MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY DIGEST

Lessons from Marine Accident Reports
1/99

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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. 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.

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Summaries (pre 1997), and Safety Digests are available on the Internet: http://www.open.gov.uk/maib/maibhome.htm

Extract from
The Merchant Shipping
(Accident Reporting and Investigation)
Regulations 1994

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.

INDEX

APPENDICES

GLOSSARY OF TERMS AND ABBREVIATIONS

ARPA	Automatic Radar Plotting Aid
CNIS	Channel Navigation Information Service
CPA	Closest Point of Approach
EBL	Electronic Bearing Marker
ROB	Remains on Board
GT	Gross Tonnage
UMS	Unmanned Machinery Space
VRM	Variable Range Marker

MAIB SAFETY DIGEST

It is often said that about 80% of all marine accidents are caused by human error. In practice the percentage is much higher but the phrase "human error" invariably attracts argument and encourages people to seek someone to blame when things go wrong. The MAIB sets out to do something different; to establish what mistakes are made at sea and why, and to identify the factors that underlie them. We have no interest in apportioning blame but are determined to find out why people act in the way they do and increase awareness of the causes to improve safety at sea.

This collection of narratives and the lessons to be learned constitute a cross section of recent accidents. One or two are potentially serious, many are relatively minor. A theme common to many is the frequency with which so many of the underlying causes occur long before the actual event. In many instances the accident could have been prevented had a shortcoming, or defect, been identified in a routine check. Too often these checks are either not properly carried out or the person making them fails to recognise that something is wrong. The shortcomings may well refer to human factors as well as the identifiable material defect.

One reason why checks fail to identify potential hazards is the acceptance by some that a long standing defect is 'acceptable' or that 'it has always been done that way'. At other times those making the checks might fail to report a known problem. Worse still senior staff do nothing about it when a subordinate draws it to their attention. We often hear people say after an event that 'it was an accident waiting to happen' but who, on questioning, have done nothing beforehand to prevent it. Some tell us there was no point in reporting a defect or shortcoming as nobody in authority pays any attention to it. In a recent investigation the master of the vessel involved in an accident told us he was aware he had a safety problem onboard but felt unable to report it to his owners in case he lost his job. This is an appalling indictment of the breakdown in trust between those at sea and the management ashore. Any master must feel confident he can report safety shortcomings without fear of reprisal.

The various narratives in this edition embrace the entire spectrum of maritime activity and focus on events that have occurred in the engine room, the galley, the bridge or wheelhouse and on deck. The MAIB hopes that those reading them will be able to identify themselves with certain situations or events and will learn from them. Readers are encouraged to read of incidents outside their normal experience because many of the lessons are applicable across the entire spectrum of seafaring.

The astute reader will notice the emphasis being placed on the wearing of lifejackets in any hazardous activity. It doesn't matter whether the reader is in a big ship working over the side in harbour, a fisherman working alone in his potter, or the pleasure craft sailor nipping ashore in his 3m tender to collect the morning papers. They should all be wearing lifejackets. The MAIB derives no pleasure from receiving so many reports of fatal accidents because lifejackets were not being worn. It is hoped that this edition of the *Safety Digest* will do something to remind all those who go to sea that this item of equipment is among the most vital items of personal equipment carried.

John Lang
Chief Inspector of Marine Accidents
April 1999

Part 1 – Merchant Vessels

Any reference to an accident on board a merchant vessel conjures up visions of collisions, groundings, fires and floodings. In practice many of the reported incidents occur away from the public gaze; in the engine room, during lifeboat drills or with the operation of on board equipment. They are rarely given much exposure and the lessons often go unnoticed.

We have therefore devoted a large section of Part 1 to some of the less well publicised incidents and accidents. We feature many engine room incidents to remind people that many potentially serious problems at sea owe their origins to something that takes place below.

Masters and mates should need no reminding that machinery breakdowns, or problems with equipment, require a good understanding of what has gone wrong and what the implications are. Masters, when confronted with a serious problem will want to know how long it will take to repair and what services are still available to them. Engineers will do their best to give a responsible reply but the master must think through the implications of the repair not being completed within the forecast timescale. Important decisions will often have to take place very early in the event and could determine whether the ship can drift safely, has to anchor or should prepare for a tow. In very bad conditions it might be necessary to evacuate non-essential personnel remembering that this is likely to take much longer than expected in strong winds and high sea states. Any difficult decisions will be made much easier if there is a good understanding between the deck and engine room departments on board. Maritime history is littered with cases where those on board thought they could sort out the problem before a catastrophe occurred. Many of the incidents recounted in this section are as much for masters and mates as engineers and management.

A common theme running through a number of reports each year concern lifeboats. In many instances the origin of the problem is a material deficiency. But they are often identifiable. If those entrusted with looking after them know what to look for and are conscientious in their duties, they should be in a position to prevent accidents happening. But material deficiencies are not the only cause of these accidents. Drill errors, handling complacency, inadequate maintenance or poor communications are often cited in the list of underlying factors. Anybody concerned with the maintenance or operation of lifeboats is strongly advised to develop an awareness of these important items of lifesaving equipment. They are carried to save life in an emergency, not maim or kill people when being tested, surveyed or being used in a drill.

CASE 1

Hydraulic Ram Fails due to Substandard Welding

Narrative

In a perfectly normal operation involving the lowering of a ramp on board a ro-ro ferry, *Pride Of Hampshire*, the failure of a hydraulic ram led to the ramp dropping 4m out of control. Nobody was injured.

The second officer had just commenced lowering the vehicle ramp when it dropped uncontrollably due to the sudden failure of the hydraulic ram controlling the wire pulley system. The ramp came to rest when the crosshead sheave, to which it had been connected, reached the end of its travel. Nobody was injured.

The ram was manufactured in medium to high carbon steel. The failure occurred at the point where the ram entered the crosshead sheave. The threaded end of the ram had been screwed into the crosshead leaving a few threads visible. The ram had been welded to the low carbon steel sheave box at this point to avoid the problem of the ram backing-off.

Visual and metallurgical examination indicated that either no, or inadequate, heat treatment had been applied during the welding process. Fatigue cracks had developed beneath the weld bead and it was from this area that the main fracture occurred. The welding defects had been the initiating cause of the fatigue cracking. The post event examination also revealed slight misalignment in the system.

Before the second officer had lowered the ramp he had raised it fully to release the support latches. As it came fully home the crosshead sheave came up hard against the ram housing. Because of the slight misalignment a high bending load was produced which, coupled with the fatigue cracking, was sufficient to produce the conditions necessary for brittle fracture.

The Lessons

1. **This weld was applied merely to stop the problem of the ram backing-off. The problem could have been solved by periodic checks and correction.**

2. **The strength of the ram was then dangerously reduced by poor quality welding. Any welding, particularly high carbon steel, requires care and attention. If the correct procedures are not followed, including the application of suitable pre and post weld heat treatments, then detrimental microstructural features might occur.**

3. **Even slight misalignment can cause considerable extra loads in a system.**

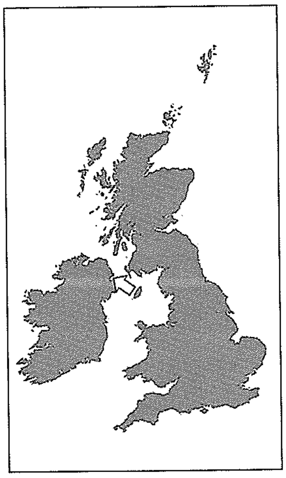
Footnote

It would have been very easy for an incident such as this to go unreported. The operating company demonstrated a high commitment to safety by not only reporting the incident but also carrying out a thorough investigation into the circumstances to prevent it happening again.

CASE 2

Main Engine Failure due to Dirty Oil

Narrative



Shortly after sailing from Belfast on a voyage to London the 1966 built general cargo vessel *Al Masooma* was forced to stop engines and drift in deteriorating weather conditions while engineers cleaned the fuel oil. No damage to the ship or environment occurred.

Al Masooma left Belfast in a force 3 after loading cargo and bunkering 20 tons of gas oil. Soon after departure, the chief engineer changed the fuel tanks and started to use the new gas oil. Shortly afterwards the main engine exhaust temperatures began to climb and blockages occurred in the main engine fuel filters. To avoid any damage, the engine was stopped and the vessel allowed to drift while the engineers cleaned the fuel system. With the weather predicted to deteriorate the master sought the coastguard's advice on the best place to anchor in the event of the cleaning operation taking longer than anticipated.

About four hours later the weather had deteriorated. A rough sea was running and the wind strength had increased to force 6 to 7 with rough seas. The engineers were still cleaning the fuel system. Due to the conditions, the coastguard arranged for a lifeboat and another vessel to stand by. Shortly afterwards however, *Al Masooma*'s main engines were restarted to enable her to proceed under her own power to a sheltered bay where she anchored. Further cleaning was carried out and she was able to resume her passage the following day.

A sample of the gas oil taken at the bunkering port was sent subsequently for analysis and confirmed to be within specification.

The Lessons

1. **In this particular instance no damage was done. Main propulsion failure in the open sea is no more than an inconvenience; it might lead to a delayed arrival and a terse telex to the master. When it occurs in a gale however, and the vessel involved is only a few miles to windward of a lee shore, it can be the precursor to a catastrophe.**

2. **Contaminated fuel is a potential cause of engine failure and every precaution must be taken to ensure it is kept clean at all times. When contaminated by water, dirt, or other ingredients, it can cause severe damage to the engine by increasing wear in the fuel pumps and injectors. It will also lead to higher running temperatures, poor combustion and the burning of valves seats.**

3. **Tests have shown that the gas oil embarked on this occasion was clean and contamination free. Fuel should be clean but, ships' engineer officers must always check it by taking samples**

during delivery. These should be taken by a ship's officer, or by a representative of the supplier in his presence, and be accurate samples of the fuel being delivered.

4. **Further measures to eradicate any possible contamination of fuel include the regular operation of water traps fitted to settling and/or daily service tanks. Any excess water drained must be recorded.**

5. **As far as practicable different supplies of fuel oil should be segregated. Although gas oil is "clean", it will tend to act as a scouring agent if stored in a fuel tank that previously carried heavy oil or if it had not been in use for some time. Any dirt or heavy fuel remaining on the internal tank structure will be released and any rough weather will aid the scouring action. These potential contaminants will be transferred into the main fuel system via the fuel pumps and can cause combustion problems and block filters.**

6. **The use of the fuel oil purifier when topping up the daily service tank together with vigilance over tank cleanliness will not only reduce the likelihood of such events occurring, but are important aspects of good engineering practice.**

Footnote

In this particular incident, there was insufficient detail in the report to establish the cause of the problem but fuel incompatibility was unlikely. It is possible that inadequacies with on board maintenance and operational procedures were relevant.

CASE 3

Steering Gear Failure

Narrative

While putting to sea the dredger *Sand Harrier* experienced a steering gear failure in a narrow channel. There was no damage and the ship was brought back under control. The origins of the failure occurred some time before the event.

After completing minor repairs and modifications to the cargo handling equipment, pre-sailing checks, including steering gear tests, were carried out and *Sand Harrier* unberthed without difficulty. On departure she used her schilling rudder with its 60° port and starboard movement, plus the main engines and bow thruster to manoeuvre into the river fairway. She then put to sea and increased speed as she entered the main channel.

About 30 minutes after leaving the berth and while still in hand steering, the rudder suddenly went hard to port. The helmsman immediately attempted to correct this by applying starboard helm but the vessel began to turn rapidly. The main engines were put to half astern and the bow thruster to starboard. Once the vessel was back under control, the master established that the helmsman had followed the correct procedures and that the loss of control was due to a defect on the port hydraulic pump. Once this pump was switched off, steering control was regained by using the starboard hydraulic pump alone. The VTS was contacted and permission obtained to return alongside using a single steering motor.

On examining the port hydraulic steering system, it was found that the port operating solenoid had jammed in the open position. On opening up both the solenoid and the hydraulic pump, metal filings were found in both units to damage the pump and jam the fine clearance in the operating solenoid.

The Lessons

1. **Steering gear failure, especially in a narrow channel, is every master's nightmare. It does little for the peace of mind of pilots either. This incident shows that malfunctions can occur at the most unwelcome time, but two actions taken in this instance ensured the vessel was rapidly brought under control. The master was able to take the way off without delay and, by being in hand steering, the helmsman recognised the problem the moment it occurred. The immediate action of both the helmsman and the master illustrate the importance of good training in crisis management. When the unexpected occurs, it is essential that everyone involved knows what to do, when to do it, and how to do it.**

2. **The important feature in this incident was that action was taken to identify the cause and for appropriate measures to be taken. On this occasion there was evidence that iron filings had managed to infiltrate the port hydraulic unit. The word cleanliness springs to mind. The Code of Safe Working Practices for Merchant Seamen states that absolute cleanliness is essential to the proper and safe operation of hydraulic and pneumatic systems. This means that when the system is being repaired or serviced, the working area and tools, as well as the system and its**

components, must be kept scrupulously clean. Additional care should be taken to ensure that replacement units, and any fluid passages, are clean and free from any contamination.

3. This care should be extended to ensuring that all vents are suitably protected against the ingress of dirt, water etc, and that all filters, both mechanical and magnetic, are checked regularly for debris and efficiency.

4. Masters and deck officers reading this narrative might ponder what action they might have adopted in such a situation. They can make the question more interesting by adding a new ingredient: what would they have done had there been another ship approaching on a reciprocal course fine on the port bow? In more general terms masters can dream up a variety of mini scenarios by asking those around them what they would do if they lost a particular control at an awkward moment.

5. Engineer officers reflecting on the same incident might well be asking themselves what they would have done had they any lingering doubt about the reliability of the starboard hydraulic unit?

CASE 4

Scalding of Engine Room Fitter

Narrative

An engineer and a fitter were attempting to fit compression rings to the pressure setting screws of a pair of safety valves on an exhaust gas boiler on board the 63,524 GT *Arcadia*. The ship was at sea and the boiler was operating at normal working pressure.

To ease his task of fitting the compression rings, which are intended to prevent an excess spring load being placed on the safety valve, the engineer slackened the adjusting screw of one of the valves. This had the effect of reducing the spring load, giving a corresponding reduction in lifting pressure, allowing the valve to open.

The resultant small discharge of steam in the vicinity of the safety valve's spring casing struck the fitter, causing scald injuries to his face, an arm and a leg.

The Lessons

1. **The only routine occasions on which the adjusting screw of a safety valve needs to be disturbed is when initial adjustments are being made following overhaul or inspection. The fitting of compression rings having the correct dimensions should not require the adjusting screw to be moved significantly – if at all.**

2. **With the exception of a safety valve floating operation, there is no necessity for any routine maintenance task to be performed on them when the boiler which they serve is under pressure.**

3. **A shroud or cover, which is often part of the valve's easing gear, should be fitted over the adjusting screw. Locking this cover in place will prevent tampering and ensure that any person having the task of working on a safety valve first consults the keyholder. As this is normally the chief engineer, he can ensure that his instructions are understood before work commences and the keys are issued.**

CASE 5

Galley Fire in Middle of the Night Leads to Death of Crewman

Narrative

On completion of a run ashore one member of the crew of a general cargo vessel decided to cook himself some food in the early hours of the morning but fell asleep after turning on the galley hot plate. One man was killed in the subsequent fire.

Inishfree had just arrived alongside and was due to start discharging her cargo the following morning. Some of the crew went ashore and returned around midnight. One of them went to the galley to cook himself some food while the rest went to bed.

At about 0310, and with everybody aboard, the fire alarm sounded. With smoke present in the accommodation spaces the master used the VHF to call the emergency services while efforts were made to trace the source.

It was established that the fire was in the galley and that the door was shut. A search was carried out for a missing crewman who was believed to be in the messroom.

The first fire brigade appliance arrived alongside at 0321. A fire team entered the accommodation shortly afterwards and made its way down to the main deck where they met the master and chief officer bringing the missing crew member out of the mess room. Entering the galley the firemen extinguished the fire and identified its source as an unattended chip pan on an electric hot plate.

Four people were taken to hospital. Three recovered but the fourth, the crewman found in the messroom, lost his life. He was known to have been in the galley messroom area at 0130 hours and is thought to have fallen asleep after turning on the hot plate.

The Lessons

1. **How many of us are tempted to heat up a little something on return from a run ashore? The galley is unlocked, we know how to switch on the hot plate and food is readily available. We have probably done it many times before. What better way to complete an evening out? Yet because it was so easy, a man lost his life most probably because he fell asleep after turning on a hot plate with a chip pan already on it containing oil.**

2. **Galley safety is as much to do with what happens outside working hours as when it is manned. Never leave a container of oil unattended on a heated surface or a cold one that can be switched on.**

3. **Only approved deep, fat fryers should be used in galleys. NEVER use free-standing chip pans.**

4. **Chip pan fires can generate a lot of smoke – quickly. If you ever find yourself in a space full of smoke you may find there are a few inches of clearer air at deck level.**

Footnote

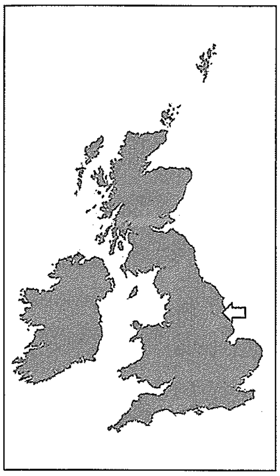
The usual temperature of fat or oil during cooking is about 200° C. The self generated ignition temperature of oil is between 310°-360° C. As the temperature of a heating element at dull red heat is about 550° C, uncontrolled heating will cause cooking oil fumes to spill over the side of the container onto the dull red hot plate. Ignition follows immediately and a fire results generating copious amounts of thick black smoke.

It is this thick, black, smoke which kills. Survival time in light smoke can be from minutes to hours but in thick smoke, it may be measured in seconds. Breathing becomes difficult, normal rational behaviour is frequently lost, and carbon monoxide poisoning can be the result.

CASE 6

Exhaust Gas Boiler Fire caused by Continuous Running of Main Engine

Narrative



The 60,719 GT motor shuttle tanker *Tove Knutsen* had secured to a monobuoy in the Hull Estuary to discharge a cargo of crude. Whilst doing so the weather deteriorated to the extent that the terminal asked for the main engine to be run at minimum revolutions with the propeller pitch in neutral so that the vessel's dynamic positioning (DP) could be run to ease the strain on the mooring. Ship's staff complied with the request and ran the engine with the result that excess steam was generated in the exhaust gas boiler. To reduce the steam output, the circulating pumps were stopped and the vessel remained in this operational state for a period of about five hours. It then became evident that the main engine exhaust gas boiler was overheating which led the chief engineer to advise that the main engine should be stopped. It was shut down for about an hour and then restarted.

Shortly after the restart the exhaust gas boiler temperature rose rapidly causing a further main engine shut down. This was followed by an automatic fire alarm indicating a fire in the engine exhaust uptakes. An immediate investigation showed the boiler casing glowing pink/red indicating the seat of the fire. The general alarm was sounded, fire teams mustered, and all cargo work stopped. VTS Humber and the Terminal Operations Centre were informed and preparations made to fight the fire.

Having made the decision to let the fire burn itself out, the main engine air intake filters were sealed and an active fire watch set with hoses rigged ready for boundary cooling. The fire was under control within 15 minutes and the temperature seen to drop. About two hours later the boiler manholes were opened and 300–400 kg of debris removed. Once the main engine exhausts were clear, the main engines were declared ready for use.

While the fire party was dealing with the fire, the duty cargo officer was busy shutting down the cargo discharge. This involved, among other things, going to the pump room to open the sea valves for back flushing. Having done so he discovered that one valve on a cargo pump was still open. This allowed crude oil in the discharge line to gravitate back through the pump and into the sea to pollute the Humber with between 20–30 tonnes of crude.

The vessel subsequently moved to an Oil Terminal berth where discharge was completed and the remaining exhaust gas boiler tubes were removed.

The Lessons

1. Operation of the main engine at low power for long periods can result in poor combustion and a reduction in the volume of exhaust gas velocity. This allows soot, lub oil, and unburnt fuel to settle and build-up in the exhaust gas boiler tube bank and increases the risk of an uptake fire.

2. The computer controlled DP system does not mean that a main engine is capable of operating for long periods at a steady low speed. The systems are computer controlled and the environmental conditions, when on station, ensure that the engine load/speed is continually varied. This reduces the risk of a significant build-up of soot and partially burnt fuel in the engine uptakes.

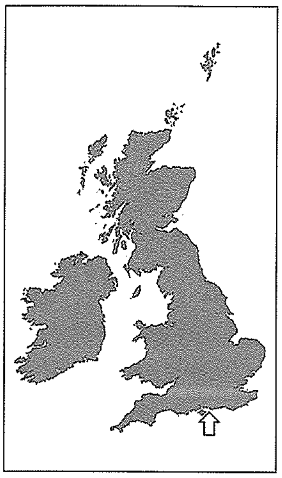
3. The boiler water circulating pumps for the exhaust gas boiler should never be stopped when the main engine is operating. Without cooling water circulation, local overheating occurs and results in a rise in the tube wall temperature. This increases the chances of igniting soot lodged in the tube stack.

4. Never open any sea valve on the cargo system before checking, and double checking, that all cargo pump valves are closed. If you don't and oil is discharged into the sea, the mistake could be very expensive. The maximum fine for pollution has recently been raised to £250,000.

CASE 7

Flooding of a Fast Patrol Craft

Narrative



The fast GRP patrol craft *Sea Ranger* was on passage from Southampton to Littlehampton doing 22 knots when she started to flood aft because the water could not drain due to a blocked freeing port.

The conditions for the passage were good. The wind was south-south-west force 3 to 4 and all was apparently going well until she was some two miles east of Bognor Regis when she became sluggish to manoeuvre and the speed started to drop off.

An inspection revealed flooding in the aft cockpit well and a trimming down by the stern. In this condition the transom freeing port was under water with the other aft freeing ports very close to the waterline. Water had been able to come on board rather than drain away to the extent that the level in the well deck had built up to about 300mm. A "Pan Pan" was made to the coastguard which resulted in a lifeboat delivering a pump. The lifeboat then escorted *Sea Ranger* safely to harbour.

The investigation revealed that a mop had interfered with the correct functioning of the transom freeing port and that a hole cut in the GRP deck during a recent refit to insert a securing pin had never been plugged. This hole allowed water to flood the spaces below the cockpit well.

The Lessons

1. **This flooding accident occurred because sea water spray from the craft's wake accumulated in the cockpit well and was unable to drain overboard. The reason it couldn't do so had been because a mop was blocking the transom freeing port. Freeing ports must never be blocked and checked regularly to ensure they can function correctly.**

2. **The accumulated water in the cockpit had also flooded the space below through an unplugged hole. This hole should have been spotted before completion of the refit. On completion of any work on the hull or weathertight deck, a careful inspection must be made to ensure that all hull and deck fittings are still watertight.**

3. **A reliable bilge alarm capable of being seen or heard by those on watch should have been fitted to provide early warning of flooding. Bilge alarms should be well maintained and regularly tested.**

4. **Had the craft been fitted with an electric bilge pump instead of manual pumps, and the warning of flooding had been provided by the bilge alarm, this flooding may have been controlled and removed the need for a lifeboat to come to her aid.**

CASE 8

Vessel Runs out of Fuel – Blackout and Eventual Breakdown

Narrative

This 1976 built bulk carrier *Radnes* was on passage from Iceland to Europe when the chief engineer informed his head office that the failure of the heavy fuel oil purifier meant the main engines would have to be run on diesel oil.

Radnes diverted to lie off a Scottish port where a spare part was delivered by a pilot cutter. She then resumed her voyage with the intention that her engineers would carry out whatever work was necessary.

They found, however, that they were unable to carry out the repair as the worm could not be separated from the purifier drive spindle. A second diversion was made.

The design of the fuel system on the vessel meant that diesel oil was supplied from the diesel oil service tank under gravity to the main engines via a small bore pipe. This meant that there was an insufficient fuel supply to run the main engines with any more than 50% pitch on the propeller.

The vessel sailed from collecting the additional parts and completing repairs using both main engines at a reduced pitch before shutting the port main engine down to conserve fuel because of the restricted fuel supply (The vessel's diesel oil ROB was marginal if it would be necessary to complete the whole passage on diesel oil). During this period the heavy oil purifier was in operation and change over to heavy oil operation on both main engines was scheduled to take place in a few hours, once there was sufficient fuel in the service tank.

About four hours later, the vessel was in rough seas and the starboard main engine began to labour. The chief engineer was called but the engine continued to slow and eventually stalled, blacking out the ship. It appears that at this time, though there was sufficient fuel available, due to the heavy weather, the engine required more fuel than could be supplied through the small diameter diesel oil supply.

The chief engineer then attempted to start the auxiliary generators. He was unsuccessful and succeeded in breaking the bendix starting gear and exhausting the air reservoirs. Immobilised and without electrical power, a "Pan Pan" was sent by the master and the vessel was eventually towed to port.

The Lessons

1. **No vessel should ever run out of fuel.**

2. **Any machinery failure affecting fuel consumption requires an immediate assessment by both master and chief engineer on its impact on the voyage plan.**

3. **Once the decision to run on diesel had been taken, regular sounding of the fuel and diesel oil tanks should have been started immediately and consumption continually monitored. If the company fuel safety margin was being eroded, then either additional fuel should have been bunkered, or departure delayed until sufficient purified fuel was available for use in the main engine. The cost to a company of being towed in, is far greater than having to delay to obtain extra fuel!**

Footnote

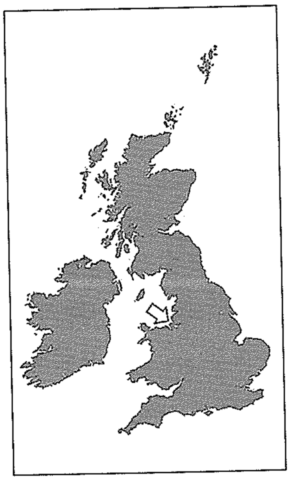
Sailing with insufficient fuel is a dangerous practice and puts both vessel and crew at risk in addition to the emergency services that respond with such speed to calls for help.

Under the ISM Code, such actions could be considered as an infringement of the requirements and objectives contained within Safety Management System and lead to the withdrawal of the safety management certificate.

CASE 9

Pilot Injured while Disembarking from Small Coastal Tanker

Narrative



Brabourne, a loaded coastal tanker of 1,646 GT, outbound from Liverpool with a pilot embarked, arrived at the pilot station at 2100 on a November evening. During the passage the pilot and master had discussed the method of disembarkation without coming to a conclusion. *Brabourne* had a low freeboard of about 0.5m and it was thought the pilot could step straight from the main deck on to the pilot boat. If the difference in deck levels between the launch and the vessel proved to be too great, a pilot ladder could be rigged from the poop deck where there is a bulwark gate. The pilot decided to wait and see.

As the pilot launch approached, *Brabourne* began a turn to starboard onto a northerly heading to provide a lee on the starboard side from the force 4 westerly wind. The wind was causing a slight sea and there was a moderate west-north-westerly swell. The pilot left the bridge after the turn had been started.

The pilot descended to the main deck where a seaman was ready to assist him to disembark. Once the vessel had settled on course and was providing a good lee, the pilot stood by a gateway in the railings and signalled for the launch to come alongside.

As it closed it became apparent that her deck level was above that of *Brabourne* and contact would have risked damage to the launch. The coxswain therefore manoeuvred the launch onto a parallel course, and very close, to *Brabourne* so that her bow was adjacent to the open gateway. Both vessels were making slow speed through the water. The shear of the launch's deck made the step up too high while the distance between tanker and the curved bow was too great for a safe step across.

The pilot waited for the launch to move further forward to a position where the step up would be less but nothing happened. Instead of waiting and giving appropriate instructions to the coxswain to come ahead, the pilot decided he would move aft himself and outboard of *Brabourne's* railings to board the launch at the lowest point.

Just as the pilot was about to step across to the launch, it closed the vessel and rolled towards it. The launch's fenders came into contact with the *Brabourne's* railings, caught the pilot's left leg and crushed it.

The Lessons

1. As so often happens this accident occurred because it was necessary to change a routine operation without thinking through the possible consequences. In this instance the differences in freeboard were known at an early stage, and there was plenty of time to think through how the transfer could be achieved safely.

2. Safe transfers between pilot and ship require the pilot launch to be hard alongside before the pilot attempts to board it. They also require someone to be responsible for its safe execution. The moment the pilot stepped outside the rails in this instance, that someone should have said, "Stop".

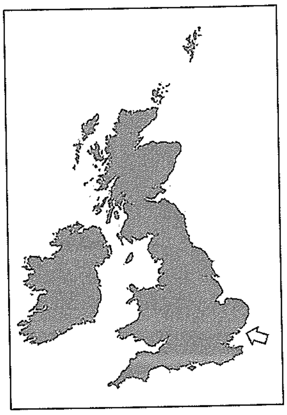
3. The moment the pilot decided to step outside the railings, the risks escalated. He might have got away with it, and obviously thought he could, but that is how so many accidents occur. He should not, under any circumstances, have stepped out and put himself between the vessel's railings and the pilot launch nor should he have attempted to step across until he had been told it was safe to do so by the person controlling the operation.

4. The person in charge of a transfer must have a good overall view of what is going on, the knowledge to think through the possible consequences of any action being taken and the authority and ability to give instructions to all concerned.

CASE 10

Collision in Fog

Narrative



The two coasters *Antonia B* and *Ilona G* were operated by the same management company and collided in the North Sea.

On 19 August 1997 *Antonia B* was on passage from Immingham towards Calais with a cargo of petroleum coke. The mate was on watch.

On the same day *Ilona G* was in ballast and on passage from Newhaven and bound for Boston. As in *Antonia B* the mate was on watch. The weather was calm and the range of visibility was about two cables in fog. The time was shortly after 1200 and in both vessels the master had just been relieved and was below.

During periods of restricted visibility, a seaman was additionally assigned to each watch although he was not required to be on the bridge unless required by the master or mate. Management company standing orders were kept with the master of each vessel and both mates were aware of their existence. Neither master had produced standing orders but there was an unwritten understanding in both vessels that the mate was to call the master if in any doubt.

Antonia B was exhibiting normal steaming lights. The radar was set initially on the 6-miles range scale, with ship's head up and fixed range rings displayed. After taking charge of the watch at about 1200, the mate changed the radar setting to 3-miles range off-centre, which gave an ahead range of about 4.5 miles. The VHF radio was monitoring Channel 16 with the volume turned up, the autopilot and watch alarm were operational and the vessel's position was being fixed at about 30-minute intervals by GPS navigator and by radar. A fog signal was not being sounded; it was not the normal practice to do so unless there was dense traffic in the vicinity. Steering was by autopilot and the course set 185°. Her speed was about 8 knots.

Ilona G was also exhibiting normal steaming lights. The radar was set initially on the 6-miles range scale with the ship's head up. After taking over the watch the mate changed the radar setting to north up without fixed range rings displayed. As in *Antonia B* the VHF radio was monitoring Channel 16 with the volume turned up, the autopilot and watch alarm were operational and the vessel's position was being fixed at about 30-minute intervals. A fog signal was not being sounded because, again, it was not the normal practice to do so unless there was traffic in the immediate vicinity. The course set was 008° and her speed was also about 8 knots.

There is conflicting evidence with regard to the position and movement of other vessels in the vicinity during the period leading up to the collision but (**see chart extract**) at 1210, an overtaking vessel was on the port side of *Antonia B* at a range of about 1 mile.

Antonia B's mate observed a radar echo fine on the starboard bow at a range of about 4 miles which he monitored by means of the EBL and VRM. With the aid of a ruler he estimated that the other vessel was on a nearly reciprocal heading and would pass down his starboard side at a range of between 4 and 5 cables. He assessed this to be satisfactory and not a close quarters situation.

Shortly before this time the mate on watch in the north bound *Ilona* G observed a radar echo on each side of the heading line at a range of about 6 miles. Although his radar was equipped with an automatic history plotting facility, he omitted to use it on this occasion. His interpretation of the situation was that the vessel on the port bow had an obligation to keep out of his way while he was required to keep out of the way of the vessel on his starboard bow. He therefore planned to alter course to starboard when the vessels ahead had closed to about 2.5 miles range. He expected the vessel on the port bow to do likewise.

When the two contacts had closed to 3.5 miles, *Ilona* G's mate switched on the fixed range rings and called on VHF radio Channel 16, "the two vessels either side of the vessel heading north, please let me know your intentions?" He then heard, "Yes, I can see you," and observed the radar echo on the starboard bow move to starboard and pass astern of the echo on the port bow. This VHF exchange was in fact not heard by the mate of *Antonia B*.

Using the EBL to monitor the bearing movement of the echo on the port bow *Ilona* G's mate found it was on a steady bearing. When it had closed to 2.5 miles range, he called on VHF Channel 16, "the vessel approaching me at 2.5 miles, please tell me your intentions?" Receiving no reply, the mate decided to take action to avoid a close quarters situation by altering course to starboard. He called on Channel 16 saying, "I am going to starboard," and then altered course by 10° to starboard.

At 1230, the mate of *Antonia B* fixed his vessel's position and, finding himself to starboard of the planned track, altered course 5° to port. He continued to monitor the echo ahead which he held at about two points on the starboard bow at a range of between one and two miles.

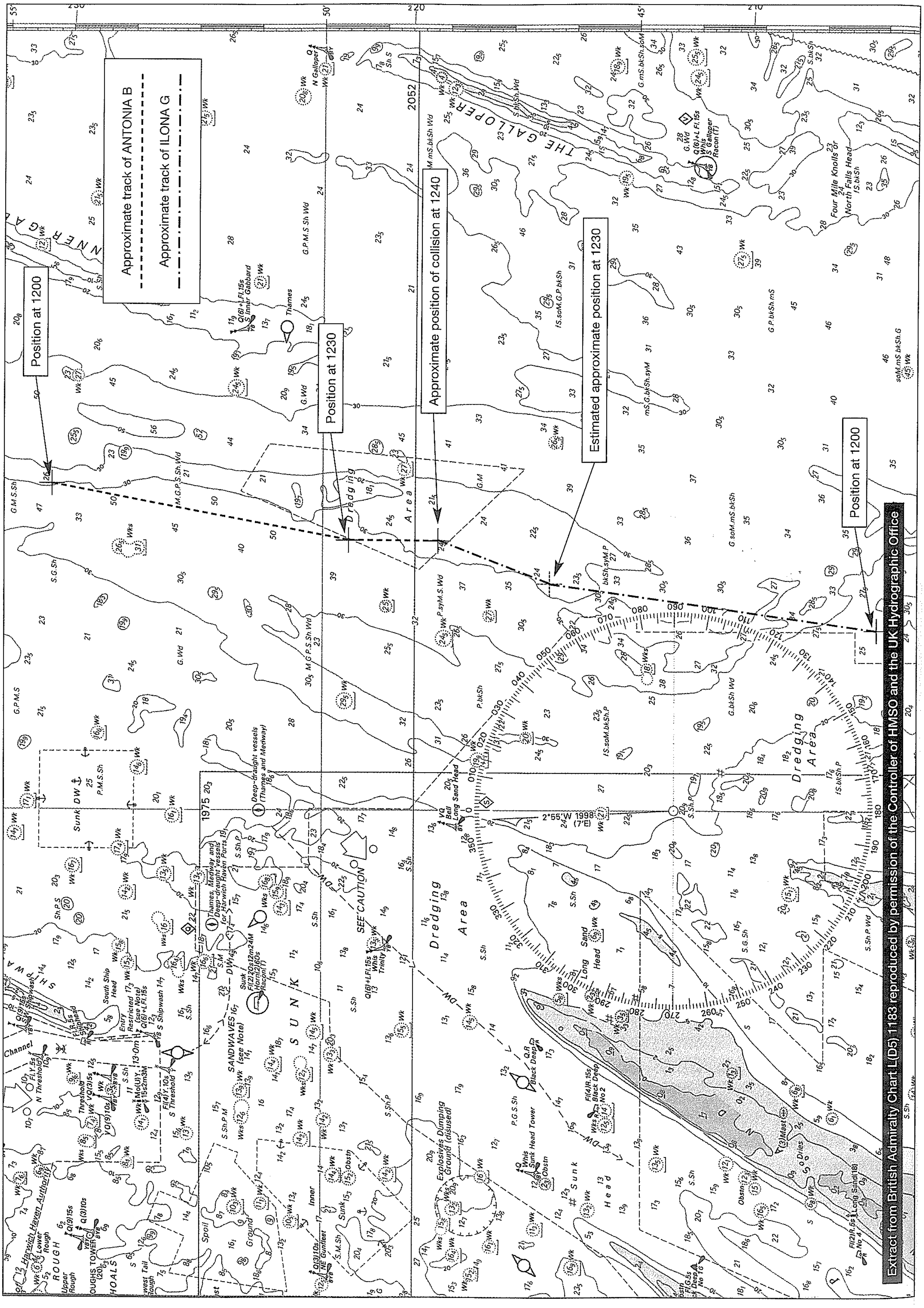
On board *Ilona* G meanwhile, the radar echo on the port bow continued to approach on a steady bearing and, at about 1.5 miles range, the mate called on Channel 16, "vessel approaching at 1.5 miles, you are coming down my bearing line. I am going to alter further to starboard." He then altered the autopilot setting by a further 20° to starboard.

At about one mile range, the mate of *Ilona* G altered course to 045° and then switched to manual steering. Shortly afterwards, he altered course further to 083° and then saw the other vessel end on at about 45° on the port bow. He called on Channel 16, "I am going hard to starboard," and then applied full starboard helm.

None of these VHF communications were heard by the mate of *Antonia B*.

Antonia B's mate then suddenly saw the port side of *Ilona* G on his starboard bow. He changed to manual steering and applied full starboard helm. It was too late. Her bow struck the port quarter of *Ilona* G at an angle of approximately 40°.

Communications between the two vessels was established. The damage to both vessels was confined to areas above the waterline and allowed them both to proceed without assistance. Nobody was injured and there was no pollution.


Approximate track of ANTONIA B
Approximate track of ILONA G
Position at 1200
Position at 1230
Approximate position of collision at 1240
Estimated approximate position at 1230
Position at 1200
Extract from British Admiralty Chart L(D5) 1183 reproduced by permission of the Controller of HMSO and the UK Hydrographic Office

The Lessons

1. The ancient mariner would describe this event as yet another 'radar assisted collision' and those with long memories will feel a sense of déjà vu. Past accidents such as the *Andrea Doria* and *Stockholm* collision in 1956 spring to mind. One can reasonably ask, "Do we ever learn?" Here we have two vessels approaching one another in poor visibility. The radars in both were functioning correctly and the mate on watch in each vessel detected the other in sufficient time to take appropriation action to avoid a close quarters situation. And yet, by the failure to interpret radar displays correctly, a collision took place. It should not have happened.

2. So what went wrong? Let us look at the way the radars were being operated. The radar display on board *Antonia B* was operated with ship's head up. While accepting that some officers like this mode, it has great disadvantages. Most mariners discarded its use as a reliable aid many years ago. It limits the accurate determination of other vessels' movements and relies heavily on relative bearing movement which is invariably done by visual estimation. As mariners are told over and over again, "Assumptions shall not be made on the basis of scanty information, especially scanty radar information".

3. Prior to sighting *Ilona G* visually, the mate of *Antonia B* failed to establish that a risk of collision existed. Contributory reasons for not doing so might have included:

   (a) an awareness that his vessel was already to the west of the intended track and that further alterations to starboard would increase the distance off track;

   (b) an apparent confirmation of his early assessment that a risk of collision did not exist because the relative bearing of the radar echo ahead of him (*Ilona G*) opened significantly following his alteration of course to port at 1230; and

   (c) his temporary inattention to the traffic situation while he fixed the vessel's position on the chart.

4. Despite his watchkeeping experience the mate of *Ilona G* failed to appreciate that both vessels had an obligation to take avoiding action in ample time. Although he eventually altered course to starboard he should have acted much sooner, and more boldly, so that his actions would have been obvious to the other watchkeeper.

5. *Ilona G*'s mate attached great importance to communicating his intentions on the VHF rather than complying fully with the Collision Regulations. The practice of talking to an unknown vessel by VHF in fog to try and resolve manoeuvring intentions is potentially very dangerous. Many, many watchkeepers have been seriously tempted to do this. It is so simple the argument goes, all you have to do is tell the other vessel what you are up to and all will be well. Real life experience and a few moments of considered thought identify the flaws. If you are watchkeeping in poor visibility and an unknown voice suddenly comes over the VHF saying he is altering course to starboard you are faced with far more questions than answers. Apart from anything else, which of the several ships you may hold on your display is making the transmission? In this case, the mate of *Antonia B* did not hear any of *Ilona G*'s radio communications. *Ilona G*'s mate thought he was being helpful but, in the event, only lulling himself into a false sense of security.

6. The avoiding action taken by the mate of *Ilona G* consisted of several small alterations of course to starboard. Identifying these correctly on another radar is extremely difficult whereas one bold alteration early on would have been obvious.

7. Neither vessel reduced speed. Even at the last moment the impact might have been avoided or, at least, minimised had the mate of *Ilona G* reduced speed to a minimum when a close quarters situation could not be avoided.

8. Neither vessel had a lookout posted despite clear statutory requirements and management company standing orders. Although the officers of the watch in both vessels were fully aware of the approach of the other and the lookout would have had no part in the initial detection, a dedicated pair of eyes might have made the visual sighting a few seconds earlier to enable last minute avoiding action to be taken. Lookouts should be told what to look for, and listen to, in fog. The first indication of another vessel might be the sudden appearance of a dark shape in the gloom but is more likely to be the bow wave or the steaming lights. One of the first questions an officer of the watch might ask his lookout once visual contact had been made is, "What's his heading?" How many lookouts would be able to give an effective answer without being trained?

9. Accident investigations such as this often reveal that the vessels involved have not been making sound signals. Although the rules were made in the days before radar, ARPA, traffic separation schemes and VHF, they can still make a major contribution to the prevention of collisions at sea. It should never be assumed the other vessel has a radar. Yachts, for instance, may not and will be relying on hearing a fog signal to give warning of an approaching ship.

CASE 11

Fatality at Mooring Station

Narrative

The 1979 built, 572 GT tanker, *Rix Harrier* was used mainly as a bunker barge on the River Humber. While berthing alongside a jetty, a mooring rope under tension sprang over a fairlead and struck the chief officer. He subsequently died from the multiple injuries incurred.

Rix Harrier was manned by a crew of five who normally wore safety clothing while on duty. The working hours were irregular and reflected the varied nature of her employment.

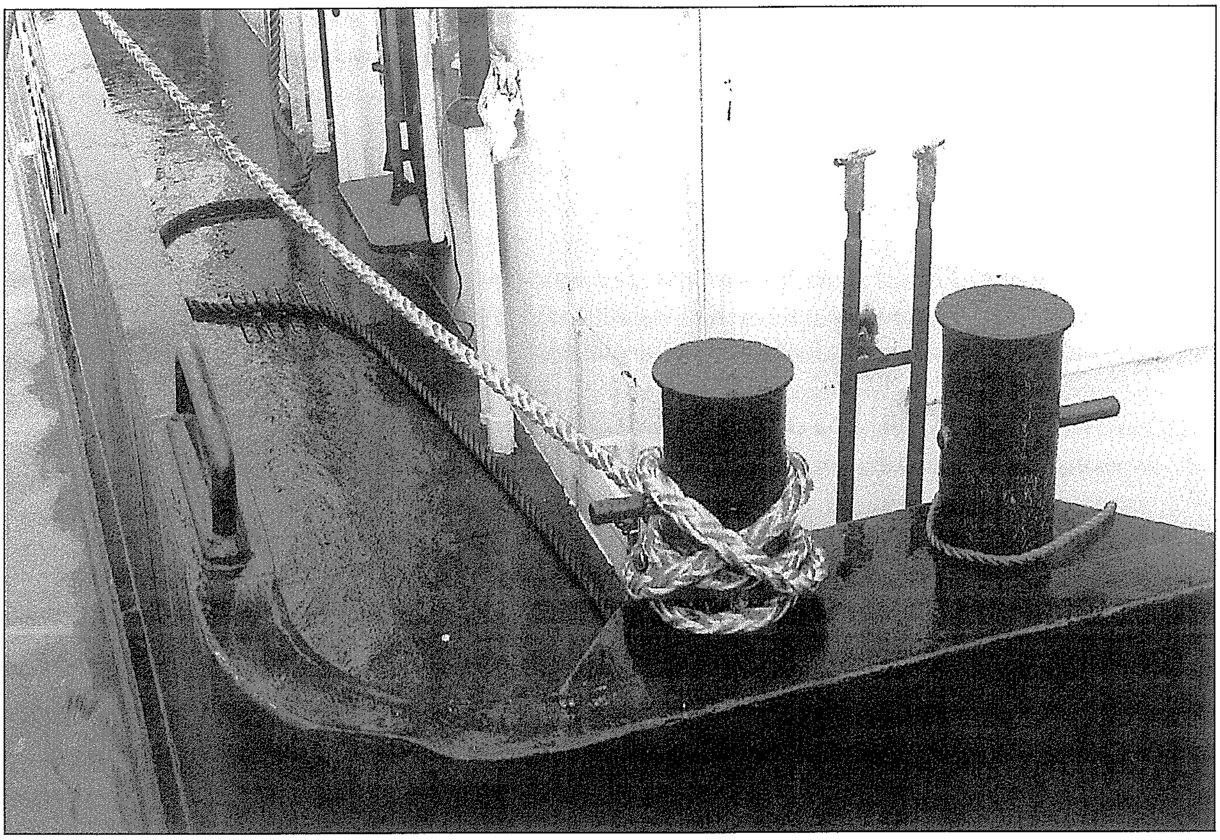
The vessel was preparing to berth starboard side to at Immingham oil jetty where three head and stern lines were required together with two springs fore and aft. The engineer and a trainee were forward while the chief officer and the motorman were aft.

The weather was fine with good visibility and a light breeze. The vessel was stemming the flood tide and coming alongside. A headrope was the first line to go ashore. Back aft the chief officer threw one end of a heaving line ashore and the motorman attached a mooring rope to it and passed it through the centre fairlead.

The aft mooring arrangements comprised two sets of bitts located on each side of the vessel, and three enclosed steel bar fairleads on top of the aft bulwark rail. The aftermost set of bitts on each side were located above the level of the bulwark rail. *Rix Harrier* normally secured with two sternlines leading through the offshore fairlead to the offshore aft set of bitts, and the third passing through the centre fairlead to the nearshore bitts. One backspring would be secured to the nearshore aft bitts and the other to the nearshore forward set.

When berthed starboard side to, it was customary to lead the centre line sternrope from the centre fairlead to the after post of the starboard aft bitts to allow adequate room for the aft accommodation door to open and for the crew to use the adjacent deck space. (**See photograph**)

The linesman ashore carried the eye of the mooring rope along the berth to a bollard astern of *Rix Harrier.* The chief officer meanwhile, was standing with his back to the motorman between the centre fairlead and the starboard bitts and was pulling the slack mooring rope in by hand. The motorman was facing away from the chief officer and was pulling the slack mooring rope around the aftermost post of the bitts. Once the slack had been taken up he made the rope fast.



[Photograph courtesy of Humberside Police]

With this task complete, the chief officer turned to face the jetty. At that moment the shore linesman noticed that the centreline mooring rope was leading outboard of the starboard fairlead and realised it was liable to spring off when the rope came under tension.

Before the linesman was able to alert the chief officer, the mooring rope tightened and sprang over the top of the starboard fairlead to strike, and throw, the chief officer heavily against the adjacent bulkhead. His safety helmet came off in the process.

The motorman was unaware that anything was wrong until he turned to find the chief officer lying on the deck. He summoned the master who immediately instructed the jetty personnel to call for an ambulance. It arrived shortly afterwards and the chief officer was taken ashore. He subsequently died of multiple injuries to his upper body.

The Lessons

1. **This was yet another accident where a routine operation went tragically wrong. As so often happens the seeds of this tragedy were sewn long before the actual event. The aft fairlead arrangement is typical of those found in vessels of a similar size but the *Rix Harrier* configuration with its narrow walkway and the lack of any centreline bitts, presented a particular hazard to personnel from mooring rope leads. The fact that a fatal accident occurred as an indirect result of this arrangement demonstrates the care with which potential hazards must be identified.**

2. Nobody will ever know why the chief officer failed to notice that the stern rope was outboard of the starboard fairlead. The need to concentrate more carefully than normal is implicit when working alone; lives may well depend on an ability to recognise a potential hazard before anything goes wrong. When two or more people are working together, each should maintain a weather eye on the other.

3. In the broadest sense the failure by either the chief officer or the motorman to notice that the sternline was not correctly led was due to inattention. We are all guilty of such oversight at times; we might be thinking about something else or we are distracted by something else. Or we could be weary.

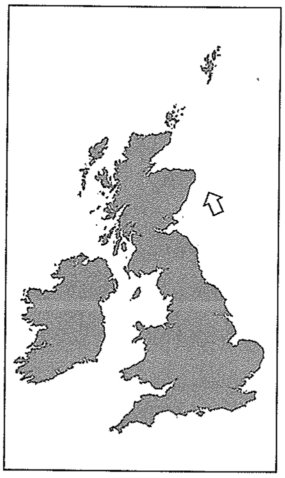
4. So how can we judge tiredness or fatigue? Or its effect? Others recognise the potential dangers. A well known motorway sign reminds drivers that 'Tiredness Kills'. In the air transport industry aircrew have statutory rest periods to overcome the problem. For diverse reasons, many mariners work long hours with intermittent rest yet sleep deprivation and interrupted rest have just the same effects as in other transport modes. It leads to errors of judgement, a failure to appreciate danger and a reduced ability to undertake everyday tasks without making mistakes. Owners, operators and masters all have a responsibility to ensure that so far as is possible, their crews are never too weary to undertake routine tasks safely.

5. Although the chief officer was wearing appropriate personal protective clothing at the time of the accident, his safety helmet was not fitted with a chin strap and came off as he was thrown across the deck. Although it is unlikely to have saved this man's life, the use of a chin strap when wearing a safety helmet might save somebody elses.

CASE 12

System Monitoring of Fuel Pump Failure

Narrative



The twin engine 1,969 GT motor offshore supply vessel *Safe Truck* was on passage from Dumbar Oil Field to Aberdeen on 3 August 1998. The engine room had been visited at midnight prior to the machinery controls being switched into the UMS condition. At 0723, the vessel's Fire Detection System activated indicating a fire in Zone 7, the engine room. The port main engine was stopped immediately and the starboard main engine reduced to minimum revolutions. The weather was southerly gale force 8 at the time with a moderate sea and heavy swell running. The visibility was moderate to poor. The crew went to their emergency stations with an engine room fire party mustered under the chief engineer. The coastguard and owners were informed of the situation and the action being taken.

The fire party entered the engine room and established that a fuel injector spill line on the port main engine had fractured to cause spray fuel droplets and fumes to form. The build-up of fuel oil fumes had activated the fire detection system but had not led to an outbreak of fire. The port main engine's fuel system was isolated and steps taken to vent the space for about an hour while the engine cooled down. Once the engine room was clear of excessive fuel oil fumes, the engine and the floor plates around it were cleaned and all fuel oil mopped up. The crew then stood down from their emergency stations and the vessel resumed passage to Aberdeen on the starboard main engine.

The subsequent investigation showed that vibration probably caused the fuel injector spill line to fracture. The fuel pump unit, which had recently been changed, may not have been tightened down sufficiently during this refit allowing vibration to occur on adjacent pipework. A comprehensive computer system was fitted in *Safe Truck* which, among other functions, monitored fuel tank contents. This showed that a large and significant increase in fuel consumption started at 0641, some 42 minutes before the fire alarm sounded. The "trend analysis" page of the computer system was not regularly monitored and this early indication of a fuel problem went undetected.

The Lessons

1. **It is all too tempting to conceal a defect and not report it. After all nobody will be any the wiser and, as in this instance, there were no injuries and no real damage was done. But *Safe Truck* lived up to her name and made a point of keeping both coastguard and owner informed of what was happening and then reported the findings of her investigation. By being commendably open she has ensured that others will benefit from the experience. It is very possible that in another vessel and at another time, the early symptoms of a similar problem will be recognised for what they are and for sufficient remedial action to be taken to prevent a potential outbreak of fire.**

2. Prompt action by the chief engineer and crew prevented what could have been a serious fire. This illustrates the importance of good safety training and teamwork.

3. The use of machinery computer systems as a periodic safety monitoring tool can prevent accidents and should feature as a routine measure. Such systems should be evaluated and tested on installation so that they can be utilised to their full potential. Although designed by the manufacturer for a particular purpose, their output can often be useful in providing a comparative value for other monitoring devices. All those required to use the system should be familiar with what information is available and able to recognise when something untoward is happening.

4. Post incident diagnosis of the cause should be mandatory and the correct lessons drawn. As is so often the case, the origins of this problem almost certainly occurred some time earlier when the fuel pump unit was changed. During the refit or renewal of any item of machinery, it is essential that all bolts, nuts or other securing devices are properly tightened and locked into place. Vibration brought about by normal operation will rapidly create a situation where poorly locked or tightened securing devices become loose.

5. Always check engine fuel systems for signs of looseness and evidence of any fuel leaks. Fuel leaking onto a hot surface is the most common cause of engine room fires.

CASE 13

An Accident Waiting to Happen – A Lifeboat Incident

Narrative

A lifeboat was being lowered into the water as part of a safety equipment survey onboard the container vessel *Oriental Bay*. During the descent the aft fall wire jumped from the lower block's sheave into the gap between the sheave and cheek plate. The lifeboat was able to complete its descent with the fall wire running between sheave and cheek plate. There were no injuries.

Inspection of the block established that the fall wire retaining bar was worn and distorted giving sufficient clearance for the fall wire to pass over the lip of the sheave. Similarly, wear had occurred which allowed the total side clearance, between the sheave and the cheek plate, to develop sufficiently to accommodate the fall wire.

The Lessons

1. **Various features may be built into lower block assemblies to prevent fall wires being displaced in this way. The depth of the wire groove in the sheave will clearly exert an influence. British Standards 4536:1970 advise groove depths to be between 1–1½ times the wire's diameter.**

2. **If wire retaining bars are fitted, these need to be sufficiently close to the sheave to prevent the wire jumping from the groove. Wear and damage can, as this incident demonstrated, cause these bars to be ineffective.**

3. **A limited clearance between sheave and cheek plates will give the wire no opportunity to pass between these components. Clearly, wear, corrosion etc can cause this clearance to grow.**

4. **Monitoring of these features is within the control of ship's staff. Regular inspections should be made, and appropriate records kept on board covering all launching equipment, blocks, wires, shackles, chains etc.**

Part 2 – Fishing Vessels

Drowning is a particularly unpleasant way to die.

If you fall overboard you suddenly and unexpectedly find yourself in the sea fighting to keep your head above water. You are staggered to find how difficult it is to counter the weight of heavy working clothes and footwear. Within a few moments you are exhausted. Very, very few people have any conception of what it is like to be caught in such a situation but the author of these words has. It is the most frightening experience imaginable. Of all the thoughts that go through your mind, one dominates, the desperate need for something to hold on to or for something to keep you afloat. The best means of achieving this is called a lifejacket.

The MAIB receives, on average, an accident report involving fishermen every twelve hours. We hear of groundings, founderings, fires, floods, injuries and death. Yet the most heart wrenching reports are those of fishermen who drown after falling overboard. One can only imagine with horror what their last thoughts might have been. We know from those who have survived that, **without exception**, they all acknowledge the sense of having some form of buoyancy aid to keep them afloat.

Lifejackets and fishermen is a sensitive subject. The MAIB is familiar with practically every argument used to explain why lifejackets are not worn. The list is long and includes views such as, *"they are too uncomfortable"*, *"too bulky"*, *"get in the way"*, *"there are none suitable"*, *"we are not required to"*, *"my father never wore one"*, *"they don't work"*, *"they increase the dangers not reduce them"*, and *"they are too expensive"*. The only people who concede it is a good idea are those who have nearly drowned and the next of kin of victims who have.

There are some grave misconceptions about lifejackets. Few realise there are two types, the generally bulky variety that are normally stowed somewhere below for use in an emergency, and the working lifejacket worn by fishermen when on deck. These are now readily available, are advertised in the fishing press and can be seen at fishing exhibitions. They are practical and can be worn comfortably while working. But there is a problem; the cost. Few fishermen would willingly go to the expense of buying one even if they were convinced by the arguments to wear them. So nothing changes and they go back to sea confident that they will return safely. But some do not, leaving families devastated by the futility of an unnecessary death. Until attitudes change there will be others who will fall overboard and find themselves struggling in the sea without lifejackets. They too will realise, for the first and last time, that the cost of a lifejacket was a very, very small price to pay to prevent death by drowning.

CASE 14

Overloaded Fast Fishing Boat Founders

Narrative

A 9.9m long fast fishing vessel was just completing a day's fishing in choppy conditions when she suddenly capsized and sank. The three crew were lucky to be spotted by a passing yacht and rescued.

The cathedral hull fast fishing boat *Lynn-Well* had a forward wheelhouse and a large working deck aft for carrying creels. She was working about half a mile offshore in some 9 metres of water. The crew were recovering the last fleet of creels to take ashore. Winds were easterly force 4 to 5. A strong tide was running against the wind resulting in a nasty chop with waves about 1.5 metres high. The crew already had about two hundred creels on board when, without notice, the boat listed sharply to starboard and almost immediately sank by the stern until only her bow was visible.

The crew were thrown into the water. They had no time to raise the alarm or release the liferaft which was strapped down on the wheelhouse top. Nobody was wearing a lifejacket. As in most fishing vessels they were stowed in the forward cabin and were not readily to hand. They were, however, able to support themselves by clinging to the marker buoys from the fleets of creels.

After about 45 minutes in the water the three crew were spotted by a passing yacht and recovered. This extremely lucky chance encounter undoubtedly saved their lives.

The boat is believed to have flooded through her transom scuppers which would have been immersed when laden with two hundred creels. The flooding went undetected until she had lost almost all her reserve of buoyancy. It was then too late and she sank.

The Lessons

1. **The boat was overloaded. It is essential that a sufficient reserve of freeboard is maintained when fully loaded. Operators must know the safe carrying capacity for their vessel. Advice on this can be obtained from your local office of the Maritime and Coastguard Agency, or the vessel's manufacturer. The temptation to take on the extra creel or two must be resisted.**

2. **Bilge alarms should be fitted to under-deck spaces to give an early warning of rising bilge water. Small boats have little reserve of buoyancy and this can be destroyed quickly by undetected flooding.**

3. **The liferaft securing straps were not equipped with a hydrostatic release unit. Had one been fitted the liferaft would have floated free when the boat sank.**

4. **Lifejackets must be kept readily to hand. In almost every case involving the sinking of a small boat, there is insufficient time to collect a lifejacket from down below. Either keep them close at hand or, more sensibly, wear working lifejackets. These would be additional to those required by the regulations.**

5. **Flares must also be readily to hand.**

CASE 15

Fishing Vessel Grounds due to Fatigue of Watchkeeper

Narrative and Background Information

Jenmar, a 20.46m long wooden seine net fishing vessel was returning to Mallaig at the end of a ten day fishing trip when, at 0325 on 19 May 1997, she grounded on the Island of Muck. She was refloated with the assistance of another fishing vessel and was subsequently able to complete the passage to Mallaig. There was no pollution and there were no injuries as a result of the accident but *Jenmar* suffered damage to her keel and forefoot.

The vessel grounded because the sole watchkeeper had fallen asleep and had consequently failed to navigate the vessel safely between the Point of Ardnamurchan and the Island of Muck. It is likely that he had been asleep for about 30 minutes prior to the grounding. Secondary causal factors include fatigue after several long and physically demanding days of work, and the inadequacy of the wheelhouse watch alarm.

On average the longest period of undisturbed sleep by any of the crew had been about five hours in any 24 hour period. Typically a deckhand was able to achieve this two nights in every five. On the other nights he benefited from only three or four hours sleep in total, sometimes divided into two periods.

The young man entrusted with the safe navigation knew he was tired and short of sleep. He could have called one of his older and more experienced colleagues but was very reluctant to do so. They, too, were tired and in need of sleep.

Having taken over the watch he settled to the normal routine sitting in the comfortable chair immediately abaft the wheel. He found it extremely difficult to stay awake. It was in the middle of the night, he had been deprived of sleep and he faced the tediousness and loneliness of watchkeeping. There was the steady vibration from the engine turning at 1,600 rpm, a constant background noise and the natural movement of a vessel at sea. The inevitable happened and he fell asleep. He woke with a start when the vessel ran aground. So did everyone else on board.

The skipper had fitted a watch alarm which was activated whenever the autopilot was switched on. After seven years of trouble-free and effective operation he had placed faith in its ability to operate correctly and wake anyone who had failed to cancel it, perhaps because they had inadvertently fallen asleep. On this occasion the sleep of the eighteen year old watchkeeper was so deep that he failed to hear the watch alarm when it sounded in the wheelhouse. Nobody else heard it either.

The Lessons

1. The simple explanation for this accident is that a young watchkeeper fell asleep in the middle of the night and failed to make a course alteration. But the underlying causes go much deeper. He was very tired indeed. Sleep deprivation among fishermen is all too common. It usually catches up with them when they are returning to port to land their catch. The last night at sea is often the first time they can enjoy any degree of uninterrupted sleep after a very busy few days. But someone has to do the watchkeeping and the danger of falling asleep on that last night is very real. Skippers should be very conscious of the potential problem and give careful thought to ensure their watchkeepers are adequately rested before taking over.

2. A very tired man sleeps very heavily indeed. A watch alarm is not guaranteed to wake him.

3. The provision of a watch alarm must not persuade skippers to ignore the requirement to ensure that a watchkeeper is adequately rested prior to commencing duty.

4. A watch alarm should be audible to everyone on board so as to be effective in situations where a sole watchkeeper fails to respond.

5. No matter what the social consequences, a watchkeeper realising he is likely to fall asleep must alert another member of the crew to the situation. The one certainty about feeling sleepy is that you are aware of it. If you find yourself struggling to stay awake, stand up. If you are still struggling, tell someone.

Footnote

Since 1991 the MAIB has received 22 reports of grounding incidents involving fishing vessels which were caused by the watchkeeper falling asleep.

CASE 16

Single-handed Fishermen lost Overboard

Narrative I

A 6.80m potter was discovered by another fishing vessel 4 miles south-east of Eastbourne with no one on board.

The weather at the time was calm with a slight sea and good visibility.

The vessel was found with the main engine and autopilot engaged, a fleet of pots outboard and one pot wedged in the rail. But there was no sign of the sole occupant.

A detailed search and rescue operation was carried out by the emergency services, but the body of the casualty was not found.

The victim had over 12 years fishing experience but was not thought to be wearing either a buoyancy aid or safety line.

Narrative II

The skipper/owner of a 7m 'Poole canoe' (a flat bottomed boat, similar to a punt, used for eel and general fishing, mostly within the confines of a harbour) had just set sail from the dockside at Poole when he fell overboard.

Although he was in the water for only a few minutes before being picked up by another fishing vessel he was pronounced dead by the time he was landed.

He was not wearing a lifejacket or buoyancy aid.

The Lessons

These incidents highlight the dangers involved in operating single handed fishing vessels.

1. It is ill-advised to put to sea single handed. If you have an accident there will be no one immediately available to offer assistance. If you fall over the side there will be no one available to inform the rescue services, and your chances of survival will be slim.

2. If you do put to sea single-handed, always wear a safety line whenever possible, especially when working fishing gear. This will prevent you from falling overboard.

3. Always wear a lifejacket or buoyancy aid, no matter how awkward or cumbersome it may seem. If you do go over the side, it will help save your life.

4. Always let somebody know your movements. Keep in regular contact with other fishing vessels whilst at sea. This way the alarm can be raised if your expected movements or call is overdue.

CASE 17

Fishing Vessel Runs Aground after Wheelhouse is Left Unattended

Narrative

The 19m trawler *Valhalla* was inbound for the port of Lerwick to land her catch.

After the final tow, the skipper engaged the main engine at half speed and set the autopilot to take the vessel south off the west coast of Whalsay.

As the last haul of fish was large, the skipper and the crew were eager to process and stow the catch prior to arriving in Lerwick. With this in mind the skipper decided to give a hand on deck. Before leaving the wheelhouse he carried out a check both visually and by radar to ensure he was clear of traffic.

The skipper was on the deck for approximately one hour. During this time he returned to the wheelhouse a number of times to check the vessel's progress but failed to note the strong tidal currents in that area. Ten minutes after his last visit to the wheelhouse, *Valhalla* ran aground on the Outer Holm of Skaw.

Later, with the aid of another fishing vessel, she was refloated successfully with minimal damage. She proceeded to Lerwick for repairs.

The Lessons

1. **The temptation to leave the wheelhouse unattended for 'just a few minutes' to lend a hand stowing fish is very great. It has been done many times in the past and, generally speaking, those responsible have got away with it. It is manifestly dangerous and breaks every rule in the book. The lesson is clear: don't do it. In this instance the consequences were not particularly serious but next time it could be a collision with loss of life or a grounding that results in a total constructive loss. Either of these consequences can be avoided by heeding the lessons of this incident.**

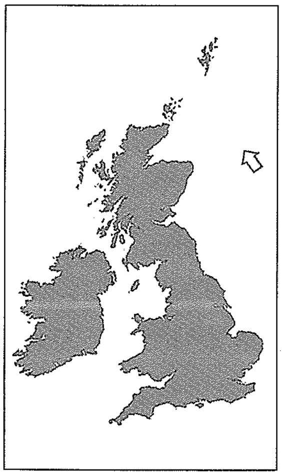
2. **When navigating in shoal waters, and especially in a narrow channel, a vessel should be in manual steering with a dedicated helmsman.**

3. **No matter how well you know a particular passage or area, a passage plan should always be drawn up. Currents and tidal streams can usually be predicted and allowed for when selecting a course to steer. Thereafter good seamanship demands that a constant check be kept on the vessel's progress. This cannot be done if the watchkeeper is stowing fish on deck.**

CASE 18

Collision between Two Fishing Vessels

Narrative



In this incident two fishing vessels collided in good visibility in the North Sea.

The 23m pair trawler *Constant Faith* sailed from Peterhead at 1200 bound for the fishing grounds at Lingbank and, once clear of the harbour, set a course of 080°. Her navigation equipment included two relative motion radars.

Two watchkeepers were on duty at 2330 when they visually detected another vessel about 30° on the port bow. The watchkeepers concluded she could not be on a steady course or bearing because they could see alternating sidelights. No attempt to plot the other vessel was made; she could be seen visually and they considered that no risk of collision existed. No compass bearing was taken. There were several well lit oil platforms in the vicinity.

The watch changed at midnight with the mate and another crew member taking over. The handover included a brief on the other vessel which was now at a range of 2 miles but still 30° on the port bow. The offgoing watch left the wheelhouse.

Turning his attention to the oncoming vessel the mate looked at her masthead lights and assumed she would pass clear to port. On this basis he judged that a risk of collision did not exist.

Shortly afterwards the engine room bilge alarm sounded prompting the mate to leave the wheelhouse to investigate. Before leaving, he informed the junior watchkeeper that the navigational situation was clear.

Having been told that all was well the junior watchkeeper turned his attention to taking a scheduled shipping forecast and went to the rear of the wheelhouse to tune the radio. Shortly afterwards he turned round and was extremely surprised to see a green light very close on the port bow. He then heard a blast from a ship's horn.

Before he could take any avoiding action, the two vessels had collided.

It was later established that the other vessel was the Danish purse seine net vessel *Stromnes* looking for herring but not actually fishing. She was correctly exhibiting the lights for a power driven vessel underway. The watchkeepers in *Stromnes* did not detect *Constant Faith* until the last minute.

Both vessels were damaged. *Constant Faith* sustained heavy damage to the port bow and stem, and flooding of the forepeak and fish room spaces. *Stromnes* was only slightly damaged and after offering assistance to *Constant Faith* she stood by until pumps arrived from the rescue services. She then continued with her passage.

Constant Faith managed to control the flooding with the aid of the pumps and was escorted by the rescue services to Fraserburgh where repairs were carried out.

The Lessons

1. This incident is all about keeping a proper lookout. The watchkeepers in *Constant Faith* saw the other vessel but did not realise a risk of collision existed while those in *Stromnes* never saw the other until collision was inevitable.

2. The mate on *Constant Faith* was unwise to assume that the Danish vessel would pass clear by appraising her masthead lights alone. The fact that *Stromnes* was showing alternating sidelights and was not on a steady course should have given cause for concern. The vessel should have been monitored at all times which would have allowed ample time to take appropriate action had it become necessary.

3. Being the only qualified person on watch, the mate was very unwise to leave the wheelhouse with another vessel so close. This step was compounded by his verbal assurance to the unqualified watchkeeper that the navigational situation was clear when it manifestly was not. Had anyone left the wheelhouse at that particular moment it should have been the junior watchkeeper.

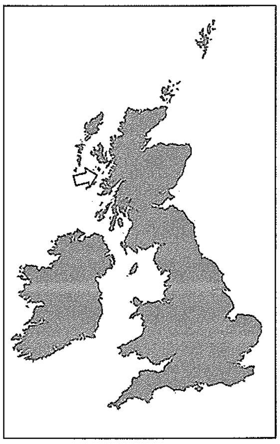
4. The precise circumstances of what happened with *Stromnes* has not been established but quite obviously her two watchkeepers failed to see *Constant Faith.* It is known they were searching for herring. We do not know what they were concentrating on but the fishfinding VDU's were below the level of the wheelhouse windows.

5. When operating in the vicinity of oil platforms at night, any lookout has to be especially vigilant. Identifying other vessel lights against a backdrop of platform lights is not easy and radar displays can be cluttered. Nothing should distract watchkeepers from maintaining a good lookout.

CASE 19

Crew Member Dragged Overboard and Loses his Life

Narrative



The seine net fishing vessel *Ajax* was shooting her gear for the last haul of the evening. The skipper was in the wheelhouse, two crewmen were tending the rope reels forward and two others were positioned aft preparing to shoot the net which was stowed, as usual, in the forward of two net bins.

The weather conditions were favourable, with a slight sea and good visibility.

When the starboard side ropes were fully shot the skipper eased back on the main engine rpm so the sweeps could be clipped to the ropes by a crewman positioned aft. Once done the skipper increased engine revs so the sweeps and net would run free from the net bin and over the stern of the vessel.

The sweeps were running free until a shackle which was being used to attach an extension to the headline sweep snagged on the upper lip of the net bin. One of the crewmen jumped into the net bin to clear it but the snagged shackle cleared itself and a bight of the remaining sweeps, which were now running free, caught round his leg. The weight of the shot ropes and the forward motion of the vessel dragged him overboard. He was not wearing any form of lifejacket.

The alarm was raised immediately. The skipper came hard astern on the main engines to enable the net to be unshackled so he could manoeuvre freely. Three lifebuoys with lines attached were thrown to the casualty who managed to pass his arm through one of them but, as the crew started to heave it in, his arm slipped and he began drifting away.

One of the crewmen then jumped into the water and swam towards the casualty. He managed to get hold of him and pull him back alongside the vessel but although only a very few minutes had elapsed since he went over the side, the victim was showing no sign of consciousness. The crewman who had gone to his rescue was, by now, also very weak and having difficulty in keeping the casualty's head above water.

The skipper then went into the water with a safety line attached and managed to get a lifting strop first around the casualty and later around the crewman. With the aid of the gilson all three were lifted aboard.

Although the victim showed no sign of life, cardio pulmonary resuscitation (CPR) was carried out immediately and the emergency services alerted. A rescue helicopter was scrambled with a medic on board.

When it arrived the casualty was examined and then airlifted off. Although CPR was maintained throughout the flight ashore the casualty was pronounced dead on arrival.

The Lessons

1. This unfortunate accident could quite easily have been avoided. Fishing gear often becomes snagged on some part of the vessel whilst shooting and many fishermen have inadvertently put themselves in danger by trying to free the snag. But this incident highlights well known lessons. Always keep clear of any fishing gear whilst it is being shot. If the gear snags inform the skipper so he can take the weight off the gear. The snag can then be cleared without danger. A torn net or broken rope can always be repaired later.

2. Even the most experienced and agile fisherman will occasionally do something he would privately admit was pretty silly. One of the best safeguards is for a colleague to warn him, probably in no uncertain terms, that what he is about to do, or is doing already, is unsafe. Everyone in the close knit community of a fishing vessel should be constantly alert for the hidden danger that might affect a colleague.

3. No matter how awkward or cumbersome they may seem, always wear a working type lifejacket or buoyancy aid when on deck. If you go over the side, it may well save your life. The lifejacket will give you a realistic chance of being recovered alive.

4. Tossing a lifebuoy to someone in the water is a sensible first step; it provides an essential means by which a man overboard can keep himself afloat. But exercise extreme caution when trying to pull someone along by it. Hanging on to a moving lifebuoy is infinitely harder than it looks. If the victim cannot help himself, some means of getting a strop around the body must be sought. Ideally this strop will be the same means by which he is lifted back on board.

5. Recovering a man overboard is very much harder than anyone ever visualises. He will most likely be very cold, extremely tired, weighed down by water-logged clothing and almost certainly unable to help himself. Body temperature falls fast and even the fittest person becomes exhausted within a short period of time, so speed of any recovery is essential. Although there are some well documented cases of people surviving immersion in the water for several hours the MAIB's experience is that survival time is generally measured in minutes rather than hours.

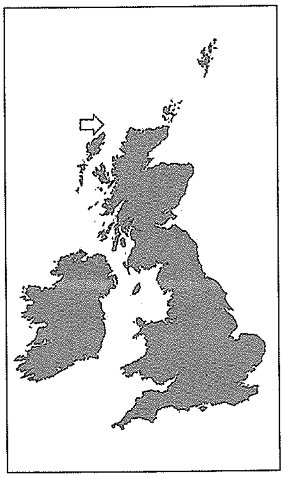
6. Every skipper should think about how he would recover a man from the water from his boat. The conscientious skipper will carry out manoverboard drills on a regular basis and have an effective system for retrieving casualties from the water.

7. The action of the two crew members who went into the water to aid the man overboard was commendable. But it almost resulted in having another casualty. Jumping into the sea is a very risky business especially if not prepared for it. It should be undertaken only when absolutely essential, and then only with the aid of a safety line and a lifejacket. If a wet suit is available, a rescuer would find his task much easier if he wore it.

CASE 20

Crew Member Crushed to Death on Beam Trawler

Narrative



The *St Mark*, a beam trawler of 33m in length, left Lowestoft on 26 June for fishing grounds to the north of the Butt of Lewis. She began fishing on her arrival two days later.

When the nets were hauled in the evening of the 1 July, nets and chain mats were found damaged. The beams were turned fore and aft and secured over the side using chains at each end of each beam. The nets and mats were lifted inboard to enable repairs to be made. The weather conditions were poor; a north easterly wind of force 6 to 7 was causing moderate to rough seas.

The repairs took an hour. The port side beam was prepared for shooting without incident but when the starboard side beam was lowered for the securing chains to be released, it came to rest on top of the bulwark. Although unplanned, the situation was not unusual. One of the crew went forward to release the forward chain but, before he was able to do so, the vessel rolled heavily causing the forward end of the beam to fall off the bulwark rail and swing inboard. The 3 tonne beam crushed him against a central housing.

A Coastguard rescue helicopter with a doctor on board was tasked to assist but although the casualty was winched off he was pronounced dead about two and a half hours after the accident.

The Lessons

1. **The skipper and crew were very experienced fishermen. Most routine work on board was carried out automatically without direction or intervention by the skipper who controlled the winches and oversaw the operation from the wheelhouse. Each member of the crew acted independently and was responsible for his own safety. In normal circumstances operations were carried out without incident. On this occasion something out of the ordinary occurred; the beam landed on the rail instead of hanging safely outboard. The normal procedure should have changed to allow for the new risks.**

2. **The crew member should have waited until the skipper could lift the beam again and lower it into the correct, and safe, position. However, acting on his own initiative, presumably to save time, he put himself at great risk in his move to unhook the beam.**

3. **The skipper had oversight of the working deck. He saw the incident develop but was either unable to stop the operation once started, or accepted the risks involved.**

4. **Every operation which involves teamwork should be under the control of a single person. As an operation moves from stage to stage that person should signal his permission, or otherwise, for it to continue. A recognised signal should exist to enable the person in control to stop the operation at any time. Nobody should be allowed to endanger himself unnecessarily.**

CASE 21

Three Recent Flooding Cases – Mechanical Failures

Narrative I

The 8.4m long fishing vessel *Samaki* was on sea trials following a major re-fit. At some point the two crew noticed smoke coming from the engine space. On investigating the source they discovered the engine space was flooding. The electrical submersible bilge pump in the bilges, rated at 2000 gallons per hour, could not cope with the flooding. The coastguard were alerted and a RNLI lifeboat came to their assistance. Using a salvage pumps *Samaki* was kept afloat and was able to return to harbour.

The flooding was caused by the failure of the shaft seal that had been replaced during the refit. A bilge alarm was fitted in the lower bilges but it failed to operate.

Narrative II

Craignair, a 9.64m long creel boat flooded through the open end of the wet exhaust system. The skipper, on board alone, was first alerted to something being wrong when he noticed exhaust fumes and smoke starting to accumulate in the wheelhouse. His investigation revealed that the exhaust hose had come off the transom fitting. Fortunately he was approaching harbour when the incident occurred and was able to beach the vessel to pump her out and rectify the failure.

The exhaust hose came off the transom fitting because the hose clips had rusted through. Although a bilge alarm was fitted, and in working order, the skipper had become aware of the flooding before the alarm activated.

Narrative III

The engine revs on the 24m long wooden fishing vessel *Vertrauen* began to fall. An investigation revealed flooding in the engine room to above the floor plates. Bilge pumps, and a portable pump kept on board, were started; and further pumps were requested from the coastguard. Another fishing vessel stood by. A rescue helicopter delivered two salvage pumps and these, together with the pumps already on board, enabled the water ingress to be controlled. She was towed to port by the other fishing vessel.

The source of the flooding was the disconnection of the hose supplying cooling water to the stern gland. A bilge alarm was fitted but failed to operate.

The Lessons

1. In each of these incidents flooding was caused by a mechanical failure. The first incident resulted from the incorrect installation of the seal while the other two stemmed from a lack of maintenance.

2. In two cases the failure of the bilge alarms allowed the flooding to pass undetected until it affected the running of the main engine. An early warning of flooding can reduce damage and save both time and money. It pays to keep a bilge alarm in good working order.

3. The complete loss of the vessel in Case III was possibly averted because the bulkhead forward of the engine room was watertight and prevented unrestricted flooding throughout the vessel.

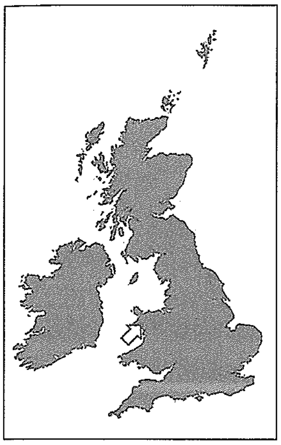
Footnote

Excellent guidance on the prevention of, early detection of, and coping with flooding is contained in the Marine Guidance Note 49(F), a copy of which can be obtained from your local marine office or MCA surveyor.

CASE 22

An Experienced Fisherman Drowns

Narrative



Shortly after 0830 on 6 April 1998, a 5.5 metre dory left Criccieth harbour, North Wales, with one man on board intending to set pots to the west of the Dwyfor estuary. Weather conditions were good with light winds and low waves. The water temperature was about 8.5°C.

At about 0955 the Marine Rescue Sub-Centre (MRSC) at Holyhead received a report that an upturned boat had been sighted west of Criccieth. The RNLI inshore lifeboat was launched to investigate. The crew found the vessel upside down about 500 metres off the shore and with one green wader and a pair of waterproof over-trousers lying on top of the inverted hull. There was no sign of the occupant and a rescue helicopter from RAF Valley, and the Pwllheli RNLI lifeboat, joined the search for him.

He was found about a quarter of a mile north-west of his capsized craft, unconscious and face down in the water. He was recovered by the helicopter and taken to Ysbyty Gwynedd, Bangor. All attempts to revive him failed.

The initial cause of the accident is unknown, but the evidence suggests he fell overboard when preparing the pots for shooting. He was not wearing a lifejacket. He was, however, able to cling to the hull and may even have been in a position to climb back on board. In the process the craft either inverted or filled with water through the submerged drain holes until she lost stability and then capsized. At some stage he might have been able to climb onto the upturned hull where he removed his waders and overtrousers. Whether he removed them while on the hull or in the water is not known but it is thought he took them off before attempting to swim for the shore.

The skipper was a well respected, competent and cautious fisherman with many years experience who knew the waters well. He held a boatmasters' licence. He was one of 24 UK fishermen to lose their life in 1998.

The Lessons

1. **Of all the types of fishing to take place in UK waters, single handed operations are among the most risky. Every fisherman who earns a living this way knows it. There is little room for serious error and when anything goes wrong, the consequences can be severe.**

2. **Very sadly, other fishermen are destined to drown in circumstances not dissimilar to this vessel's skipper. Not one of them will have any fore knowledge of what could befall them. The one certainty is that they will be mourned by people who will ask "Could it have been avoided?" Few will readily admit it but the answer is yes.**

3. Beware of low bulwarks and guardrails. On this vessel the bulwarks were about 500mm high and topped by guardrails to a safe height of 1 metre. But down the starboard side where the pots were shot away the top of the bulwark remained at about 500mm or just below knee height. This is just the right height to trip someone overboard if caught off-balance. An awareness of this potential danger must encourage other precautions to be taken.

4. In such circumstances fishermen will realise that despite their experience, skill, qualifications, natural instincts and familiarity with their boat, they might go overboard. It is then far too late to start thinking about what might have been done to save them from their predicament. There is nobody to help them back on board. There is nobody, other than themselves to raise the alarm. They are very much on their own, very cold and probably very tired. As anyone knows who goes swimming from a boat, it is almost impossible to climb back on board unless you are extremely strong or there is some form of ladder. Every skipper should think through how he would climb back in the event of him being in the water.

5. Perhaps he will think about raising the alarm. But how? Is this the moment he would give anything for a personal locator beacon which he could activate? Or would mini flares suffice? Without either the option is closed to him.

6. Then there is the cold. Sea water has a very rapid chilling effect. Theoretical survival times tend to overlook the shock effect, the break down in insulation and waves breaking over a face. Actual survival times are, with a few conspicuous exceptions, much less than the text books say. And yet, the wearing of thermal protective clothing can do much to maintain body heat and keep the victim alive.

7. Finally lifejackets. It will never be known exactly when this vessel's skipper died but the one option he never had was something to keep his face above water. Although the dory carried a lifejacket it was in a locker and out of reach. Had the skipper been wearing a personal lifejacket at all times when he was at sea, he would not have had to worry about donning it in the event of an unexpected emergency. He would have had it on when he was thrown into the water, and he might have been alive today. The only thing we do know is that by not having it, he didn't even have that chance.

Part 3 – Leisure Craft

The events described in this section cover a wide range of incidents and some particularly tragic events. As with all *Safety Digest* reports, their sole purpose is to prevent the accidents described happening again. The lessons are, in general, very simple, but described in such a way that those reading them will remember the contents should they ever find themselves in similar circumstances in the future.

The Chief Inspector is well aware of the publicity surrounding the loss of the brig *Maria Asumpta* and three lives in 1995. The MAIB investigated the accident at the time and produced a report which was made available to all parties involved in the trial of the skipper when he was charged with, and eventually found guilty of, manslaughter. There has been no cause to change the findings since then and the investigation has not been re-opened. Nonetheless the lessons to arise from the accident have never been published and the changed emphasis in the style and content of the *Safety Digest* provides an opportunity for these to be promulgated for the benefit of anyone charged with sailing large vessels. As already stated the MAIB has only one interest in this incident; it must never happen again.

MAIB Inspectors only investigate a relatively few pleasure craft accidents. Many more are drawn to the attention of the Branch and a weather eye is always maintained to identify worrying trends or a particular problem. The statistical basis for any observation is usually fairly limited and comment is often based on subjective analysis. But two recent themes have emerged; the problems caused by power boats going too fast in confined waters and the tendency for some yachtsmen to push their luck in rough weather. Neither problem is new.

Skippers of high speed power boats have a responsibility to ensure that they do not cause accidents by proceeding at excessive speed in confined waters or in the vicinity of other small craft. No matter what the actual speed limit is, if indeed it exists at all, a careful eye on the wash being generated astern can be revealing. In shallow water it can be accentuated and, for all you know, that seemingly empty yacht secured to a mooring buoy adjacent to the main channel is where the owner is just about to remove a saucepan of boiling water from the cooker. A scald, or something worse, is just as much a marine accident as a collision or grounding.

The MAIB still receives too many uncomfortable reminders about keen and enthusiastic yacht skippers, who might be superbly qualified and even highly experienced, taking risks with bad weather. They often seem to sail with inexperienced or unworked up crews. There are times and places for heavy weather sailing, but to set out with gales forecast in a boat designed for fair weather conditions and with a novice crew, is asking for trouble.

Some of the lessons contained in the fishing vessel section are of interest to the leisure craft user. The Part 2 introduction emphasises the importance of wearing lifejackets. There is growing evidence to indicate that the most experienced yachtsmen are often the most reluctant to wear them. Even the oldest, boldest and most weather beaten sailor can get it wrong sometimes. ***Always wear a lifejacket.*** Apart from anything else it sets the right example.

CASE 23

Watchleader Falls from Bowsprit and Loses Consciousness in Harness

Narrative

The sail training vessel *Morning Star Of Revelation* was on passage from Scheveningen, Netherlands to the River Orwell on the UK's east coast. There were thirteen on board, split into three watches.

At 0100 the wind was south-west force 4 and the sails were set accordingly. If anything she was slightly undercanvassed. By 0540 the wind had freshened to south-west force 6 and at 0630 it was decided to shorten sail. The skipper was called on deck to take the helm while the watch on duty performed the sail change.

The vessel was beam on to the wind with seas breaking across the bowsprit. The foresail was lowered but as it was being detached from the forestay the watchleader, working on the bowsprit, was washed off. She was attached to the jackstay running along the bowsprit and found herself hanging in the water. She tried to climb back on board with the help of others but, because her clothing had absorbed so much water and increased her weight, it proved extremely difficult to recover her.

The casualty lost consciousness. The skipper, made a "Pan Pan" call which was acknowledged by Thames Coastguard, and then supervised her retrieval by passing a line through her harness. She was hauled back on board by several other members of the crew. She vomited as she came back on board and was bleeding through her nose and mouth. Her breathing was short and her pulse was rapid. The skipper provided effective first aid treatment and attempted to establish the extent of her injuries which were then passed to the Coastguard. A helicopter evacuation was arranged.

The patient was successfully evacuated by hi-line transfer and treated in hospital for hypothermia, cuts, and bruises. Most of the injuries were caused by the safety harness but some seawater was also found in her lungs. She was discharged from hospital two days later.

The Lessons

1. **Single point life-harnesses are not suited for work on bowsprits. The length of line needed for normal working means that in the event of a fall, the wearer will drop to the full extent of the harness line. This means they are likely to land up in, and being dragged through, the water without anything to hold on to. Climbing back on board is virtually impossible. A harness line with a short and long attachment would be more suitable.**

2. **In rising wind conditions, sail changes should be made as soon as they are thought necessary. It was admitted in this case that the decision was made late and that conditions for the sail change had become difficult.**

3. **When bowsprit work is required in heavy weather, and there is no pressing need to do otherwise, the vessel should be hove to or turned downwind.**

4. Recovering people from the water is always extremely difficult especially when still making way. Not every sailing vessel has the luxury of a large crew to provide manpower and skippers must have a contingency plan for recovering anyone in the water. There are no hard and fast rules but it must be done as rapidly as possible and, so far as possible, the lifting point must be above deck level. Above all nobody else should fall in during the recovery process. In thinking through the best method to adopt, skippers should reflect on the effectiveness of any system that involves passing a strop around the body and under the arms.

5. Anybody in charge of a vessel at sea must be prepared to administer first aid. Some Certificates of Competency require certain standards of proficiency. In practice skippers need to ensure that their first aid kit is properly maintained and fully stocked. They should be capable of handling most common injuries and situations including hypothermia. They must know how to handle a patient without injuring him or her further and be able to communicate the symptoms accurately over the radio. Finally they should know how to prepare a casualty for evacuation.

CASE 24

Brig Runs Aground after Both Engines Stop – Three Lives Lost

Narrative

Maria Asumpta, a United Kingdom brig of length 30 metres on deck and built of timber in 1858, was on passage from Mumbles, South Wales, to Padstow in late May 1995. While making her approach to Padstow Bay at the end of the passage she grounded on a submerged rock while attempting to weather a headland and broke up within minutes. She was manned by her skipper/owner and thirteen crew. Three of the crew lost their lives.

Maria Asumpta's planned passage took her across the Bristol Channel and along the north coast of Devon and Cornwall to pass one to two miles off Hartland Point, and then to Padstow Bay passing through the half-mile gap between the outcrop of rock known as Newland, and Pentire Point that marks the northern entrance to the Bay.

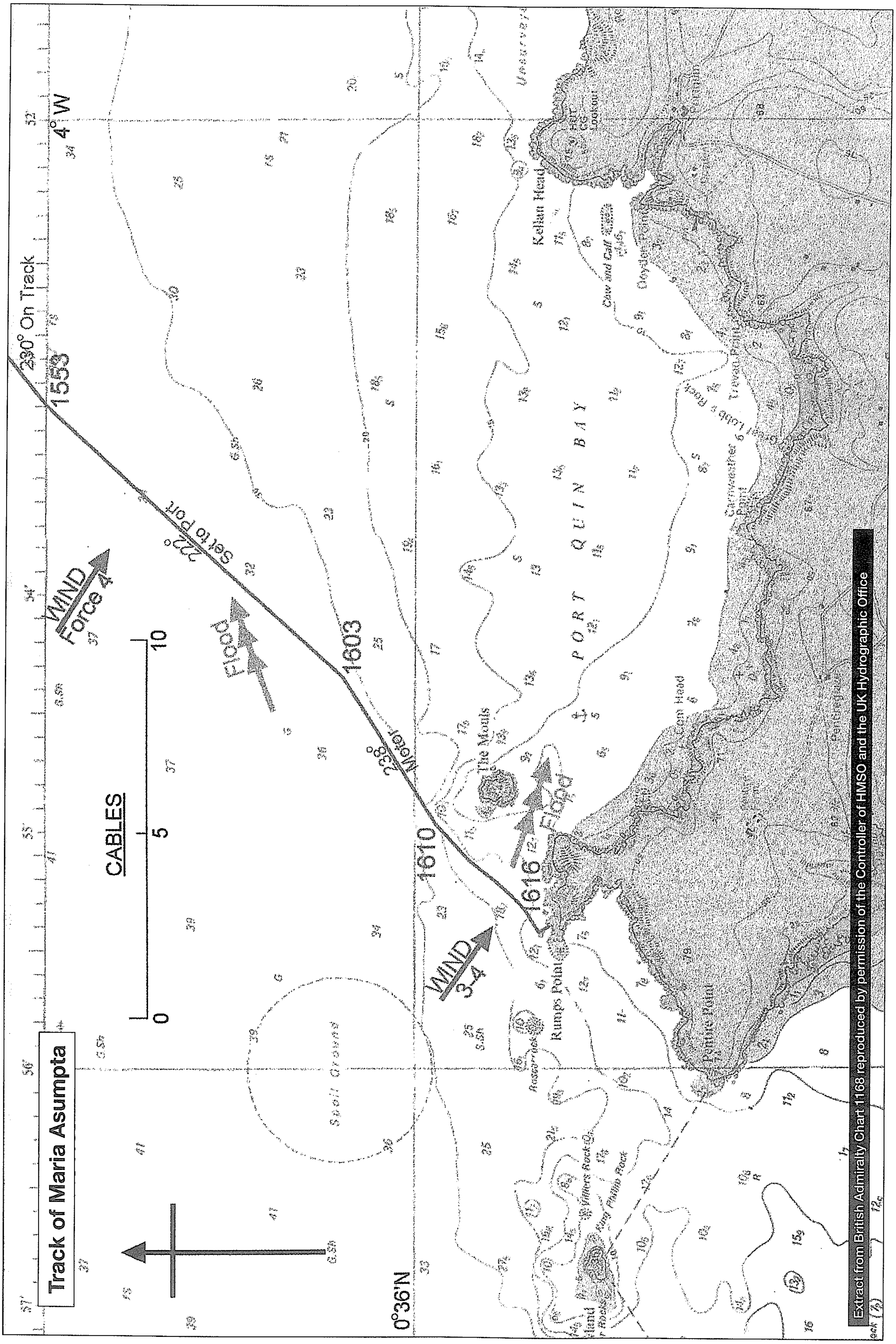
The weather was fine, the wind was north-west force 3 to 4, a long west-north-westerly swell was running and, at 1600 on 30 May, the spring tide was setting up channel with an easterly set making between The Mouls and the Rumps peninsular. Visibility was good.

The vessel motor-sailed for much of the passage but, during the latter stages, proceeded under sail alone with two main engines ready for use.

The skipper fixed his position by visual bearings and radar ranges and, on approaching the entrance to Padstow Bay, had a clear view of the peninsular and off lying islets. As he approached the first of these, The Mouls, he realised *Maria Asumpta* was being set to port and towards the land. He ordered the engines to be started to enable him to turn to starboard and closer to the wind to counter the onshore set.

About five minutes later both engines stopped together and, despite efforts to restart them, remained so. Without engine power she was again set towards Rumps Point. Despite efforts to set more sail to increase headway and claw herself offshore, she struck a submerged rock. She was set further inshore, heeled heavily to starboard and started to break up almost immediately. Most members of the crew managed to scramble onto the nearby rocks or were rescued by other craft or a helicopter but three were lost. Nobody was wearing a lifejacket.

The reason why the two engines stopped simultaneously has never been precisely determined. They were both mechanically sound and were, until they stopped, supplied by an adequate supply of fuel which was not contaminated. The most probable cause of stoppage was the simultaneous, and involuntary, movement to the 'stop' position of the solenoids which were linked to the fuel pumps' racks.


Track of Maria Asumpta
CABLES
0
5
10
WIND
Force 4
WIND
3-4
230° On Track
1553
222°
Set to Port
1603
238°
Motor
1610
1616
Flood
Flood
PORT QUIN BAY
Kellan Head
The Mouls
Rumps Point
Pentire Point
Spoil Ground
0°36'N
4°W
Extract from British Admiralty Chart 1168 reproduced by permission of the Controller of HMSO and the UK Hydrographic Office

The Lessons

1. A fundamental responsibility of any skipper is to plan a passage that is safe and takes full account of the expected conditions. He must be prepared to adjust his plans if the actual circumstances are different to those anticipated. Planning any passage involves considering all the professional advice available and *Maria Asumpta*'s skipper had access to Sailing Directions. The Admiralty Sailing Directions advises the best approach to Padstow Bay as being from a position midway between Gulland Rock and Newland. Because the skipper had previously used the narrower route several times by day and night, he did not follow this sound advice.

2. Any passage plan can be, and often is, adjusted at the time if the circumstances allow. In reasonable conditions a passage between Newland and Pentire Point is acceptable for some vessels providing the conditions are suitable, the risks are carefully weighed up and an alternative plan drawn up in the event of things going wrong. Local sightseeing boats and other small craft, including yachts, do it routinely. Small merchant vessels pass that way occasionally. In this case, the chosen route allowed little margin for error, particularly in view of the prevailing wind direction and the inability of the vessel to sail close to the wind with square sails.

3. *Maria Asumpta* was not a small yacht. She was a square rigged vessel with certain limitations in her handling characteristics when proceeding under sail alone. She was sailing close to the wind and was closing land to leeward. She would have found tacking virtually impossible given the prevailing sea and swell conditions, but she did have two good engines.

4. With an onshore wind and east setting tidal stream north of the headland on the afternoon of 30 May, the decision to take this inshore passage under sail alone involved an element of risk, even though the main engines were available. Many square rig skippers might be wary of taking a relatively unwieldy ship so close to a lee shore unless they absolutely had to.

5. There was no such compulsion in this instance and a more sensible approach would have been to lay off a course that kept her much further offshore. Such a course should have been set sufficiently early to ensure that in the event of anything going wrong an alternative plan could have been adopted. In short, what he needed, and should have sought, was plenty of sea room. Before the days of powerful engines, more sea room was the perpetual quest of the old sailing ship masters.

6. When planning a passage, ensure there is plenty of sea room.

7. In the event *Maria Asumpta*'s course took her close to The Mouls. As he approached it the skipper realised he was being set to leeward and that his options were limited. His fall back position was to use the engines. They had already been used that day, had shown themselves to be reliable and were ready for use. The engines were started and *Maria Asumpta* proceeded under power leaving The Mouls 1.5 cables to port.

8. But then the engines stopped, a possibility that had not been considered. It left the skipper with very few remaining options. His choice of course had already denied him the sea room he needed. Because of the sea and swell he was now unable to tack to starboard but might have had a window of a few seconds to wear ship to port. Had he done so he would have encountered risks of a different nature by taking his vessel closer inshore whilst turning towards cliffs.

9. Another option was to press on, hope the engines would restart and set more sail to increase headway. Any options at this stage carried a high risk of failure. The chances of weathering the headland under sail alone were not high but the skipper felt it the better option. He knew he would be sailing very close to the shore but believed his actions would achieve the aim.

10. The skipper's attention was totally focused on sailing his vessel out of trouble. He could see clear water ahead and pressed on. Although he was aware the visible end of the point was not where danger ended and that rocks lay out from it, he judged he was just clear of them. He may well have considered the possibility that he was facing a life threatening situation but chose to focus on saving the ship and, thereby, all his crew rather than make any attempt to prepare for the worst.

11. When all options are exhausted, the most important consideration is the safety of those on board.

12. A skipper is ultimately responsible for the safety of his ship and all on board. Although every effort must be made to avoid a potential disaster, part of a skipper's mind must think through what needs to be done in the event of things going catastrophically wrong.

13. Both liferafts and lifejackets were carried in accordance with the regulations; the latter in approved stowages below decks and therefore not immediately available. The lifejackets themselves were unsuitable for use when working ship, especially when aloft, but they were capable of preserving life in the event of a disaster. The skipper knew this. He also knew that breaking out the lifejackets would take a finite time. He, more than anyone on board, would have known what this might have been. The decision to do so should therefore have been made in time for them to be brought on deck and at least made readily available to those on board.

14. Had the vessel sailed clear nothing would have been lost. But had the lifejackets been immediately available and, better still, already donned, then the chances of survival would have been increased.

15. Once *Maria Asumpta* struck the rocks at Rumps Point, it was too late to start preparing lifejackets. The power of the sea became all too apparent and total destruction of the vessel was measured in minutes.

16. Lifejackets are for the preservation of life. Whenever there is a possibility that a life threatening situation is beginning to develop, they should be made readily available and, if possible, put on before the unknown occurs. Afterwards is often too late.

17. What lessons arise from the failure to restart the engine? Few of us, very few, who have been afloat can honestly say we would not have been acutely embarrassed had one's own engine failed at a particular moment. It does not require much imagination to visualise such a situation arising in any craft we might be in, including a small dinghy with an outboard.

18. How would we react if the engine failed at the worst possible moment? Leaving aside any seamanship response for a moment, would we unhesitatingly know how to diagnose the fault and restore power before it was too late. Too many of us who are not marine engineers would probably fare badly if put to the test.

19. Those who sail in vessels with engines should be able to rely on them. But such reliance depends on knowing something about them and looking after them properly. We cannot all be expert marine engineers but the very least we can do is maintain our engine correctly, follow the maker's instructions carefully and know what checks need to be made when it stops for no apparent reason.

20. Those of us who sail for pleasure should have a working knowledge of how the engine works and be able to diagnose the basic causes of engine failure. Training in these matters is very strongly recommended.

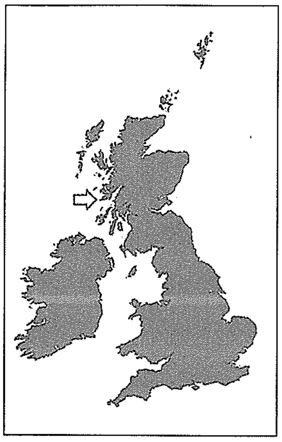
Footnote

The lessons have been described in some detail to draw out the key points. No accident is the result of a single cause. The loss of the *Maria Asumpta* is a classic example of how a series of events can combine to result in a tragic accident. If only some of the many contributory factors had been handled differently on 30 May a fine ship would have completed her voyage safely and three lives would not have been lost.

CASE 25

Four Die after Dinghy Capsizes in Sound of Iona

Narrative



Five young men were returning to the Isle of Iona after a Christmas ceilidh in a hotel on Mull. The dinghy they were using to take them across the Sound of Mull capsized and threw them into the water. Only one of those on board survived; the remaining four lost their lives.

Generations of Ionians have crossed the 1.4 km wide Sound of Iona in open boats without incident over many, many years. The early hours of Sunday 13 December 1998 were little different to many others.

It was dark, the wind was from the south west force 5 against the remains of the ebbing tide and a moderate swell was running. Five young men, great friends and living life to the full, decided to attend a ceilidh in the nearby village of Bunnessan on Mull. They left Iona at about 2100 and crossed the Sound in their 4.27m [14ft] dinghy to enjoy a very happy evening with friends until about 0200 when they set off on the return journey. One had not drunk alcohol all evening, the others were 'happy'.

They re-embarked in their dinghy from the jetty at Fionnphort at about 0215 and set off for what should have been no more than a 10 minute crossing. The seating configuration on board meant that most of the weight was concentrated forward despite the 6hp outboard engine clamped to the transom. The dinghy did not contain any additional buoyancy and nobody was wearing a lifejacket. They were wearing normal clothing and shoes. In varying degrees each of them had extensive experience in small boats and knew the waters of the Sound intimately.

About two to three minutes into their crossing the dinghy nosed into a wave and shipped an extensive amount of water. Although they started to bail almost immediately the freeboard had been reduced to such an extent that the gunwale dipped below the waves and the dinghy capsized. They were all thrown into the water. Although two of them were not good swimmers there was no panic. Each looked for something to hang onto and found fenders or the floating fuel canister. The boat itself had inverted and was floating bow up but was inclined to roll if too many hung onto it. One man, the eventual survivor and wearing boots rather than shoes, found himself, clinging to a bottom board. After a while he became separated from the others who were talking among themselves. He drifted for a while until he became aware of the shore line close by and decided to swim for it.

He made the rocks and managed to pull himself ashore. Having been in the water for about 45 minutes, he was very very cold but was able to climb the rise to reach a track some 200 metres inland. It was about 0400. He then walked back to nearby Fionnphort where he woke some friends who lived there. Although in an advanced stage of hypothermia he managed to convey what had happened. His friends did three things, raise the alarm, did all they could to restore body heat and initiate a search for the others.

Using a local fishing boat, they found the upturned dinghy within an hour and the body of one man shortly afterwards. There was no sign of the others. The Oban lifeboat arrived shortly after 0600 and was joined by both Royal Navy and coastguard helicopters, the Tobermory lifeboat and many of the local community who searched along the shore for more survivors.

There were none. The community was devastated.

The Lessons

1. This accident could have happened anywhere in the world where embarking in a small open boat for a short journey is an everyday occurrence. As many car accidents are said to happen within one mile of home, so too do many boating accidents occur in that short distance between shore and shore or when transferring by tender between larger vessel and the jetty. That no accident had occurred on the short crossing from Iona to Mull persuaded people over many years to take what they thought was an acceptable risk. Familiarity with a particular course of action is often the prelude to a tragic accident.

2. This accident, as in so many others was not the result of one catastrophic event but rather the accumulation of many smaller ones. Even the decision to cross the Sound of Iona in the early hours of the morning is worth analysing. There was an option to stay put on Mull until the morning when at least it could be attempted by daylight.

3. Being alert is the hall mark of the true seaman. Many things can adversely affect alertness such as trying to do things at the end of a long day, or having to make accurate decisions between 0100 and 0600 when body temperature drops in the self sustained biological rhythm synchronised to the 24 hour clock. Drink, even in small quantities, affects judgment. It also exaggerates self confidence.

4. Placing five people in an open 4.27m dinghy might be safe in calm weather and in daylight – providing nothing goes wrong nor additional weight added. Water or spray being shipped adds to the weight and reduces freeboard. An open dinghy is designed to rise to the sea and swell but it is limited in its ability to do so if heavily laden, especially forward. This dinghy failed to rise to an oncoming sea, shipped a substantial amount of water and lost all it stability. From that moment the capsize was inevitable

5. The weather was not particularly bad. Had it been so it is generally thought inconceivable the five men would have taken the actual route adopted and headed across the sound into the weather. The alternative track usually adopted in bad weather entailed taking a slightly different passage that lay further to the north. Recognising the limits imposed by sea states was a natural process to all on board – providing they could see it. Although they knew the wind had freshened since their outward trip it was very dark on their return journey and it was very hard to see. The man on the helm gave no warning of a large wave nor did he slow down. It is very unlikely he could see the waves ahead of him and take appropriate action to ride them. Handling a small boat in potentially rough conditions requires special skills and an ability to see what is coming next. The middle of the night is not the best time to be trying it, especially when heavily laden and no reserves of buoyancy.

6. Even if all the right precautions are taken, a capsize or some other disaster is always a possibility and measures should be taken to anticipate being in the water. There are four basic requirements to consider before setting out in any small boat at any time no matter what the time of the day or night, or for how short a journey. The considerations are prompted by the question: 'what shall I do if I find myself in the water?' The first is personal buoyancy. Those without it are at an instant disadvantage and will find it difficult to keep afloat. The second is an instinctive need to hold onto something that will keep you from sinking. The third is to attract attention and the fourth is to stay warm. The sea can be very chilly, especially in winter.

7. The well prepared man will be wearing a lifejacket before he sets out. His boat will have some form of additional buoyancy in it. He will have some means of attracting attention which will be anything from flares in a waterproof container to a personal locator beacon and finally he will be wearing clothing to help him survive. Everyday clothes, light jackets and heavy shoes are ideal for many occasions but swimming around at night is not one of them.

8. Before embarking in that open dinghy for that journey you have done many times before without incident, just pause for a moment and think of Iona. Put on that lifejacket!

APPENDIX A

Investigations commenced in the period 01/09/98 – 30/04/99

Date of Accident	Name of Vessel	Type of Vessel	Flag	Size	Type of Accident
21/08/98	*Edinburgh Castle*	Cruise	UK	32,753 GT	Fire
08/09/98	*Trijnie*	Tug	UK	38 GT	Capsize
19/09/98	*Silver Sturgeon*	Passenger	UK	1,003 GT	Fire
28/09/98	*Anna Louise*	Fishing Vessel	UK	9.20 M	Accident to Personnel
13/10/98	*Arco Arun*	Dredger	UK	3,476 GT	Grounding
13/10/98	*Catrina*	Fishing Vessel	UK	11.99 M	Capsize
15/10/98	*Amber Rose*	Fishing Vessel	UK	24.02 M	Capsize
22/10/98	*Octogon 3*	Ro-Ro – Cargo	Romania	9,983 GT	Grounding
02/11/98	*Pescalanza*	Fishing Vessel	UK	28.32 M	Capsize
04/11/98	*Christina (B)*	Fishing Vessel	UK	7.20 M	Accident to Personnel
10/11/98	*P&OSL Kent*	Ro-Ro Passenger	UK	20,446 GT	Accident to Personnel
12/11/98	*Blue Hooker*	Fishing Vessel	UK	7.41 M	Capsize
07/12/98	*Pentland*	Gen Cargo – Single Deck	Barbados	909 GT	Grounding
09/12/98	*Geeske*	Fishing Vessel	UK	27.36 M	Accident to Personnel
09/12/98	*Arcadia*	Cruise	UK	63,524	Dangerous Occurrence
11/12/98	*Donna Anne.*	Fishing Vessel	UK	7.75 M	Capsize
13/12/98	*Unnamed Dinghy*	Pleasure Craft	UK	4.27 M	Capsize
02/02/99	*Toisa Gryphon*	Offshore Supply	UK	1,488 GT	Fire
03/02/99	*Unnamed Dinghy*	Pleasure Craft	UK	6.10 M	Capsize
04/02/99	*Baltic Champ*	Gen Cargo – Multi Deck	Panama	1,660 GT	Grounding
11/02/99	*Suzanne/* *Elm*	Fishing Vessel Gen Cargo – Single Deck	UK St Vincent & The Grenadines	9.90 M 959 GT	Hazardous Incident
12/02/99	*De Kaper*	Fishing Vessel	UK	30.87 M	Fire
02/03/99	*Arklow Marsh/* *Hoo Robin*	Gen Cargo – Single Deck Gen Cargo – Single Deck	Irish Republic UK	1,524 GT 794 GT	Collision
09/03/99	*Beverley Ann II/* *Cypress Pass*	Fishing Vessel Specialised Carrier	UK Liberia	9.96 M 42,477 GT	Collision
17/03/99	*Quiberon*	Ro-Ro Passenger	France	8,314 GT	Grounding
18/03/99	*Pride of Le Havre*	Ro-Ro Passenger	UK	33,336 GT	Fire
19/03/99	*Multitank Ascania*	Chemical Tanker	Tuvalu	2,780 GT	Fire

APPENDIX B

Inspector's Inquiries

An Inspector's 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 Inspector's Inquiries and will be submitted to the Secretary of State:

Name of Vessel	Brief Details
Sand Kite	Dredger; collision with Thames Barrier
Margaretha Maria	Fishing Vessel; foundered, SW Approaches
Green Lily	Cargo Vessel; grounding, Shetland Islands
Island Princess	Passenger Cruise Ship; Economiser Accident
Rema	Coastal General Cargo Vessel; foundered in North Sea

The report of the Inspector's Investigation into the capsize of the tug *Trijnie* will also be published.

APPENDIX C

Reports issued in 1998

GORAH LASS - *Loss of a fishing vessel on 11 March 1997 with the loss of 3 lives*
Report published 23 July 1998
ISBN 1 85112 100 5
£12

MAIB ANNUAL REPORT 1997
Published 20 August 1998
ISBN 1 85112 103 X
£16

PESCADO – *Loss of a fishing vessel in February 1991 with the loss of 6 lives*
Report published 22 September 1998
ISBN 1 85112 101 3
£25

CITA – *Grounding of feeder container ship on 26 March 1997*
Report published 20 October 1998
ISBN 1 85112 102 1
£14

MAIB SAFETY DIGEST 1/98 published October 1998

WESTHAVEN – *Loss of a fishing vessel on 10 March 1997 with the loss of 4 lives*
Report published 19 November 1998
ISBN 1 85112 104 8
£25

ALBATROS – *Grounding of Bahamas registered passenger ship on 16 May 1997*
Report published 26 November 1998
ISBN 1 85112 106 4
£12

Copies of Reports are available in the UK from The Stationery Office bookshops, or alternatively: DETR Publications Sale Centre, Unit 21, Goldthorpe Industrial Estate, Goldthorpe, Rotherham S63 9BL. Tel: 01709 891318; Fax: 01709 881673. Copies are not available direct from MAIB and no payments by any means are accepted by this office.

A list of Stationery Office stockists and distributors outside the UK appears at Appendix C.

SAFETY DIGEST
Copies of this publication can be obtained, free of charge, on application to the Marine Accident Investigation Branch (Mrs J Blackbourn 01703 395509).

APPENDIX D

Stationery office stockists and distributors overseas

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