ann II* carried a common corner radar reflector on her mast, but it was rigged at an angle and not in the ideal position with its main axis at 45° to the vertical.

9. GRP constructed vessels give poor radar returns, but metal objects inside the hull (such as a cooker or an engine) have reflective properties. If they have a radar cross-section, which matches the energy returned, the boats motion can enhance or, paradoxically, nullify the returning signal. The effect is an intermittent echo. And they can be difficult to recognise.

10. You might wonder whether this accident would have occurred had one, or both vessels been making sound signals before the event. Some will argue that it isnt necessary when the visibility is between 1 and 2 miles. But in just such conditions two vessels managed to collide.

Footnote

Merchant Shipping Notice No M.1638 provides useful advice on the fitting of radar reflectors to small vessels.

Part 2
Fishing Vessels

MAIB inspectors are always looking for trends in accident reports with a view to identifying problems so that appropriate action can be taken. And by action we do not mean having to undertake expensive training courses, buying new equipment, or having to comply with new regulations. We learn from the mistakes, oversights, and experiences of others. It is far better than repeating the accident which is probably expensive, or painful, or both.

Sometimes we come across a problem that worries us sufficiently to warrant a special point being made to drive a hard lesson home. We have, for instance, been concerned to note the number of times fishing vessels sink with seemingly little reason. In past editions of the Safety Digest we have commented on faulty pipework, on bilge alarms that dont work, and watertight bulkheads that arent watertight. The lessons arising from past accidents in which all these factors have played a crucial part are worth a revisit, and if anyone wants a copy of a past edition of a Safety Digest, they are more than welcome to contact us and ask for a copy to be sent.

But a more worrying trend is beginning to emerge, a failure to understand how easy it is to destroy a fishing vessels stability. It isnt new and we have commented on it before.

To many the topic of stability is a black art, a science designed to baffle the most knowledgeable of fishermen, and to be endured as a necessary evil when sitting for a certificate of competency. It embraces such exotic expressions as GZ, metacentric heights, vertical centres of buoyancy and other terms that are as likely to produce as many glazed looks as enlightenment. Naval architects tend to get very excited about the subject, and start talking in a language that is incomprehensible to most mariners.

The problem for fishermen is that it is a deadly serious subject. Even if individuals do not have an in-depth knowledge of the technicalities, a basic understanding could mean all the difference between life and death. Overloading a vessel to bring in some much needed income might seem a good idea at the time, but it can dangerously reduce freeboard, bring doors and hatches nearer to sea level, or dangerously reduce the overall stability.

Topping up derricks in a beam trawler with the nets very full could raise the centre of gravity to a dangerously high level, and reduces the stability.

And free surface water sloshing around in a hold or bilge could be the precursor to a capsize. Many fishermen think that a hold or bilge full of water is an acceptable working configuration, and argue the vessel is designed to remain afloat if any one compartment is full of water, or they have done it before and found no problem. OK, perhaps in still water, but a recipe for disaster in a seaway. Even if the heel is only a modest 10° or so, the sudden surge of water to one side, perhaps only centimetres deep to start with, could be sufficient to capsize you.

It is a very serious business. Try and understand it. Resist the temptation to overload. Know the limitations when topping the derricks. And if you are aware of water accumulating in the bilges or the fish hold, get rid of it, fast. That means making sure the bilge suction system is functioning correctly. **Even a few inches of water in the hold can be the prelude to your vessel becoming unstable and capsizing. Keep your vessel dry, and heavy weights low.**

Case 19
Pair Trawling - Crewmen Injured in Two Similar Incidents

CASE 1

Narrative

The 21m Fraserburgh pair trawlers *Amoria* and *Acanthus* had arrived on the fishing grounds and were preparing to shoot the trawl. The weather conditions were moderate with a 25 knot wind.

Amoria paid her trawl into the water, astern and slightly to starboard, and waited for *Acanthus* to close on her port side, so she could transfer the tail-end rope of the trawl across to her. *Amoria* was lying with her propeller disengaged.

As *Acanthus* approached, her speed was greater than normal, but a heaving line with the tail-end rope was passed to *Amoria*.

As soon as the tail-end rope was connected on board *Amoria*, it immediately tightened as a result of *Acanthus*s relatively high speed. One of *Amorias* crew was caught by the rope and knocked over, while a colleague who had just secured the tail-end rope, was dragged forward and over the net drum to land up hard against the accommodation casing.

The weight on the rope then caused the towing yoke chain to part, so that the crewman was dragged aft, and back over the net drum. He was then pulled hard against the stern roller with his left leg entangled in the sweeps. The weight of the sweeps tore his boot off and this alone prevented him from being dragged overboard.

*Amoria*s skipper immediately engaged astern propulsion, which eased the weight on the sweeps and enabled the crewman to be freed. Emergency assistance was then requested by radio, and the crewman was airlifted to hospital.

After three days in intensive care, he was transferred to a normal ward and was expected to make a full recovery.

CASE 2

Narrative

The 22m Peterhead pair trawlers, *Elegance* and *Provider* were also shooting the trawl. As before, the weather conditions were moderate.

When the tail-end rope was connected, to transfer the port side of the trawl from *Elegance* to *Provider*, it came taught immediately, and pinned one of the crewmen against the rail.

Once the crew of *Provider* realised what had happened, they slackened away on the rope, allowing the crewman to be freed. There were no visible injuries to the crewman, but he was in severe pain. Internal injuries were suspected, and emergency arrangements were made to airlift him to hospital. He was expected to make a full recovery.

The Lessons

1. Transferring one end of a pair trawl from one vessel to another can be a hazardous operation, especially if weather conditions are not ideal. It necessarily involves both vessels coming close together to pass gear from one to another. It is imperative that the skippers and crews of both vessels are fully conversant with the operation and the dangers involved.

2. The speed of the vessel receiving the net end should be kept to the minimum at which she can be kept on course until the transfer is complete.

3. The crews of both vessels involved should ensure they do not place themselves in an area of danger. A time of potential danger exists if the receiving vessel approaches at too high a speed.

4. Good communication between vessels, and between the skipper in the wheelhouse, and those on deck in each vessel is essential.

Case 20
Fishing Vessel Grounds after Skipper Falls Asleep

Narrative

After 4$^1/_2$ days of none too successful fishing around wrecks, a steel-hulled 15m gill netter was returning to harbour ahead of schedule. The sea was calm with a slight swell, and visibility was poor due to mist. The vessel was steaming at reduced speed with the skipper alone on watch.

About 3 miles from the harbour entrance, the skipper sat down and promptly fell asleep. The next thing he remembered was being woken when his vessel ran aground. By the time he realised what had happened, the rest of the crew had arrived in the wheelhouse. The engine was reversed and she came free of the ground. The crew meanwhile had donned lifejackets and were preparing the liferaft. Two went forward and found that the fish hold was flooding. Pumping had little effect, and the skipper decided to make for shallower water so that he could beach his vessel before she foundered. An RNLI lifeboat transferred salvage pumps to her, and these successfully contained the flooding sufficiently for her to make harbour. Since the accident, the skipper has fitted a new autopilot with a watch alarm. It sounds both in the wheelhouse and in the cabin. He has also equipped the vessel with two more salvage pumps, and has taken on additional crew to reduce workloads and increase rest periods.

The Lessons

1. There can be few skippers who do not relate to at least part of this narrative. During the two days before the accident, the skipper had slept for no more than a total of 5 hours. Some people think they can manage on this and still remain alert. But you cant. Your senses are dulled, rational thought becomes elusive, and you make mistakes. To deprive yourself of so much sleep invites trouble. It might only take seconds to fall asleep, and in so doing you betray the trust of those others onboard who look to having an alert watchkeeper to ensure a safe passage home. Fatigue is one of the greatest enemies of safe fishing.

2. This skipper has learned from his experience. He has recognised the need for adequate rest periods, and has fitted a watch alarm, which sounds not only in the wheelhouse, but also just as importantly, in the cabin. Other skippers should heed the lessons, and take appropriate action before they too take the ground or, worse still hit another vessel.

3. There is however a cautionary note to sound. Fitting watch alarms only goes part way to solving a problem. It does nothing to relieve fatigue. The MAIB has several instances on record where very tired fishermen have slept through even the loudest and most ear-piercing alarms. Fatigue can kill. Make sure the operating cycle allows time for adequate rest.

Case 21
Close Encounter in Fog

Narrative

It was daylight, but visibility was restricted by dense fog.

The fishing vessel *Gaidan* was hauling pots. She was equipped with a radar reflector but no radar, and was displaying the daytime signal for a vessel engaged in fishing.

The general cargo vessel *Johannes C* was outbound from the River Tees and heading towards *Gaidan*. The master was on watch, with a dedicated lookout and a helmsman. A radar was operating on the 3-mile range scale with some adjustment made for sea clutter. The master observed two targets generating multiple echoes, but saw nothing to indicate the presence of a vessel ahead. A second radar was on standby. A fog signal was sounded manually at intervals of approximately 2 minutes.

The two-man crew of *Gaidan* were unaware of the approach of *Johannes C* until the last minute when, to avoid a collision, they cut the back rope and went full astern. The cargo vessel passed at a range assessed to be less than 100m. When *Johannes C* sighted the fishing vessel she appeared to be stopped and clear to starboard, so the master assessed no avoiding action was necessary, and kept on going.

The Lessons

1. Anyone, who has ever kept a watch in fog, be it in the merchant ship or the fishing vessel will relate to this incident. What are the lessons? First and foremost it is the need to keep a proper lookout. To comply with this requirement, it is essential you have sufficient people available to do so. It is too easy to think radar will solve all the problems. This incident shows, yet again, that you need every pair of eyes and ears available to achieve it. One man glued to the radar, in fog, close to a port is not keeping a proper lookout. And two radars are better than one. On different range scales.

2. The cargo vessel was making sound signals, manually. Anyone who has ever kept a watch on a bridge, in fog, and is being honest, will probably admit to not maintaining the correct interval with total reliability. If one adds to that the demands of watching the radar carefully, and you are in dense fog, remembering to make sound signals yourself may not be the first priority. If there is no automatic system, which will alleviate the need for an additional hand to make the signals, there is little alternative but to ensure someone is doing just that without interfering with either the steering or keeping a proper lookout.

3. Although equipped with sound signalling equipment, the fishing vessel made no sound signals. Undue reliance was placed on an approaching vessel detecting her by radar or visually and taking the appropriate avoiding action. Fishing vessels, no matter if they are fishing or not, are still bound to observe the rules, fog or no fog. This means a proper lookout must be kept. It involves eyes, radar (if carried) and ears.

And if another vessel is approaching, put yourself in his position. Even if it is assumed he has detected you and holds you on his radar, and you arent making any sound signals, he doesnt know you are fishing. The rules are quite clear about your responsibilities in fog.

Rule 7. ***Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists***

Rule 19. ***Every vessel shall have due regard to the prevailing circumstances and conditions of restricted visibility***

The entire philosophy behind watchkeeping in fog is to detect the other vessel and follow the rules to avoid collision. It does not mean you assume the other man does everything, just because you are fishing.

4. A fishing boat skipper should be aware that his vessel may not be easy to see on anothers radar. This could happen if it is built of wood, or GRP. Perhaps there is a lumpy sea, the radar reflector is unsuitable for his craft, or it has been incorrectly rigged. There is at least a possibility that the vessel heading towards you on a collision course, and still out of sight, is totally unaware of your presence. In this case you have to do something to avoid the collision.

5. Fishing in the approaches to a busy port in dense fog will carry additional risks. Ask yourself, is this sensible?

6. If the worst comes to the worst and collision is almost inevitable, drastic action may be necessary. There can be no hard and fast rule about what to do. However, each skipper should have a plan about how he can take the way off in an emergency, or suddenly accelerate, or alter course very rapidly in a last ditch attempt to avoid being run down without causing another accident to vessel or personnel. It is far better to avoid the collision in the first place.

Case 22
Beamer Capsizes

Narrative

At 1630 on 11 November 1997, the 21.54m twin beam trawler *Margaretha Maria*, left her home port of Newlyn with a crew of four and headed for fishing grounds in the western approaches to the English Channel. Apart from a telephone call that evening, there was no further contact with the vessel.

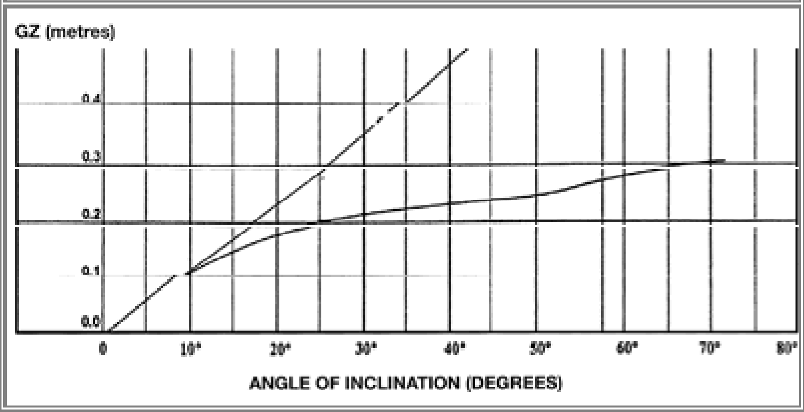
Several days later, concern for the vessel began to develop when the owners were unable to contact her. The coastguard made its own unsuccessful efforts to contact the vessel, as did the French authorities. The incident was raised to a Mayday and a full-scale search and rescue operation began. Aircraft and surface vessels covered over 2500 square miles of the western channel. No signs of *Margaretha Maria* and her crew were found, and the search was called off after two days.

The skippers body was recovered in the Western Channel during February 1998. Sonar searches of the area by Royal Navy vessels located and identified the wreck of *Margaretha Maria* in 120m of water.

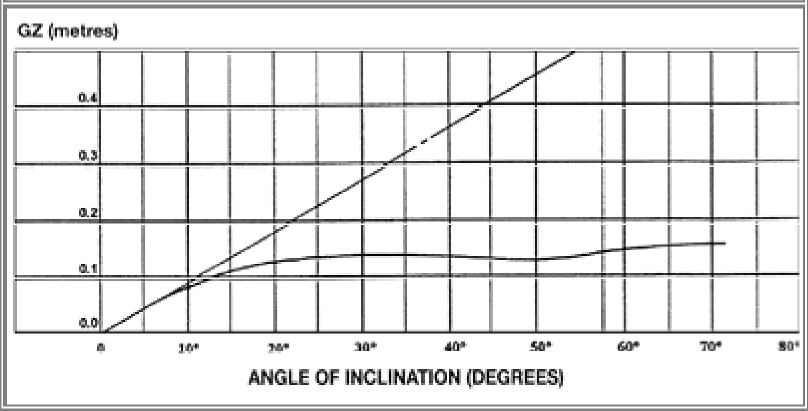
The wreck was surveyed using remotely operated vehicles (ROVs). She was found with her derricks partly topped, her beams at the derricks ends, and a large quantity of shells and sand in the cod end of one net. The other cod end was badly damaged. It was concluded that she had hauled her nets to the surface with a large amount of sand and shells in each cod end. Both derricks were then topped, but the unusually large weights in her nets acting on the derrick ends, seriously reduced her stability. In this state she was unable to resist even small heeling forces and she rolled to port, was unable to recover due to lack of stability, and sank by the stern.

As she went down by the stern, her liferafts, which had been stowed on the aft shelter, floated free. Unfortunately they floated forward and became fouled on the derricks and netting, resulting in neither being able to float to the surface. The emergency position indicating radio beacon (EPIRB) probably suffered a similar fate, because it too had been stowed on the shelter, quite close to the liferafts.

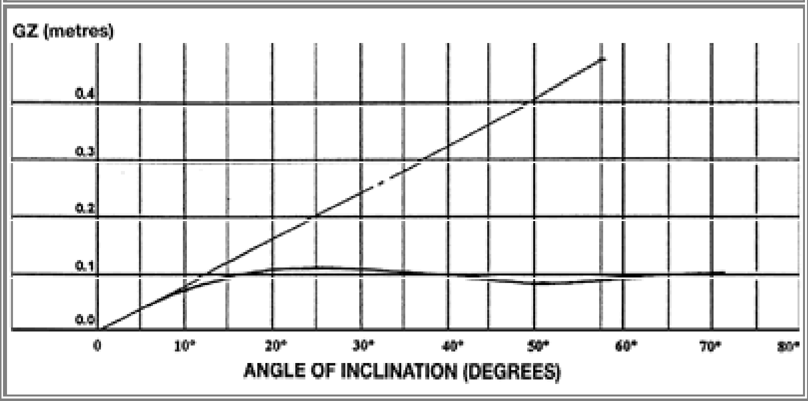
Curve (1) is with derricks horizontal and with weight of beams at their ends. Vessel complied with all stability criteria for twin beam trawlers.



Curve (2) is with derricks 30° above the horizontal with weight of beams at their ends. Vessel did not satisfy four of the six criteria for twin beam trawlers, or the lesser standards of non-beam trawlers.



Curve (3) is with derricks 45° above the horizontal with weight of beams at their ends. Vessel did not satisfy four of the six criteria for twin beam trawlers, or the lesser standards of non-beam trawlers.



The Lessons

1. Skippers and crews will know that it is more difficult to accurately assess the weight of any debris while the gear is still on the bottom. This is particularly so if the winchs capacity is large. With little idea of the weights in the nets, it is impossible to assess the effect on the vessels stability of bringing gear to the surface, and handling these weights at the derricks heads.

2. During the MAIBs investigation, the stability of *Margaretha Maria* was examined under various conditions. Some of these were operational conditions, which occur daily on most twin beam trawlers, but are not required to be considered when assessing stability for a UKFV survey. In particular the condition where the weights of both sets of gear are suspended from topped derricks, but with empty nets, caused some concern. The effect on her stability was marked and, although beam trawlers are required to have 20% greater stability than other fishing vessels, her stability in this condition was significantly less than that required of any fishing vessel over 12m long. Thus, more than the mandatory 20% stability

margin was lost due to the effects of normal topping of derricks and gear, *without any additional weight of sand and shells in the nets*.

3. Fishermen are well aware of the effect of hanging weights from derrick ends. However, fishing vessels do not usually have stability data on board which attempts to place any figures on just how much stability is affected by this type of operation. The diagrams illustrate the size of this effect on *Margaretha Maria*.

Footnote

Other beam trawlers might be affected to a similar degree, depending on the weight of their gear and geometry of their derricks. The MAIB has therefore recommended that the Maritime and Coastguard Agency (MCA) makes a study of this effect on operational beam trawlers, with a view to amending stability requirements of this type of vessel.

Case 23
Sidewinder Sinks in Heavy Seas Six Die

Narrative

The 28.32m long *Pescalanza* was fishing in an area about 80 miles south of Ireland, with an estimated 12 tonnes of fish on board. The weather was not good with frequent heavy showers and a north-north- west to north-west force 8 to 9 wind. There was a heavy swell running and the sea was described as very rough.

*Pescalanza*s trawl gear was sidewinder rigged, but on her port side instead of the more traditional starboard side. Prior to hauling her fishing gear, both warps were released from the towing block aft so that she could come round to place the prevailing weather on to the port side.

With the weather on the port beam, *Pescalanza*s crew began heaving on the trawl warps with the main winch until the trawl boards were close up to the fore and aft gallows. While this was happening, she was rolling heavily in the very rough seas.

As the crew were about to secure the trawl boards to the gallows with the trawl and sweeps still outboard, *Pescalanza* shipped a heavy sea, heeled over to port and flooded her main deck. Before she could recover, she was struck by another heavy sea. Because she had so much water trapped on the main deck, and now had the weight of the trawl to contend with, the list increased until she was on her beam-ends. She began to take on water aft, which caused her stern to partially submerge. Just as the fishing skipper was calling on VHF Channel 13 for help from nearby fishing vessels, a third large wave struck *Pescalanza*. It was more than she could take and she began to sink.

The skipper and the fishing skipper managed to get out of the wheelhouse and onto the starboard bridge wing. From there they could see that the crew were clinging to an exposed part of the vessel. The port liferaft was under the water by now and could not be reached. They managed to release the starboard liferaft, only to discover that it inflated upside down. The fishing skipper then saw another fishing vessel approaching, and attempted to attract her attention by throwing a lifebuoy with smoke float attached into the sea. *Pescalanza* continued to sink.

When the water had reached chest level of those onboard, the painter of the inverted liferaft was cut and it began to drift away. Realising that their only hope of rescue lay in reaching the liferaft, the skipper and the rest of the crew swam towards it. After three of them had reached it they tried to right it but found it impossible to do so in the conditions prevailing at the time. Eventually six of them made it, and managed to hang on to it. One person was swept away, but he managed to grab the lifebuoy which had been thrown into the water earlier. The others were able to climb on to the liferaft, where they huddled together trying to keep warm. With their position becoming increasingly precarious, they were eventually rescued by *Agorreta*, another fishing vessel that also managed to recover the person who was holding on to the lifebuoy. *Agorreta* also recovered four bodies. Two remaining crew members were not found.

Under normal circumstances an accumulation of water on deck will run off through the vessels freeing ports on the main deck. Weathertight doors and hatches will, if properly secured, prevent water getting inside.

There is insufficient evidence available to the MAIB to identify precisely how water entered *Pescalanza* on this occasion, but it is obvious that she shipped a substantial amount very quickly. As there is no report of structural damage from eyewitness accounts, it is reasonable to suppose water entered through the weathertight door protecting the shelter from the main deck area. It is probable this had been left open while recovering the trawl gear and provided the means whereby water could flow into the shelter.

Not only did *Pescalanza* list heavily to port, but she also adopted a stern trim. This is indicative of the doors to the mess room and the engine room having been left open to allow sea water to enter and downflood.

The third large wave to hit *Pescalanza* exacerbated the situation, and she was unable to recover.

The volume between the main deck and the shelter deck aft of the bridge front was included in the zone used in calculating stability. Once water was allowed to enter this space it would adversely affect the vessels stability, and this was clearly stated in *Pescalanza*s approved Stability Booklet. One of the working instructions contained in that booklet deals with watertight integrity and states The levels of stability are entirely dependent upon water being excluded from the hull below the trawl deck. Open doorways, hatchways etc. breach this watertight integrity leaving the vessel vulnerable when suddenly heeled, or when taking the sea on board.

The Lessons

1. The MAIB is seeing increasing evidence that too many fishermen are failing to ensure water is kept out of spaces that, if flooded, are likely to sink their vessel. Skippers must read their Stability Book, understand the implications of shipping seas that might adversely affect stability, and do something about keeping weathertight doors and hatches shut. If the stability book provides working instructions, follow them carefully.

2. Weathertight doors should be marked, or painted in some way, to indicate to the crew that they are to be kept closed except when used for access. A practice adopted by some mariners is to paint, in some distinctive colour, the top outboard edge of any door to indicate the importance of keeping it shut when at sea.

3. Where the buoyancy effects of shelters have been considered when assessing stability, fishing vessels may not comply with stability requirements if certain weathertight doors are left open at sea.

4. The chances of survival at sea in such situations are greatly increased if lifejackets are worn at all times when working on deck.

5. Righting an inverted liferaft in a high sea state and rough seas is always far more difficult than the textbooks would have us believe. But the chances of success will be greatly improved if you know how to do it. *Everyone* should attend a basic survival-training course even those who are exempt.

Case 24
Deckhand Struck by Port Fishing Gear

Narrative

The twin beam scalloper *Geeske* was fishing in the English Channel in moderate weather conditions early one winters morning. During the final haul, a deckhand was struck by the port fishing gear as it was dropped on to the deck. He was badly injured, and despite valiant efforts by the crew to save him, he subsequently died. Three crew were involved, led by the mate in the wheelhouse who was in charge of the winch controls. Two deckhands were tending the fishing gear.

The skippers instructions for hauling operations were not being followed. When the port gear was hauled inboard, one deckhand should have been on the starboard whipping drum, hauling the pulling-in rope for the port gear. The other deckhand should have been in a protected position under the whaleback, where he could see the entire dropping zone for the port gear.

The starboard gear had just be brought inboard, and the winch operator thought that the deckhand had finished using the port whipping drum, and was stowing the pulling-in rope for the starboard gear in front of the wheelhouse, which is just inboard from the dropping zone of the port gear. The winch operator did not wait for the deckhand to move to the protected position under the whaleback. The port gear was dropped, but instead of the deckhand being just clear of the gear, he was under it.

In mitigation, the view from the wheelhouse was poor, especially for the mate who was quite short. An upturned fish box was fitted as a standing platform for the winch operator, but even with this aid the aft parts of the dropping zones could not be seen.

The Lessons

1. For dangerous operations, it is essential that the proper procedures are followed. If the hauling inboard had been conducted correctly, the winch operator would have been able to see that both deckhands were clear before the port gear was dropped. One would have been in a protected position under the whaleback, and the other would have been stood just forward of the whipping drum on the starboard side.

2. To reinforce the proper procedure, a professional safety audit is to be carried out on the hauling operation, which will lead to the production of a set of written instructions for this dangerous exercise.

3. The accident would almost certainly not have happened if the winch operator had been able to see the whole of the dropping zone. Mirrors have now been installed to achieve this; owners of similar vessels have used closed circuit television for the same purpose. Also, a permanent standing platform has been built instead of the fish box.

4. Provision of a formal set of safety instructions for the hauling operation, and clear vision of the whole of the dropping zone on both sides by the winch operator, should prevent a similar accident in the future.

Case 25
Weathertight Closures Left Open. Vessel Sinks. Four Die.

Narrative

Sapphire and *Elegance* were two very similar wooden fishing vessels that operated as partners in pair trawling operations. Following two days on the fishing grounds east-north-east of Peterhead and with the catch stowed in boxes, they headed for Fraserburgh at 1000 on a course of 298° and making good about 8 knots, with *Sapphire* leading. *Elegance* followed about two miles astern. They were within visual and radar contact of each other.

The wind was westerly, about force 4 to 5. *Sapphire* was taking heavy spray over her wheelhouse, but because *Elegance* was taking seas over her bows, her skipper reduced speed.

At 1030, *Sapphire*s skipper handed over the watch to one of the crew, and having checked the engine room, went to his bunk.

At about 1330 the watchkeeper in *Elegance* noted that *Sapphire* was gradually pulling ahead. By now the wind had increased to north-west force 7 to 8. The last contact between the two vessels was at about 1400, when *Sapphire* was seen both visually and on radar about 4 miles ahead of *Elegance*. Radio contact between the two vessels was made at about that time.

*Sapphire*s skipper was woken at about 1530 by the vessel listing heavily to starboard. Thinking this was caused by turning sharply to port, he got up to find out why. On his way to the wheelhouse the list increased to about 60°, and realising something was desperately wrong, he called for all the crew to get up.

On reaching the wheelhouse, he found the watchkeeper sitting in the starboard chair holding the armrest with his left hand, and leaning on the instrument console with his right. The skipper considered sending a Mayday, but before he could select the appropriate channel, changed his mind and tried to activate the distress alerting function of the telex instead. The skipper asked the watchkeeper whether *Elegance* had been told of the situation, and was informed she had not. A call was then made for everybody to evacuate the accommodation. The starboard windows of the wheelhouse were, by then, immersed in the sea.

The skipper tried to call *Elegance* on MF radio, but before he could read the vessels position from the GPS display, the power supply failed. The wheelhouse filled rapidly with water and the skipper was swept towards the port aft window that was open, but by now, underwater. He managed to escape through it. *Sapphire* sank shortly afterwards. The two liferafts released and inflated as designed, the skipper swam to one, and managed to board it. He set off some flares and smoke floats, one of which was seen by *Elegance*s watchkeeper and skipper who contacted the coastguard. The skipper was rescued by helicopter, but no other member of *Sapphire*s four crew managed to escape.

The MAIB investigation found that *Sapphire* had been operating with the following weathertight closures open: the engine rooms emergency escape hatch; the forward and aft doors on the starboard passage; and the door from the starboard passage to the engine room. In addition, the weathertight main fish hatch was not securely closed.

Careful analysis of all the facts, led the MAIB to conclude that the fundamental cause of the sinking of *Sapphire* was the progressive downflooding of major spaces through weathertight doorways and hatches, which were open or inadequately secured while at sea. A major contributory factor was the crews lack of understanding of the function and importance of the weathertight hatch covers and doors.

The Lessons

1. It is important to keep weathertight doors and hatches securely closed when at sea, except when being used for access or egress.

2. The doors and hatches, which are required to be closed at sea, should be identified in some way so that all crew can recognise them immediately. The doors or hatches could be painted or marked in a particular way, or warning notices could be fixed to them.

3. The vessels high-level bilge alarm was not working. Had it been, the flooding might have been detected at an earlier stage and before it became serious.

Part 3
Leisure Craft

Unlike most pursuits, accidents afloat have two distinct components, the actual event followed by the recovery phase. The event can be traumatic enough; the grounding, the collision, man overboard, fire or the capsize. And so can the recovery. So often the leisure craft sailor is still on his own after whatever has happened. Not for him the automatic arrival of the emergency services, with sirens wailing and blue lights flashing. The search and rescue services are there to help, and extremely good they are too, but they have to be alerted and then find you. It can be some time before they actually arrive on scene.

Accidents at sea bring their own problems, not least of which is the environment itself. The sea pays little heed to mans difficulties in the face of adversity. It is still wet, usually cold, often rough and very unforgiving of mistakes. The sailor still has to cope with the immediate problem. This may vary from trying to work out exactly what to do with water flooding into the cabin, or looking for the person who has just fallen overboard, raising the alarm, or even having to restart the engine when trying to weather an unsympathetic headland on a foul night with a seasick crew down below.

Nearly all ones training is focused, quite rightly, on preventing the accident happening in the first place. It means you understand the basics of navigation, of knowing what to do when the GPS fails. It means you know when to put in a reef before it is too late. It means you know your engine and how to look after it. And it means you know your craft. It does not mean launching a flat-bottomed canal boat into the North Sea from the Norfolk coast on the misguided assumption that the open water ahead of you is part of the Broads. (It has happened!) And it means knowing your crew. A good skipper is a pearl beyond price. He or she will understand the strengths, weaknesses and limitations of those on board. He or she will teach, encourage, guide and take ultimate responsibility for everything that happens. And that includes knowing what to do when it goes wrong.

The skipper who has thought through every eventuality is not only well placed to take the right action at the time, but will almost certainly have realised he or she needs to do some basic checks to ensure all is well before letting go fore and aft. Are the lifejackets and liferafts in date? Have the charts been corrected? Has that slightly suspect forestay been changed after the dramas of an earlier voyage? And does everyone on board know what to do in an emergency?

Sailing, power boating, racing round the cans, facing the challenge of a trans-global, or meandering through the inland waterways including the Norfolk Broads, are supremely enjoyable and richly rewarding pursuits. But things can go wrong. The wise sailor never takes anything for granted. Experience, training, careful thought and thorough preparation for even the shortest passage are necessary ingredients for a safe voyage or outing on the water.

And one of the easiest tasks of all is to read, and digest the contents of this and other MAIB publications. It is just possible you might hoist in something that will save your life, or that of someone else in the far distant future. And, furthermore, Safety Digests are free.

Case 26
Man Overboard Fatality from Keelboat

Narrative

Two men and a woman, students at the UK Sailing Academy in the Isle of Wight, were sailing an Etchell 22 keelboat in the Solent. A 6m launch with two instructors on board was close by. It was May, the weather was good, the wind was force 3 to 4 and the water temperature was about +11°C. All was well, until the Etchell gybed unintentionally and knocked one of the two men overboard. The man was properly dressed, wearing full sailing waterproofs with a fleece underneath and a 150N lifejacket. He was not injured when he fell overboard, but although fit and generally in good health, he weighed about 127kg (20 stones).

The attendant launch with the two instructors on board came to the immediate assistance of the man overboard for what was assumed to be a straightforward recovery. The launch had a freeboard of 0.8m, and to the dismay of the instructors, they found they could not lift him out. At first the man was able to assist his would-be rescuers, but he soon tired. After about 4 minutes he became unconscious, and very soon stopped breathing. The coastguard and the sailing academy were informed about what had happened, as one of the instructors went into the water to begin mouth-to-mouth resuscitation on the casualty.

A rescue helicopter was on scene about 25 minutes later, and the casualty was airlifted to hospital on the Isle of Wight. However, despite continuous attempts to revive him, he was eventually pronounced dead. One of the academys RIBs, which had responded to the emergency call, arrived five minutes after the helicopter.

The Lessons

1. This accident occurred despite every reasonable precaution being taken. The Sailing Academy had given much thought about how to prevent accidents, and how to react should one occur. The man was sensibly dressed for keelboat sailing, and was wearing a lifejacket. A launch was close by with two instructors on board who saw what had happened and were able to provide assistance within seconds of the man going overboard. And yet, despite all this, a man died. Anyone studying this accident will realise that one thing had been overlooked. Recovering anyone from the water is always much more difficult that almost anyone ever realises, but in this instance, trying to lift someone weighing 20 stone is very nearly impossible without the manpower, the lifting purchase, or sufficiently low freeboard to achieve it. Freeboard in this instance can be achieved in a number of ways.

2. Cold shock, combined with the general trauma of having suffered a sudden accident, can occasionally cause death very quickly.

3. Losing a person overboard should always be considered a possibility whatever the craft being sailed, and whatever the weather conditions. There should be well-rehearsed routines, and specific equipment to aid the recovery of any of the boats occupants, whatever their size or disability.

4. Crew members of very large stature, or crew members otherwise restricted in their mobility and agility, are particularly vulnerable, especially in a performance sailing craft with a low boom height. The particular risks should be thoroughly assessed before a voyage, and if necessary, extra precautions should be taken to cope with an emergency.

Case 27
Winter Fishing Trip Ends in Tragedy

Narrative

On 30 December 1998 three men and young boy set out from Penarth near Cardiff for a days sea angling in *Kelly Marie*, a 16' powerboat fitted with an 85HP outboard engine. The weather was fine with a force 2 to 4 southerly wind.

The state of the boat on 30 December is unknown, but a month earlier a coastguard had seen it and described her condition as very poor. There is no evidence to show that any improvement of note had been undertaken in the intervening weeks.

None of the occupants were experienced sailors. Their clothing was suitable for outdoor pursuits on dry land, but not for use on the water in winter. Buoyancy vests had been provided, but not proper lifejackets. Chemical lights were carried, as were some flares in the main cabin. A weather forecast had been obtained from Ceefax before setting out, but no attempt was made to obtain a suitable weather forecast for use by anyone spending a day afloat. The sea conditions were described as moderate to rough. Nobody carried a personal locator beacon.

On putting to sea, the boat began to experience choppy water once clear of the lee of the land. Course was altered to head down sea, and conditions moderated. Shortly afterwards, the skipper decided to anchor so that they could fish, but soon afterwards she began to drag rapidly without, apparently, anyone being aware of what was happening until someone noticed she had drifted a considerable distance. The evidence indicates that the anchor used had insufficient cable attached to it, and that the length of line being used was totally inadequate for either the depth of water, or the strength of the flooding tide. Anchor was weighed and the decision was taken to return to the shelter of Penarth Bay.

While on passage and proceeding at an unknown speed, the craft appeared to hit something and started to take in water. Very soon afterwards, with a substantial quantity of water onboard, she capsized. Futile efforts were made to recover the flares, mobile phones and other safety equipment.

The occupants were now faced with the need to attract someones attention to their predicament. Their survival depended on being rescued. The saving grace was that *Kelly Marie* remained afloat and able to provide something for the survivors to cling to.

The craft had capsized so suddenly that it had not been possible to recover anything that might have been useful for attracting attention, including the flares and a mobile phone. All they could do was cling to the part submerged boat and hope that someone would either register they were overdue, or that they would be seen. At one stage they were tempted to swim to a buoy which passed close down one side as they drifted past on the flood.

Meanwhile they were all becoming very cold, and no one more so than the young boy. When they were eventually spotted by the crew of a passing merchant ship, and subsequently rescued, it was too late to save the life of the young boy. The cause of death was recorded as unascertained, although there was some evidence of hypothermia. The survivors spent about $3^1/_2$ hours in the water.

The cause of the sinking was never established, but may have been the structural failure of the hull following some earlier repair work, or she may have hit some floating debris. Theories that she hit a buoy or had been sunk by a submarine have been discounted.

The Lessons

1. The sea does not differentiate between professional mariner, the leisure sailor or the casual sea angler. No matter what the reason for spending a day on the water, the same basic precautions and preparations must be made. Any such precautions must make allowances for the type of boat, the anticipated conditions, the experience of those embarked and the time of year. Part of such preparation must address the action to be taken if something goes seriously wrong.

2. The most fundamental preparation is to ensure your boat is seaworthy. If you intend purchasing a craft from someone else, arrange for it to be professionally surveyed before you part with any money. Even if you ignore this advice, make sure it is thoroughly checked for any defects before it is taken to sea. Unless you are very knowledgeable, detecting structural defects might be very difficult.

3. Tell somebody, preferably the coastguard or someone at home, about your intentions before you set out. When you become overdue there is every prospect that someone will do something about it before it is too late.

4. Make sure the size of engine is suitable for the size of craft. Too big, or indeed too small, an engine will create unwelcome problems when underway. A heavy outboard will tend to reduce the freeboard aft and might tempt you to go too fast.

5. Check your gear and know how to use it. An anchor is useless unless there is adequate chain and line attached and deployed. There is much good advice on how much to stream, and it is usually advisable to put out too much rather than too little. And if you anchor always check to see if it is holding. Noting transits ashore is one way, feeling the anchor line is another. And if you are dragging, do something about it. A vessel that is dragging means you are no longer in control of what is happening.

6. If your craft founders but remains afloat, you are best advised to stay with it.

7. At least one person embarked for such a day out on the water should carry something that can be used for attracting attention in the case of an emergency. This might be a mobile phone or a portable VHF radio in a watertight bag, miniflares or a personal rescue beacon.

8. If in the water and clinging to something buoyant, do your utmost to retain body heat. Keeping as still as possible and curled up is better than thrashing around.

Footnote

Whenever a small vessel, usually a fishing vessel, sinks in unexplained circumstances around the coast of the United Kingdom, a submarine is often blamed as being responsible. It is a convenient theory much loved by the media, and often leads to sensational and inaccurate speculation. Such an inference featured in the local press following this instance.

Whenever there is even the slightest suggestion that a submarine could be involved, and no matter how improbable, the MAIB automatically checks with the Royal Navy to see if such a claim is justified. Such checks are made even if it is known the incident did not take place in a published submarine operating area, or a glance at the chart reveals there is insufficient depth of water for a submarine to dive in. The Navy has everything to lose by denying such an encounter and is very good at responding to such checks with total integrity.

Whenever such accusations are made, all submarines under naval operational control are routinely instructed to note their positions at the time of the alleged incident. Contrary to some perceptions, the navy does not cover up its activities when such accusations are made.

Addendum
Yacht Race Rescue Radio Communications

Correction

In one of the footnotes that accompanied the article in Safety Digest 3/99 which described how everybody was saved following the capsize of a number of catamarans in Weymouth Bay during June 1999, we stated that most race organisers use M (channel 80) and channel 37 to conduct on-the-water operations.

It has been pointed out to us that this statement contained errors, which we hasten to correct.

The following excerpt has, with the kind permission of the Royal Yachting Association, been reproduced from its booklet on VHF communications.

Channel M, a private simplex channel on 157.85MHz, is one of two available to British yacht clubs and marinas. It is shown on some VHF sets as P1 or 37. A normal ship licence permits all craft to use this frequency, but only in UK waters.

Since yacht clubs and marinas are not normally permitted to use Channel 16 the initial call must be made on Channel M if that is the listed frequency.

Channel M2 is a secondary frequency issued in 1989 for use by British yacht clubs and marinas. It uses a simplex frequency of 161.425MHz and is also included in UK Ship licences. It is now the preferred channel for yacht race management although it might not be available on some older VHF equipment.

Channel 80 . Because Channel M is not fitted in foreign vessels, the UK authority has designated the International Channel 80, a duplex channel, for use by yacht clubs, marinas and ships calling them. This is now the preferred marina channel. Since marinas and yacht clubs are not normally licensed to use Channel 16 the initial call must be made on Channel 80 if that is the listed frequency.

It must be noted that the use of Channel 80 afloat is only permitted under a ship radio licence, and a certificate of Competence and Authority to Operate is also required.

Comment

M2 is not nearly as well used as it deserves to be and M tends to be grossly overcrowded.

Channel 16 is the obvious channel for use in the initial stages of a SAR but an on-scene-commander can always relieve the pressure by using channel 06; the scene-of-search channel.

We are grateful to one of our readers for alerting us to the error and to the RYA for advising us on how channels M, M2 and 80 are used in the UK.

Appendix A

Investigations commenced in the period 01/12/99 31/03/2000					
Date of Accident	**Name of Vessel**	**Type of Vessel**	**Flag**	**Size**	**Type of Accident**
29/10/99	*P&OSL Aquitaine*	Ro-ro passenger	UK	28,833grt	Machinery
16/12/99	*Samphire of Wells*	Pleasure craft	UK	4.26m	Foundering and flooding
31/12/99	*Chapter 2*	Pleasure craft	UK	9.45m	Accident to personnel
08/01/99	*Harbour Lights*	Fishing vessel	UK	7.20m	Foundering and flooding
11/01/00	*Solway Harvester*	Fishing vessel	UK	19.43m	Foundering and flooding
13/01/00	*Pasadena Universal/ Nordheim*	Reefer/ Bulk carrier	Cayman Islands/ Cyprus	9,273grt/ 5,306grt	Collision
16/01/00	*Ross Alcedo*	Fishing vessel	UK	28.15m	Fire and explosion
22/01/00	*Be Ready*	Fishing vessel	UK	22.39m	Fire and explosion
27/01/00	*Highland Pioneer*	Offshore supply	UK	2,099grt	Collision
06/02/00	*Angela*	Fishing vessel	UK	15.24m	Foundering and flooding
23/02/00	*Opportune*	Fishing vessel	UK	24.04m	Accident to personnel
19/03/00	*Celtic King/ De Bounty*	General cargo-single deck/ Fishing vessel	UK/ Belgium	4,015grt/ 37.87m	Collision
21/03/00	*My Sandra Jane*	Fishing vessel	UK	6.94m	Missing vessel
23/03/00	*Annandale*	Fishing vessel	UK	20.93m	Foundering and flooding

Appendix B
Inspectors Inquiries

An Inspectors Inquiry is the highest level of investigation carried out by the MAIB. Reports arising from such inquiries are normally submitted to the Secretary of State for the Environment, Transport and the Regions within twelve months of the date of the incident.

Such reports are published, subject to the approval of the Secretary of State.

The following accidents are at present subject to Inspectors Inquiries and will be submitted to the Secretary of State:

Name of Vessel	**Brief Details**
Island Princess	Passenger Cruise Ship; Economiser Accident
Multitank Ascania	Fire on chemical tanker in Pentland Firth

Appendix C
Reports issued in 1999/2000 (Priced)

Sapphire - Sinking of fishing vessel on1 October1997 with loss of four lives
Published18 March1999
ISBN185112107 2
£10

Gaul - Report on the underwater survey of the stern trawler and supporting model experiments
Published16 April1999
ISBN1851121714
£20

Sand Kite - Collision of dredger with the Thames Flood Barrier on 27 October1997
Published 24 April1999
ISBN185112108 0
£20

Margaretha Maria - Sinking of fishing vessel between11and17 November1997 with loss of 4 lives
Published 22 July1999
ISBN185112109 9
£12

MAIB Annual Report1998
Published 3 August1999
ISBN185112184 6
£16

Green Lily - Grounding of cargo vessel on19 November1997 with loss of one life
Published11August1999
ISBN185112183 8
£12

Rema - Sinking of cargo vessel on 25 April 1998 with loss of four lives
Published17 February 2000
ISBN185112185 4
£20

The publications home page contains information on how and where you can obtain publications produced by the Department for Transport.

Copies are not available direct from the MAIB and this office accepts no payment by any means. A list of Stationery Office stockists and distributors outside the UK appears at Appendix E.

Appendix D
Reports issued in 1999/2000 (Unpriced)

Adherence - loss of tug in the Bay of Biscay on 25 October1996

Arcadia - lifeboat winch failure on passenger cruise ship on 9 December1998

Arco Arun- grounding off Broadness Point, River Thames on13 October1998

Baltic Champ - grounding off Kirkwall on 4 February1999

Beverley Ann II/Cypress Pass - collision on 9 March1999

Blue Hooker- loss of the fishing vessel with two lives off Blackchurch Rock, North Devon on 12 November1998

Catrina - capsize of the UK registered fishing vessel south of Newhaven on13 October1998

Constancy - sinking of fishing vessel with loss of one life on 30 July1998

De Kaper - fire on board trawler of Hanstholm, Denmark on12 February1999

Dinghy (Unnamed) which capsized in The Sound of Iona with the loss of four lives on13 December1998

Dory (Unnamed) which sank on Loch Awe with the loss of three lives on 29 May1999

Drum Major - foundering of narrow boat with the loss of four lives at Steg Neck lock near Gargrave, North Yorkshire, on19 August1998

Edinburgh Castle - fire in main galley of vessel on 21August1998

Edinburgh Castle - death of one person on cruise ship while berthed in Southampton Docks on 3 May1999

Enak/Loveletter - failure of lifting arrangement in Sunderland Docks with loss of one life on 9 May1997

mv Elm/Mfv Suzanne - near miss incident on11 February1999

Geeske - death of one person while fishing off Beachy Head on 9 December1998

Hoo Robin/Arklow Marsh- collision between cargo vessels on River Trent on 2 March1999

Loch Awe (see **Dory**)

Ocean Madam - capsize of yacht with the loss of one life in the Bay of Biscay on 8 October1997

Octogon 3 - grounding of the Romanian registered ro-ro cargo vessel two cables south-east of Spurn Head at the entrance to the River Humber on 22 October1998

Pentland - grounding of the dry bulk carrier on 7 December1998

Pescalanza - sinking of a the fishing vessel with the loss of six lives on 2 November1998

P&Osl Kent - death of a donkeyman on10 November1998

Pride Of Le Havre - engine room fire on18 March1999

Saga Rose - fire on the passenger cruise liner whilst undergoing a refit at the A&P Docks, Southampton on14 December1997

Sally Jane - capsize alongside in Shoreham Harbour on 27 July1998

Samphire of Wells - foundering of dinghy off north Norfolk coast with loss of two lives on 16 December1999

Sea Centurion - fatal accident to a motorman on board the ro-ro cargo ship at Portsmouth Naval Base on18 May1999

Suzanne - see **Elm**

The Sound Of Iona- see **Dinghy** (unnamed)

Toisa Gryphon - engine room fire150 miles west-south-west of Isles of Scilly on 2 February 1999

Trijnie - capsize and foundering of the workboat/tug in the approach channel to Milford Docks, Milford Haven on 8 September1998

Wahoo - man overboard fatality from an Etchells 22 keelboat, off Yarmouth, Isle of Wight on14 May1999

Willem B - crushing and subsequent death of a bargehand at Nab Tower Dumping Grounds on 6 June1999

Copies of these reports are available free of charge on request from MAIB (023 8039 5506).

MAIB Safety Digest 1/99
Published May1999

MAIB Safety Digest 2/99
Published November1999

MAIB Safety Digest 3/99
Published January 2000

Fishing 2000 Safety Digest
Published March 2000

Copies of the *Safety Digest* publication can be obtained free of charge, on application to the Marine Accident Investigation Branch (Mrs J Blackbourn (023 8039 5509)).

Appendix E
Stationery office stockists and distributors overseas

If there is no agent in your country and you have difficulty placing an order, please write to:
Stationery Office Books, PO Box 276, London, SW8 5DT, England

Argentina
Carlos Hirsch
Florida165
Galeria Guemes
Escritorio 454-459
Buenos Aires

Australia
Hunter Publications
58a Gipps Street
Collingwood
Victoria 3066

Bangladesh
Karim International
GPO Box No 2141
Yasin Bhavan
64/1 Monipuri Para
Tejgaon
Dhaka-1215

Belgium
Jean de Lannoy
Avenue du Roi 202
Koningslaan
1060 Brussels

Canada
See USA

Cyprus
Bridgehouse Bookshop
Bridge House
Byron Avenue
PO Box 4527 Nicosia

Denmark
Arnold Busck
Kobmagergade 49
Copenhagen1150

Far East
Distributor:
Toppan Co (S) Pte Ltd
38 Liu Fang Road

Jurong Town,
Singapore 2262

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Akateeminen Kirjakauppa
Keskuskatu1
SF-00100 Helsinki

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Alexander Horn
Friedrichstrasse 34
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Athens105 63

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Daryaganj
New Delhi110002

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Chuo-ku, Tokyo103
(PO Box 5050
Tokyo Int.,100-31)

Jordan
Jordan Book Centre Co Ltd
University Street
PO Box 301
(Al-Jubeiha) Amman

Korea
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Yungdeungpo-ku
Seoul150-010

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13030 Kuwait

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2311 C K Leiden

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Etterstad, N-0602
Oslo 6

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Manila1088

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10th Floor
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Cape Town 8000)

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PO Box16356
S-103 27 Stockholm

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Bassel 4001

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