MARINE ACCIDENT

INVESTIGATION BRANCH

Summary of Investigations No 3/92

Marine Accident Investigation Branch
5/7 Brunswick Place
SOUTHAMPTON
Hants SO1 2AN

Telephone : 0703 232424

Accident Reporting Line 071 276 6004 (24 hours)

This summary contains facts which have been determined up to the time of issue. This information is published to inform the shipping industry and the public of the general circumstances of accidents and must necessarily be regarded as tentative and subject to alteration or correction if additional evidence becomes available.

INDEX

INTRODUCTION

There have been many text books written on the subject of seamanship. Some of the older ones have gone out of print but remain classics in their own right, and a copy can be a much sought-after possession. Others are kept up-dated and new editions appear on the bookshelves and, then to add to the store of knowledge available, new authors appear on the scene and present the same subject in a different manner. These text books, whether old or new, will become part of the essential library of both trainee and experienced seamen.

Good reference books help the practitioner form a sound background knowledge of the subject, but in most cases it takes practical experience before a person can really be said to be proficient. Seamanship is no different in this respect. A person can acquire any amount of knowledge from books on the work of navigating, maintaining and operating a vessel, but the all important skill aspect can only be acquired from hands-on practical experience.

Unfortunately, although experienced seafarers could be expected to have achieved the skills associated with good seamanship many accidents which occur makes one wonder where those skills have gone. If we look at the examples of accidents which are included in this edition of Summary of Investigations, it will be readily seen that in a lot of cases poor seamanship, in its broadest sense, was a contributory factor. One would expect that seamen would realise the importance of ensuring that the bilge pumping system on their vessel would be in working order. It is in their own interest that the bilge pump is operative, that the strums are kept clear and that if a bilge alarm is fitted it is working in all respects and also the alarms are not switched off. Other examples show the dangers of high speed in fog, inadequate lookout, the effects of wash created by vessels and failure to take tank soundings.

All these are no more than examples of what one would term good seamanship but this all important factor was absent, or at least not being put into practice, in so many of these accidents. No doubt the experience was there but the skill necessary to carry out operations in the tradition of good seamanship was not, or at least, was not applied at that particular time.

A far greater emphasis has to be placed on the importance of the skills of good seamanship because if it is not accidents will continue to occur, many of them with fatal consequences, and those traditions we were so familiar with and rightly proud of will be a thing of the past. Text books on seamanship augment the skills which are so important, they cannot replace them.

Chief Inspector of Marine Accidents
December 1992

1. ENGINE ROOM FIRE

Narrative

A 363 gross registered tonnage passenger/vehicle ferry, propelled by twin Voith-Schneider propulsion units, and operating an inter-island service was approaching the terminal when black smoke was seen coming from the engine room vents. An immediate investigation by one of the crew established that fire had broken out in the engine room in the vicinity of the central heating boiler.

The engine room starboard door was closed, the engine room vents shut down, the boiler fuel shut off and the boiler electrically isolated. The crew then proceeded to fight the fire using portable foam and CO_2 extinguishers. The Master, after calling the Coastguard and arranging for the attendance of the fire brigade, continued to manoeuvre the vessel alongside despite damage to the main engine controls. Whilst the crew continued to fight the fire, the vehicles onboard were moved away from the engine room door.

Once alongside, the main engines and generators were shut down and the passengers disembarked. The fire brigade boarded to inspect the damage and to confirm that the fire was out. After an assessment of the damage, the vessel manoeuvred to its proper berth on one engine where the vehicles were discharged.

Observations

1. The fire was located on the central heating boiler front and was caused by the fracture of a flexible fuel oil pipe leading from the header tank to the boiler pressure pump. The fuel, gas oil, sprayed onto a section of the boiler front which was not insulated and ignited.

2. The resultant fire damaged the motor, fan and fuel pump before melting part of the aluminium burner casing causing the assembly to break away and fall onto the floor plates. The fire spread to the immediate bulkhead and deckhead, severely damaging electric cabling in the vicinity.

Comment

1. This incident is similar to those quoted in Merchant Shipping Notice No M.1456 where particular emphasis is laid on the use of flexible fuel pipes and their suitability for the installation proposed. Regular checks of flexible pipes and their connections should be undertaken and the manufacturer's projected life of such fittings strictly adhered to.

2. The provision of a suitable fire detection system within the space would have alerted the crew at an earlier stage and might well have reduced the amount of fire damage suffered.

3. The action of the crew in promptly tackling the fire using portable extinguishers undoubtedly prevented the fire developing into a serious engine room fire.

2. COLLISION IN DENSE FOG BETWEEN A CONTAINER SHIP AND A YACHT

Narrative

A large container vessel was proceeding under pilotage within a narrow channel in dense fog. A small catamaran yacht was crossing the channel at right angles from port to starboard. On seeing the bow of the container vessel on his starboard side, the Skipper of the yacht applied full port helm and full astern revolutions on his port engine. The yacht turned onto a heading parallel to that of the container vessel. However the flare of the bow of the container vessel made contact with the top of the yacht's mast causing it to break. Two crew members were thrown from the yacht as a result of the contact. They were subsequently recovered from the water with only minor injuries. The ship was unaware of the collision.

Observations

1. In the container vessel the bridge was manned by the Master, an officer, the pilot, a lookout and a helmsman; two radars were in operation and the appropriate sound signals for a vessel in fog were being made. However, the ship was proceeding at a speed of 16.5 knots, and no lookout was positioned forward. The yacht was neither seen nor observed on radar at any time.

2. The yacht was proceeding at between 6 and 7 knots with no operational radar. She was not sounding the appropriate signals required by the Collision Regulations.

Comment

1. The container vessel was not proceeding at a safe speed under the prevailing circumstances and conditions. A lookout should have been posted forward; even if he had not seen the yacht in time to avert the collision, he would at least have been able to report it. As it was, with the ship unaware of the accident, the two men thrown into the water were fortunate to survive. Merchant Shipping Notice No M.1348 draws attention to a number of previous accidents to ships which have resulted from serious disregard for the basic principles of good seamanship and prudent navigation in bad visibility.

2. It was not prudent for the yacht to attempt to cross the narrow channel in the prevailing circumstances and conditions. Further, at all times in fog the proper sound signals should be made and a keen aural lookout kept for other vessels' signals.

3. It is vital that small craft use a radar reflector and instal it to achieve the optimum effect, as recommended in Merchant Shipping Notice No M.1497. Conventional reflectors should be rigged in the "rain-catch" position, <u>not</u> point upwards.

3. GROUNDING OF GENERAL CARGO VESSEL FOLLOWING STEERING SYSTEM FAILURE

Narrative

A general cargo vessel of 985 gross registered tonnage was approaching a narrow stretch of navigable water. The Master and a rating were on watch and the vessel was being steered by autopilot. The Mate arrived on the bridge with the purpose of taking over the watch. While the Master and the Mate were speaking in the vicinity of the chart table, the off-course alarm sounded.

The vessel was observed to be swinging to port with 10° of port helm applied. The green light associated with the electrical steering system was illuminated, indicating a starboard helm order, but the rudder remained at 10° to port.

The Master changed over to the hand tiller (electro-hydraulic) steering mode and ordered the Mate to apply full starboard helm. The Mate reported that the rudder was still not responding to the starboard helm order. The Master stopped the main engine and changed over to the direct hydraulic manual steering mode. The rudder then responded to the full starboard helm order and the Master put the main engine to full astern. Such action failed to prevent the vessel from grounding.

Observations

1. Damage was sustained to the fore peak tank and to No 1 double bottom tanks.

2. The failure of the electrical steering system was traced to a loose connection in way of the starboard contactor.

3. The contactors had recently been changed and it was found that the old type of connection on the wire ends was not suitable for use with the terminals of the new type of contactor.

4. The off-course alarm was set to operate after the heading of the vessel had deviated 20° from the intended heading.

Comment

1. Merchant Shipping Notice No M.1471 warns against the use of automatic steering systems in restricted waters. The delay in changing over to the direct hydraulic manual mode of steering following the failure of the auto-pilot was exacerbated by the fact that the Master failed to appreciate that the fault associated with the auto-pilot would also affect the hand tiller (electro-hydraulic) steering mode of operation.

2. The off-course alarm was set too high to provide an early warning of a steering malfunction; it has since been re-set at 10° in order to provide an earlier warning of any deviation from the intended heading.

3. There is no evidence to suggest that the steering gear was not properly tested prior to departure. The electrical fault has since been rectified to the approval of the classification society concerned.

4. All Masters and Mates in the management company have since been reminded of their duties and responsibilities under Statutory Instrument No 571, The Merchant Shipping (Automatic Pilot and Testing of Steering Gear) Regulations 1981, and the advice given in Merchant Shipping Notice No M.1471.

4. POWER AND STEERING LOSS ON RO-RO FERRY

Narrative

A 2495 gross registered tonnage ro-ro ferry with cargo but no passengers was on its regular coastal passage south.

The weather at this time was south-easterly, gale force with wind speeds of 40 knots. The Master was on the bridge with the Chief Officer and two seamen. The vessel was on a south-easterly course with reduced engine revolutions to suit the conditions, when the vessel encountered a large trough followed by a very steep breaking sea. The vessel moved downwards into the trough but before she could rise to meet the oncoming sea, it broke on board burying the bow and hitting the bridge front windows with such tremendous force that all four windows were broken.

The ingress of large quantities of sea water tore down the wheelhouse deckhead and rendered all the bridge equipment immediately useless. The wheelhouse personnel were washed from one side of the wheelhouse to the other, suffering cuts and bruises with the Master receiving a cut on the back of the head and becoming semi-conscious. The vessel lost steering control and one engine stopped. She fell away to leeward and lay in the trough rolling violently.

Due to the proximity of the shore, the partial disablement of the vessel and the severe weather, the Chief Officer who had assumed command, put out a Mayday call using a hand-held VHF set. The rescue services were alerted and some of the crew airlifted off the vessel. Limited power was restored and the second main engine restarted but steering was still not available. The vessel continued to steam in 1 to 2 mile diameter circles with the nearest point to land being less than 1 mile away.

Due to the loss of the internal communication system, the Chief Officer requested, and was passed, a number of portable radios. Ten more people were lifted from the vessel at this time. During this period, partial control was regained and the vessel steered by the emergency steering system away from the coast and finally to a safe anchorage. The vessel subsequently continued her voyage under tow.

Observations

1. The vessel's course and speed prior to the time of the incident was acceptable, she was pitching but not violently and only shipping light water forward. The wheelhouse windows were stated to be 12 - 15 millimetres thick with no apparent deformation of the frame occurring when the glass shattered.

2. The bridge/chartroom contained the radiotelephone and VHF equipment normally used for external communications. This equipment, together with all the bridge control, internal communication and information systems were put out of action due to the ingress of sea water.

3. The failure of the steering control mechanism and the apparent long delay before the emergency steering could be put into operation was due to the angle of helm on the vessel at the time the electrical failure occurred and the need to re-establish some form of communication between the bridge and steering gear flat. A considered decision was made to leave the vessel circling until some order and control had been established. When communication was regained, the emergency steering was operated by means of hand control of the solenoid valves.

4. The shut down of one engine was due to the short circuiting of the engine control system on the bridge. The remaining engine was kept running in order that the vessel could maintain steerage and avoid further damage.

Comment

1. Seafarers should never under estimate the power of the sea in a gale, and the damage that can be caused by a single wave.

2. Despite the failure of various control and communication systems, the prompt action of the crew prevented this incident turning into a major disaster. It illustrates the importance of sound professional training, good inter-departmental communication and effective safety procedure drill.

3. This case illustrates the value of having back-up equipment (such as portable VHF sets) stored separately from the main communications equipment.

5. GROUNDING OF A COASTER WHILST ATTEMPTING TO BERTH

Narrative

A coaster of 800 gross registered tons was attempting to berth alongside a jetty in a small port. The jetty was orientated north/south and the vessel was on the west side of it heading north. The wind was easterly force 2 - 3. The sea was slight but, after previous strong winds, there was a heavy easterly swell. The vessel was moving alongside the jetty and had two ropes out forward and one rope aft.

The Mate and one seaman were forward and one seaman was aft. The aft rope had been run out in a bight, ie the eye of the rope was secured on the bitts and the rope then ran from the vessel round a mooring post on the jetty and back to the aft capstan. Since the vessel was running too far ahead, the Master used the bridge controls to put the engine astern. The result of this action was that the bow turned towards the berth and the stern swung off the berth.

It is probable that the seaman aft had not completed putting turns on to the capstan. He was unable to check the rope and the stern continued to swing off the berth until the vessel grounded aft on rocks opposite the jetty. The vessel was able to clear the rocks under her own power then went to anchor off the port. The vessel had suffered damage to the keel plating, the rudder stock and propeller blades, and had to be towed to another port for dry docking and repair.

Observations

1. The stern moved off the jetty as a result of transverse thrust and the wind.

2. The vessel had a crew of five, namely the Master, Mate, Engineer and two seamen. According to the conditions of the safe manning certificate the Engineer had agreed to "assist on deck as required". At the time of the incident the Engineer was in the engine room.

3. The accident was not reported as is required in the Merchant Shipping (Accident Investigation) Regulations 1989 and as advised in Merchant Shipping Notice No M.1383 sections (b) and (d).

Comment

1. The Master should have been aware that under the prevailing conditions and with the effect of transverse thrust, putting the engine astern would tend to swing the stern off the berth. Before doing this he should have ascertained that a swing could be checked by the stern line.

2. This was an accident as defined in the Regulations and was required to be notified to the Chief Inspector of Marine Accidents as quickly as possible and not later than 24 hours after the vessel's next arrival in port. Accidents can be reported by telex, telephone or fax to MAIB or via HM Coastguard or a Department of Transport Marine Office.

6. HEAVY WEATHER DAMAGE TO A RO-RO PASSENGER FERRY

Narrative

Whilst on route from Folkestone to Boulogne in heavy weather, a ro-ro passenger ferry with over 200 passengers and crew on board suffered the loss of the starboard bow fender, allowing the ingress of a large amount of water into the bow steering compartment which damaged all electrical equipment in that space and rendered the bow steering rudder inoperative. The pumps were unable to cope with the quantity of water entering; the compartment was abandoned and the vessel proceeded to Boulogne at reduced speed and altered course to reduce the pounding. On arrival the compartment was pumped dry and an inspection revealed two holes in the starboard bow plating. The vessel was removed from service and temporary repairs effected. The vessel returned to Folkestone in ballast and with no passengers, and a survey and hose test was carried out. The vessel was permitted to resume service, with the proviso that full and complete repairs should be carried out within two weeks.

Observations

1. The vessel had been proceeding at 12.9 knots in heavy weather, with a westerly wind of force 8 - 9 and a very heavy sea and swell,

2. An activated bilge alarm had alerted an engine room rating to the flooding.

3. On arrival in port, an inspection showed the starboard side of the bow fender to be missing, presumably due to the heavy pounding, and when the compartment was pumped dry damage was noted to the starboard shell plating extending to about one square metre. It is probable that this was caused when the bow fender was torn away. No corrosion was seen to the structure. Temporary repairs were effected by fitting 12 millimetre thick doubling plates in way of the damaged hull, full repair being completed at a later date.

Comment

This incident highlights:

1. The need to reduce speed in heavy weather to minimise damage to the ship, and

2. The value of bilge alarms in drawing early attention to flooding, hence allowing effective measures to be put in place as soon as possible.

As a result of this incident, the ferry operator instigated a thorough checking of all bow fender arrangements in its fleet, with regular inspections to follow.

7. HOLD FLOODING AND LIST

Narrative

A 496 gross registered tonnage general cargo vessel, built in 1967, was on a loaded passage from Portugal to the UK. The weather on the voyage was mainly from astern with wind south-westerly force 5 - 6.

Two days after leaving Portugal, the vessel developed a slight list to port with water reported spilling out of No 4 port double bottom air pipe when the vessel rolled. Further investigation showed that both the No 4 port double bottom and the hold contained water. Continuous pumping of both spaces was ordered although no soundings were taken at that time. An inspection the following morning showed the depth of water in the hold to be holding at 600 - 700 millimetres. At this time the vessel suddenly heeled from a port list to a starboard list of between 5° and 10°.

With the list steady and in a slight sea and low swell, the vessel continued at full speed towards port although at 1100 hours the Master advised the Coastguards of the problem and requested assistance. At 1145 hours the first pumping unit was delivered onboard by helicopter with a lifeboat standing by from 1202 hours onwards. A second pumping unit was delivered by helicopter at 1335 hours but both units had insufficient lift to be effective.

At 1340 hours the vessel anchored off the port with the vessel's pumps still operating continuously to await the pilot and entry to the port. At 1700 hours the vessel suddenly rolled from a starboard list to 5° - 10° list to port. Shortly afterwards the pilot boarded and the vessel entered port being safely berthed alongside at 1850 hours. Although the harbour berth dried out during the night, pumping continued. Cargo discharge started in the morning with water still visible in the holds. As the vessel at this time was on a rising tide, it was anticipated that a hull fracture would be found once discharge had been completed.

No such fracture was found. What was found however were fractured double bottom tank tops in No's 2 port, 4 port and 4 centre ballast tanks. The three way discharge valve for the port auxiliary engine cooling system was also found with the discharge aligned for delivery to No 4 centre double bottom tank. This tank being used for cooling purposes when in "dry-out" ports or drydock. Later attempts to rotate the valve so that cooling water would be discharged overboard resulted in the cock handle shearing off.

After a survey by a Class Surveyor, temporary doubling plates were welded onto the tank top fractures and the vessel left port in the ballast condition for repairs on the Continent.

Observations

1. The failure of the Master to take the elementary action of sounding all tanks when the problem was first discovered cannot be considered as either good management or good practice. To ignore such basic detail suggests that the Master did not appreciate the effect such flooding could have on his vessel's stability. The subsequent development of an "angle of loll" due to the flooding illustrates the importance of taking regular tank soundings.

2. The early assumption of the Master as to the cause ie a hull fracture, and his failure to investigate further resulted in a decision not to broadcast a PAN message but to just advise the Coastguard of the situation. The initial identification of No 4 port double bottom as the cause of the trouble was due to the Master assuming that the air pipe involved came from that tank without making a positive check. It illustrates the need for all valves, air pipes etc to be clearly identified and for problems to be clarified by investigation rather than assumption.

3. With the Master being familiar with the arrival port and its drying out characteristics, it is surprising that given the acknowledged assumption that the problem was a hull fracture, no attempt was made to carry out a preliminary inspection of the hull whilst the vessel was dry on the mud the night of arrival.

4. There are two possible explanations for the jammed cock. Either it jammed whilst in the last port, hence no problems had been experienced prior to this voyage or it had been jammed for some time and the air pipe had overflowed regularly thus exciting no interest from the crew. If the latter, ignoring the implications as to the standard of onboard management, then the tank top had been stressed for some time and it only required a particular set of circumstances to occur to cause the tank top to fracture.

Comment

1. The cause of the fractured tank top to No 4 centre tank was over-pressurisation brought about by the continuous discharge of cooling water from the port auxiliary engine into the tank rather than overboard. The condition of the tank top was such that a small head of water was sufficient to cause a split and flood the hold.

2. That both No 4 and No 2 port double bottom tanks also filled indicates that either leaks already existed in these tank tops or that various ballast line valves had been left open. Good watchkeeping and management practices would have identified these particular points at an earlier stage.

3. Poor watchkeeping and onboard management allowed the three way discharge valve to remain in the "closed" position for an unidentifiable period. It emphasises the need for the engineering staff to be fully conversant with the systems in their charge and for frequent checks to be made as to valve positions etc.

4. Regular tank soundings are an essential part of sound onboard management practices and "pumping dry" is no substitute.

5. In any situation whether it be watchkeeping, maintenance or general management, decisions must be arrived at using all available factual information. Decisions based on assumptions can be misleading and sometimes dangerous. In this case, tank soundings could have identified the problem area earlier with the resultant investigation by the engineering staff revealing the mis-aligned valve cock.

8. HAZARDOUS INCIDENT CAUSED BY WASH

Narrative

A high speed ferry of approximately 3,000 gross registered tons (grt) was undergoing speed trials. On three occasions within a period of twenty minutes, the ferry passed a beach used by the public at distances between 0.45 miles and 0.75 miles and at speeds of up to thirty knots. At about the same time, a large ro-ro ferry (approximately 17,000 grt) was proceeding through the area.

Two children were swept off the beach by the wash from the passing craft. They had been two or three metres away from the water's edge. Fortunately the children were rescued from the water by their parents and it was found that they had not been injured, but several people on the beach lost personal possessions.

Observations

Underestimating the effects of wash and the associated hydrodynamic force is a common error. Incidents more common than the type described above are those which frequently occur in rivers and harbours, when a vessel passing a berthed ship fails to slow down sufficiently, and the ship alongside ranges and may part her moorings. A very serious accident of this kind occurred fairly recently in the United States when a large bulk carrier passed a tanker which was discharging her cargo of gasoline. The tanker broke free of her moorings, the discharge hose parted and the pipeline on the pier was damaged. The resulting spill of gasoline led to fire and explosion culminating in the death of one member of the tanker's crew and the total loss of the ship.

Comment

1. Masters and pilots should pay great regard to the possible effects of wash. Where vessels berthed alongside must be passed close to, speed should be kept to a minimum; equally, in ships berthed where passing traffic is to be expected, especial care must be taken to see that moorings are adequate and are tended frequently.

2. The effects of wash are felt for a considerable distance, so where there is a requirement to proceed at full speed, as for example in a case like that described in the narrative above, it is essential to plan the track very well offshore.

3. Members of the public should be warned that when shipping is passing close to shore there will always be some wash however carefully the ships are navigated, and especially when the sea is generally calm. Local Councils should post notices on all bathing beaches which are likely to be affected to warn of the danger, and should ensure that the notices are displayed and legible at all times.

9. DEATH BY DROWNING WHILST BOARDING COASTER

Narrative

The Master of a coaster was returning to his ship from ashore. Access to the ship was by means of a fixed vertical ladder attached to the jetty. Whilst negotiating the ladder, the Master fell into the river between the ship and the jetty and drowned.

Observations

1. The Master had been drinking ashore and tests following the accident indicated an alcohol level of almost three times the permitted road traffic driving maximum.

2. The ship was equipped with an approved gangway, a portable ladder and a safety net. The portable ladder and safety net had been rigged earlier in the day but had been removed prior to the accident.

3. The means of access provided at the time of the accident consisted of a fixed vertical ladder attached to the jetty. Safety nets were not provided. Due to the state of the tide, the point of access to the ship was at a much lower level than that of the jetty walkway. A rapid rise in the level of the river was expected during the forthcoming flood tide.

Comment

1. The portable ladder and safety net provided an acceptably safe means of access to the vessel earlier in the day. The forthcoming rapid rise in the level of the river would have necessitated frequent adjustment of the access equipment. The equipment was, instead, removed thus alleviating a requirement for continued attendance at the point of access.

2. The Master should have ensured that a safe means of access existed between the ship and the jetty. The "Code of Safe Working Practices for Merchant Seamen" advises that even when access equipment is provided from the shore it is still the responsibility of the Master to ensure as far as is reasonably practicable that the equipment is suitable, properly rigged and deployed, and adequately illuminated.

10. ACCIDENT WHEN USING HIGH PRESSURE JETTING TOOL

Narrative

A member of a ship's crew was working with a high pressure water jetting tool in order to descale rust from a deck. As the seaman was stepping sideways and at the same time in the process of stopping the tool, the jet caught his left foot with such force that it cut through his safety wellington boot and caused lacerations to three of his toes.

Observations

1. This machine is capable of a pressure of 12000 psi, but at the time of the accident it was working at only 6000 psi.

2. There were, including the injured seaman, three men operating the machine on a rota system: one man working the jetting tool lance, with a hand trigger release; one man on a foot brake, which by taking his foot off the pedal stops the machine and removes the water completely and one man on a rest period.

3. When the machine had been initially hired, three senior members of the crew had been trained by the firm supplying the equipment. The intention was to use these crew members to further train and supervise the other personnel on board.

   Although on-board training was carried out, none of the fully trained personnel were on board to supervise on the day of the accident, because they had been seconded elsewhere. This left the supervision to crew members not so well trained despite having been made aware of the danger involved.

4. All three men had been wearing correct protective clothing. However, the injured man's visor had become scratched from flying deck chippings, and had also been contaminated by a small amount of oil contained in the water splashed from the deck. Both these factors had impaired his vision.

Comment

1. The use of high pressure water jetting tools is becoming common practice on ships. They can be extremely effective in removing scale and other contaminants but can be very dangerous if not used properly. Great care should be exercised at all times whenever such equipment is in use.

2. Within a week of the accident, most of the core crew had been trained and certificated by the suppliers. It is also the intention, the next time this machine is used, to re-train all operators and give intensive instructions in safety procedures.

3. A longer lance was fitted for the rest of the duration the equipment was on hire.

4. The visors were to be changed as the visibility became impaired, or at least every day.

11. FALL INTO WINCH RESULTING IN DEATH

Narrative

A 32 metre stern trawler was engaged in a hauling operation. A Youth Training Scheme deckhand trainee had overslept and was late in reporting to a designated observation position on the after working deck. When he emerged from the accommodation he proceeded along a route which involved him having to step over a longitudinal breakwater and, simultaneously, dip under a suspended wire rope. He stumbled whilst negotiating the step which resulted in him falling onto a moving wire warp in a position in close proximity to a trawl winch. He was drawn into the stowed wire and suffered decapitation as a result.

Observations

1. The weather was calm which caused no noticeable movement of the vessel.

2. The after working deck was well illuminated.

3. The area in which the trainee fell was obscured to the winch operator by the deck machinery arrangement but the fall was observed by another crew member who immediately signalled for the winch to be stopped.

Comment

1. The close proximity of the moving wire warp and the trawl winch to the position at which the trainee was required to negotiate a step over the breakwater presented a hazard which had not been guarded against.

2. Although appropriate action was immediately taken to stop the trawl winch the trainee had fallen in a position so close to the winch drum that the winch could not be stopped before he had been drawn into the stowed wire on the drum.

3. Merchant Shipping Notice No M.1349 reports similar accidents with winches in fishing vessels.

4. The "Recommended Code of Safety for Fishermen" includes the following:

   "6.2.1 As far as practicable, all moving parts of winches which may present a hazard should be securely guarded or fenced."

   A guardrail has since been fitted in the vicinity of the winch.

12. THE GROUNDING AND SINKING OF A SMALL FISHING VESSEL

Narrative

A 10 metre fishing vessel of glass reinforced plastic construction was employed in Long Line fishing operations off the west coast of Scotland. The vessel had a very high level of watertight sub-division and was capable of travelling at over 15 knots. Equipment included radar, Decca navigator, video plotter, echo sounder and VHF radio, but neither a liferaft nor an EPIRB was on board. The crew of two were very experienced fishermen, having a reputation for being exceptionally hard and conscientious workers.

Some 16 hours after the vessel had left its home port, in good weather and during the hours of darkness a Mayday message from the vessel was received by the Coastguard. This message gave a position which was on the east side of a peninsular, in an area well known to the two crew.

Several hours later, the wreck of the boat, together with the bodies of the two crew, was found on the seabed and in shallow water close inshore to the west side of the peninsular. This error in position caused some small delay before Search and Rescue operations were extended to the area of the sinking.

A diving operation performed a few hours after the vessel sank revealed severe damage to its hull.

Observations

1. The vessel did not carry, and was not required to carry, either a liferaft or an EPIRB. An auto-pilot was fitted but had been out of commission for several months, indicating that all steering was by hand.

2. The observed damage to the hull, together with the proximity of the site of the wreck to the shore, indicated that the vessel had run aground whilst travelling at speed.

Comment

1. The quantity and quality of the navigational equipment carried by the vessel suggested that the cause of her running aground was not a navigational error. Far more probable is considered to be the likelihood that the person at the helm dozed off after a long and exhausting days fishing. This scenario also explains the disorientation of the helmsman as demonstrated by the error in position given in the Mayday broadcast.

2. All lone helmsmen should be aware of the dangers of fatigue, especially when they are tempted to use a wheelhouse chair from which to navigate.

3. Further advice on the dangers of enclosed wheelhouses and comfortable chairs inducing drowsiness in lone watchkeepers is to be found in Merchant Shipping Notice No M.1190.

13. ACCIDENT ON BOARD A FISHING VESSEL WHILST WORKING WITH WINCHES AND CHAIN

Narrative

A steel hulled fishing vessel of 21 metres length was taken to sea from an English east coast port. The intention was to fish for sole about three miles off shore, using a twin net trawl system. The vessel was crewed by an experienced and qualified Skipper and four crewmen. The weather was favourable, with a calm sea, no swell and good visibility.

Once at the fishing ground the twin net trawl was streamed over the stern. The nets were rigged so that the two outboard warps went to the port and starboard gallows whilst the inboard warps were connected to a block which rode on a chain fastened between the outboard warps (see Figure 1). The length of this chain needed adjustment and the Skipper went on deck to do this, leaving two men in the wheelhouse and the other two men on the fore deck to operate the winch control and brakes. There was no clear line of sight between the winch and the aft deck (see Figure 2).

The Skipper, standing by the starboard gallows, instructed the nets to be hauled up until the chain was just over the aft deck. He could see the winch control man through the gutting shelter and a small window in the shelter's forward end. The Skipper made the block, which rode on the chain, fast with a rope and then adjusted the chain. Having done this he released the rope, stood back from the block, but not where he could see the winch driver, and shouted "Slack away". He then saw the block coming towards him. He was unable to avoid being hit by the block and was crushed against the net drum.

The Skipper was subsequently airlifted to hospital suffering from serious injuries.

Observations

1. The Coastguard were informed of the incident indirectly by a nearby fishing vessel.

2. The crew, other than the Skipper, were inexperienced and only one of them had attended the mandatory Safety Training Courses.

3. A fisherman transferred from another vessel and took the boat back to harbour, after the Skipper had been airlifted ashore.

Comment

1. The Skipper was injured because he was standing in the bight of the chain. He expected the block and chain to be slacked away but, because of either the difficulty of communication or a possible malfunction of the winch, the block was unexpectedly heaved in and injured him. The "Code of Safe Working Practices for Fishermen" draws attention to the fact that there is a need for good seamanship and communications when working with winches and wires.

2. The inexperienced crew were unable to assist the injured Skipper. Skippers may themselves be injured in accidents and it would be in their own interest to instruct the crew in the action to take in an emergency.

3. Attendance at the Safety Training Courses is a requirement for all new employees in the fishing industry, no matter what the size of vessel. By the 1 March 1993 all fishermen, other than serving fishermen born before 1 March 1954 and certificated officers, should have attended the courses in Basic First Aid, Fire Fighting and Sea Survival. Merchant Shipping Notice No M.1367 provides guidance about these courses. There are penalties for not attending them.

FIGURE 1

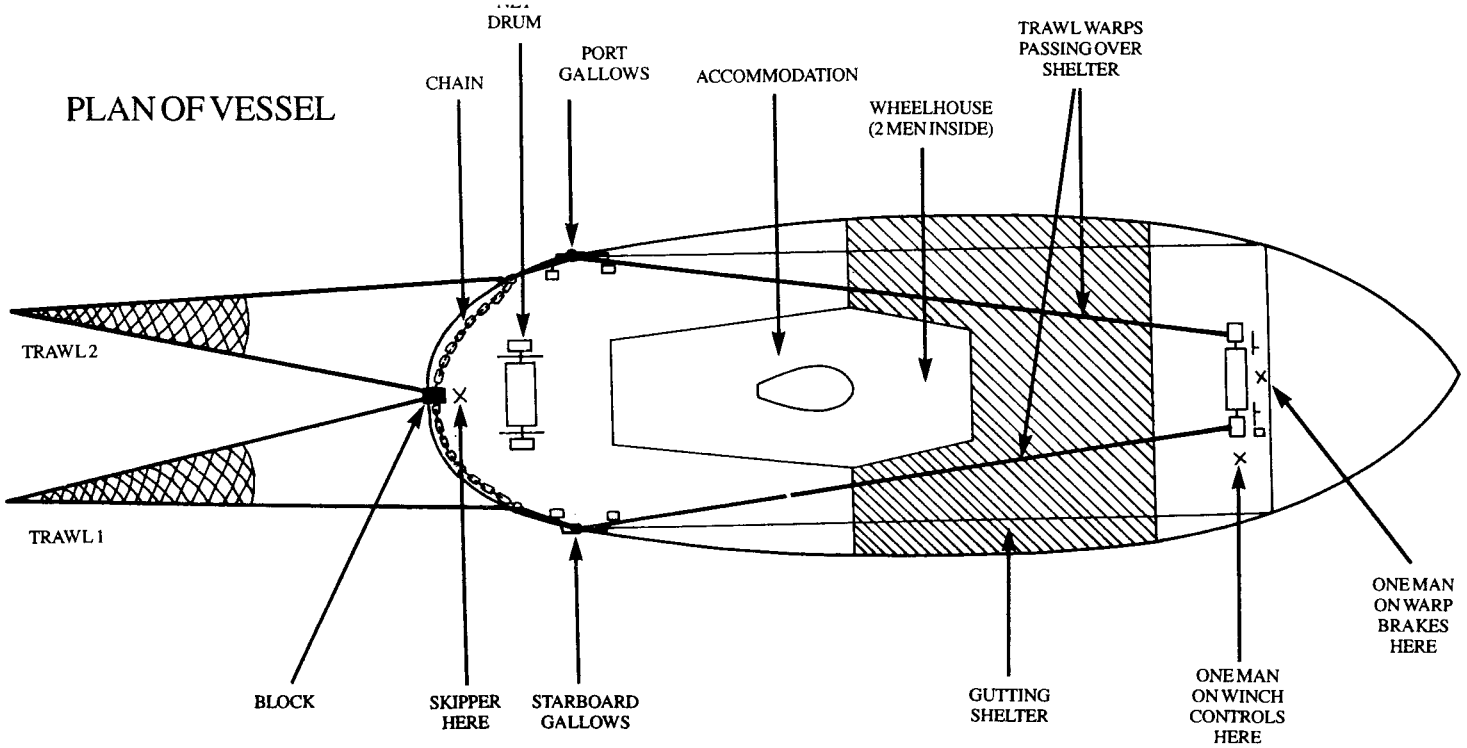
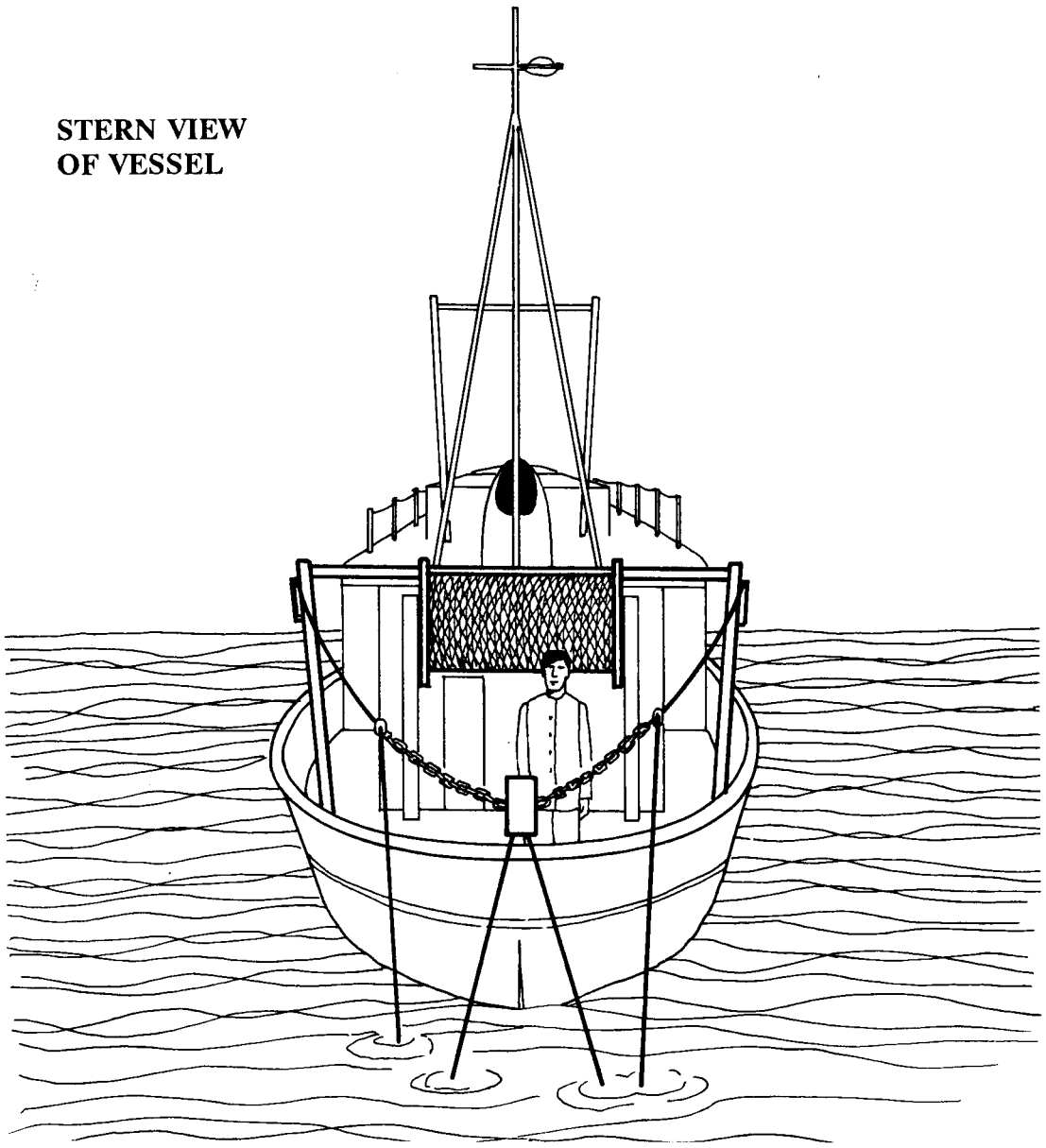


FIGURE 2



14. SINKING OF WOODEN FISHING VESSEL

Narrative

A fishing vessel of 16.3 metres in length, built of wood in 1948, was fishing for prawns during the night about 25 miles from shore. Due to a freshening north-westerly wind and a poor weather forecast, the fishing gear was hauled in and the vessel headed back home with the crew of three in the wheelhouse.

After about two hours, the Skipper opened the engine room hatch to make a routine inspection and found rapidly rising water. He found a fractured rubber connector on the discharge side of the bilge and deck wash water pump, with water pouring from it. This pump was engine driven and ran continuously. He disengaged the pump, shut the ship's side inlet valve and repaired the fracture with adhesive tape. However, before completing this, the water level rose above the engine air intakes and the engine stopped.

The engine could not be restarted and contact was made by VHF with another vessel which took the vessel in tow and headed home. The water level continued to rise and the source of the further leakage could not be found. An electric bilge pump failed and a hand bilge pump became blocked so that further pumping was not possible.

The tow line broke twice, and on the second occasion the vessel was so low in the water that the Skipper decided to abandon ship. The assisting vessel came alongside and the three crew stepped safely aboard. They remained in the vicinity until the vessel sank at about 4.00 am. They collected the liferaft and EPIRB which had floated free and returned to their home port two hours later.

Comment

1. The final cause of the sinking has not been established, but it is thought that the initial flooding then led to further flooding, and two possible causes are suggested:

    1.1 hull damage such as a sprung plank due to increased hydrostatic pressure,

    1.2 further progressive flooding due to another discharge/inlet piping system being below water level.

2. It is not known why the bilge alarm was not activated. Merchant Shipping Notice No M.1327 requires the correct installation and regular tests to be made. Had the alarm operated, the crew would have had much more time to take emergency action.

15. A CASE TO SUPPORT SURVIVAL TRAINING AND THE FITTING OF A LIFERAFT

Narrative

A glass reinforced plastic fishing boat of about 10 metres overall length began taking water and subsequently sank approximately 8 miles from shore. The wind was of force 6 north-westerly with a moderate sea swell, visibility at the time was good. The 12 year old boat was originally fitted with bilge keels, three each side, and although these had been later removed, the steel support bars were left in place. These had been through bolted into the hull and glassed over on the inside.

The boat had been at sea with two crew aboard for only one hour when the ignition alarm activated. The Skipper went to investigate and discovered a great deal of water in the engine room. There was no bilge alarm fitted so he had been denied an earlier warning of the flooding. As the bilge pump was working at only about half capacity, a Mayday was sent and a lifeboat, rescue helicopter and two other vessels headed for the scene.

The boat was turned so that the wind was from the stern and headed for the shore at maximum possible speed, but after proceeding about two miles the rudder locked hard over. A 4-man inflatable liferaft was on board, in addition to life-jackets, lifebuoys and flares (but no EPIRB), and when water began to lap over the deck the crew disconnected its hydrostatic release, removed it from the cradle and abandoned the fishing boat into the raft. The boat sank by the stern in 40 fathoms of water leaving them adrift in the liferaft. They fired a flare as a guide to the helicopter, which located and rescued them. The liferaft, which had according to the crew performed well, was subsequently retrieved.

Observations

It is probable that the leak originated either through a bilge keel bolt, or more likely in the cooling water bleed-off into the bilge which ensured that the bilge pump did not run dry.

Comment

1. There was no panic during the incident, and thanks to survival training the crew dealt competently with the emergency.

2. The vessel might have been saved if a bilge alarm had been fitted, giving early warning of flooding. However, in other respects the boat was well equipped, with portable VHF radio, life-jackets, lifebuoys, flares and an inflatable liferaft. Although this is not a mandatory requirement for vessels under 12 metres in length, its value in an emergency is clearly demonstrated by this case.

16. SINKING OF A DAY ANGLING BOAT WITH LOSS OF LIFE

Narrative

A 10 metre glass reinforced plastic boat, registered as a pleasure craft with the Local Authority for carrying fare paying anglers, was employed to carry a group of twelve anglers on a one day trip. The vessel had a crew of two. During the 24 hours before the commencement of this trip problems were experienced with an accumulation of water in the vessel's bilges. However the vessel proceeded to sea, with 14 persons on board and anchored at the spot chosen for the fishing session. Although the weather conditions were generally considered as reasonable the working deck of the vessel started to take on substantial amounts of water. Inspection of the bilges revealed serious flooding which the crew of two could not control due to the bilge pumps proving to be defective. Although a VHF radio broadcast for assistance was made, and a SAR operation initiated, the vessel sank in 5 metres of water and two of the anglers lost their lives.

Observations

The vessel was salvaged a few days after the incident and a thorough inspection was made. Serious defects were revealed in the vessel's equipment which are considered to have led directly to the sinking. These are as follows: manual bilge pump was non-operational due to missing components; the electric bilge pump had defective wiring; the engine cooling water inlet pipe was leaking in two places and the rudder post bearing was badly worn and had no packing in its gland. Further, neither the engine cover nor the covers to other spaces were watertight and would have allowed water on the working deck to find its way into the bilges. None of the transverse bulkheads would have prevented the vessel from flooding throughout its length. Many other defects were noted which were caused by poor maintenance.

Ingress of water was possible through the defective cooling water pipe and the rudder gland so producing severe trim by the stern. Poor trim would then have allowed water to reach the deck, via the freeing ports, and then into the bilges through the non-watertight deck covers.

Comment

The sinking of this vessel was a direct consequence of poor or neglected maintenance of the vessel and its equipment. Also the problem of water accumulation, discovered the day before this incident, was not properly investigated, pointing to the lack of experience on the part of the crew.

17. ADVANTAGES OF WATERTIGHT SUBDIVISION IN FISHING VESSELS

Narrative

Two recent accidents make an interesting comparison.

Case 1 A steel fishing boat of about 11.5 metres registered length and without watertight subdivision began taking water and subsequently sank. The 13 year old boat had been at sea with three crew aboard for about 2½ hours when the flooding was discovered in the fish hold. The Skipper went into the engine room via the fish hold, but was unable to close the ship's side inlet valves as the water was about waist deep throughout the boat. The bilge pumps were unable to cope; the flooding continued.

The boat had a bilge alarm fitted, but it was the Skipper's normal practice to switch the audible function off. On the day of the accident he also failed to notice any illumination of the visual alarm, and therefore did not have the earliest possible warning of the flooding incident.

The Skipper returned to the wheelhouse and made a 999 cellnet call using a portable telephone that fortunately was aboard, as the VHF radio was by now not working. A rescue helicopter and a lifeboat were then tasked to give assistance, and several vessels including a warship responded to a Coastguard call.

The Skipper, who had undergone survival training as had one of the remaining two crew, then instructed the others to remove the inflatable liferaft from the wheelhouse top in preparation for abandoning ship, instructed them to put on life-jackets and placed an orange smoke float on the deck edge to attract attention. All three crew members were subsequently safely lifted off by helicopter and taken to hospital unharmed but suffering from the effects of cold and shock. The boat finally sank.

Case 2 This accident in which a fishing vessel of approximately 23 metres registered length and with six persons aboard began to take water through a sea suction pipe, contrasts sharply with the previous case. In this second case the engine room bilge alarm operated giving the crew effective warning, and having traced the source of the flooding they were then able to shut off the seacock. The flooding had been contained because the vessel was built with bulkheads at each end of the engine room. The vessel did not sink and the crew were safely able to make for harbour for repairs.

Observations

1. It is known that the boat in Case 1 recently had work undertaken on the main engine cooling system. It is probable that a leak developed in the flexible pipe on the outlet side of the main engine salt water cooling system, and without internal watertight subdivision there was no means of containing the flooding and the boat progressively filled up until it sank.

2. In Case 2 the suction pipe had corroded and failed under pressure. The owners are now to make regular checks of the bilge and sea suction pipes to ensure that severe corrosion does not take place in the future unnoticed.

Comment

1. Without watertight subdivision, any leak will give rise to extensive flooding throughout the boat. In the former case, once flooding had started there was nothing that could be done to contain it, and the boat progressively filled up until it sank. The boat was separated by bulkheads, but the doors through them were not watertight. By contrast, subdivision saved the second vessel from sinking, ensuring that the floodwater did not permeate into the adjacent accommodation area or fish hold. The incorporation of watertight cells in new buildings is considered to be well worthwhile in restricting the spread of any flooding.

2. The value of safety training was clearly shown in the first incident, where the Skipper took all necessary steps to maximise the safety of the crew. The third crew member who had not undergone safety training was, however, dependant to a great extent on the other two for his survival.

3. In both cases, bilge alarms were fitted. It was only of real advantage in the latter case, however, as in the former the audible function had been turned off as a matter of routine. This is bad practice, since it can lead to a delay in the dealing with any flooding as it did in this instance.

18. SINKING OF FISHING VESSEL DUE TO FLOODING

Narrative

A wooden hulled fishing vessel of 20 metres length had a recent history of problems with the bilge alarm and valves in the bilge pumping system.

In spite of the difficulties experienced with the bilge alarms, the crew performed no regular checks to test their operation. Similarly, no regular cleaning of bilge strainers and operation of sea valves was performed.

A few hours after leaving port, water was noticed on the floor of the cabin causing the engineer to look into the engine room. This inspection revealed flood water to the level of the engine room floor plates. Attempts to pump out this water, using the bilge pumps driven by the main and auxiliary engines, were unsuccessful largely because the strainer boxes were choked and access to them for cleaning was impossible due to the level of water.

The Skipper of the vessel contacted his agents, by portable telephone, asking them to inform the Coastguard of his plight. This the agents did and a SAR operation was initiated. However, attempts by helicopter and lifeboat crews using portable pumps failed to prevent the flooding from spreading. The vessel sank only 2 or 3 hours after the floodwater was first discovered. Fortunately all of the crew were safely taken off their vessel.

Observations

1. The cause of the flooding proved impossible to establish with any certainty. However the rate of flooding would suggest some defect in the vessel's hull or piping systems.

2. The lack of regular testing of the bilge alarms and sea cocks is a very poor practice. In this case an early indication of a high bilge level might have given the crew sufficient time to identify the source of the floodwater and, possibly, control the rate of rise of the water. Regularly cleaned strainers would also have assisted in this task.

3. Coastguard should be alerted directly, not by way of non-urgent channels. In this case the Skipper felt that the Coastguard would waste time by asking questions. However, the more information made available to the Coastguard the more likely they are to be able to assist with the proper equipment, and in the proper place. SAR operations are in no way delayed once initial VHF radio contact has been made with the Coastguard.

Comment

The contents of Merchant Shipping Notice No M.1327 are very relevant to this and many other cases of fishing vessels flooding.

19. SINKING OF A SMALL SINGLE HANDED FISHING BOAT

Narrative

A small steel fishing vessel of 9.8 metres length was being operated as a stern trawler by one person. This Skipper had never sailed the vessel before but had worked as a fisherman for several years and had his own somewhat larger fishing boat.

Equipment on board included a VHF radio and the required life saving apparatus, but the recommended liferaft and EPIRB was not carried.

After several hours of fishing, the Skipper decided to head for his home port because of deteriorating weather conditions. Shortly after setting course it was noticed that the stern of the boat was getting low in the water, the Skipper therefore started the bilge pumps and checked that they were operating correctly. Within a few minutes the stern of the vessel sat even lower in the water causing the aft deck to be awash. Difficulty was experienced by the Skipper in broadcasting a complete Mayday message, giving rescue services no indication of the vessel's position. The Skipper abandoned the rapidly sinking vessel and attempted to swim ashore using his clothing as a crude buoyancy aid. The attending RNLI lifeboat, with good fortune and the local knowledge of the coxswain, managed to locate the now unconscious Skipper. A doctor, who was a member of the lifeboat's crew, performed a successful resuscitation.

Observations

The Skipper of this vessel was indeed very fortunate that the estimate of his position, by the lifeboat's coxswain, allowed him to be located and recovered very quickly. A very few more minutes spent in the water would have cost the Skipper his life.

Comment

1. Although it is not a requirement that vessels of this size carry a liferaft, the Department of Transport make strong recommendations in Merchant Shipping Notice No M.1467, that they should do so. The lack of a liferaft in this case could so easily have cost this fisherman his life. It is also strongly recommended that an EPIRB is carried on board and is registered with the Department of Transport.

2. There are always dangers in single-handed working and they are increased when the boat and her equipment are unfamiliar to the one man crew. While the cause of sinking cannot be established with certainty it is likely that the Skipper, used to a larger boat, failed to make sufficient allowance for the worsening weather; it is also likely that his lack of familiarity with the boat's VHF set explains his inability to send a complete Mayday signal.

APPENDIX A

INVESTIGATIONS COMMENCED IN THE PERIOD 01.07.92 - 31.10.92

DATE OF ACCIDENT	NAME OF VESSEL	TYPE OF VESSEL	FLAG	SIZE	TYPE OF ACCIDENT
05.07.92	PRIDE OF LE HAVRE	Ro-Ro Passenger	UK	14,760 grt	Accident to Person
• 09.07.92	WILLIAM HENRY 11/ AEGEAN REEFER	Fishing Vessel/ Reefer	UK Panama	22.51m 9,593 grt	Collision and Contact
• 15.07.92	SYLBE/ SOUSS	Ro-Ro Other Cargo Reefer	UK Morocco	982 grt 2384 grt	Collision and Contact
19.07.92	VERITATEM/ CHELSEA HARBOUR	Pleasure Craft Pleasure Craft	UK UK	61 grt 52 grt	Collision and Contact
21.07.92	LAURA HERD	Fishing Vessel	UK	17.60m	Foundering and Flooding
22.07.92	LAERLING	Pleasure Craft	UK	38 grt	Stranding and Grounding
29.07.92	GEESTHAVEN	Reefer	UK	8,030 grt	Dangerous Occurrence
07.08.92	QUEEN ELIZABETH 2	Cruise	UK	69,053 grt	Stranding and Grounding
12.08.92	SEAFALKE	Fishing Vessel	UK	22m	Accident to Person
14.08.92	SAND GULL	Dredger	UK	534 grt	Collision and Contact
15.08.92	TARANIS	Fishing Vessel	UK	23.29m	Foundering and Flooding
18.08.92	RED JET 1	Passenger	UK	168 grt	Machinery Failure
19.08.92	ST CLAUDE	Fishing Vessel	UK	266 grt	Accident to Person
20.08.92	HOEGH DUKE	General Cargo	Cayman Islands	30,061 grt	Machinery Failure
21.08.92	OPTIMISTIC	Fishing Vessel	UK	15.91m	Listing/Capsizing
22.08.92	SEA REEFER	General Cargo	Antigua	1,738 grt	Stranding and Grounding
22.08.92	KROSSFJORD	Fishing Vessel	UK	36.85m	Stranding and Grounding
04.09.92	GIRL SYLVIA	Fishing Vessel	UK	15.69m	Foundering and Flooding
06.09.92	ST KILDA/ CLIPPER ALLIANCE	Fishing Vessel Bulk Carrier	UK Cyprus	22.87m 9,637 grt	Collision and Contact
14.09.92	CORSAIR	Fishing Vessel	UK	15.55m	Accident to Person
14.09.92	ANDREAS BOYE/ GANNET	General Cargo General Cargo	Denmark St Vincent	499 grt 462 grt	Collision and Contact
16.09.92	LUPINA "C"/ USS STURGEON	Fishing Vessel Naval Craft	UK United States	18.07m -	Hazardous Incident
18.09.92	NORTHERN STAR	Liquid Gas Carrier	UK	944 grt	Dangerous Occurrence
20.09.92	ARDMORE	Fishing Vessel	UK	20.43m	Stranding and Grounding
29.09.92	SUNNY LADY/ INSISTENCE	Liquid Gas Carrier General Cargo	Norway UK	5,274 grt 475 grt	Collision and Contact
29.09.92	SKY PRINCESS	Cruise	UK	43,692 grt	Fire and Explosion
13.10.92	SUPREME/ ACTIVE	Fishing Vessel Fishing Vessel	UK UK	23.89m 21.31m	Collision and Contact
15.10.92	OUR LADY PATRICIA	Passenger	UK	312 grt	Fire and Explosion
20.10.92	ORCADES VIKING III	Fishing Vessel	UK	68.6m	Accident to Person

APPENDIX B

MAIB PRICED PUBLICATIONS AVAILABLE FROM HMSO

Report of the Chief Inspector of Marine Accidents into the loss of the Suction Dredger BOWSPRITE with four lives in the North Sea on 5 December 1988.
ISBN 0-11-551018-4 £8.50 — 2 May 1991

Report of the Investigation into the sinking of the Fishing Vessel GREY FLAMINGO with the loss of life of two crew members.
ISBN 0-11-551037-0 £5.40 — 5 July 1991

MAIB Annual Report 1990
ISBN 0-11-551041-9 £5.50 — 15 July 1991

The Report of the Chief Inspector of Marine Accidents into the collision between the Passenger Launch MARCHIONESS and MV BOWBELLE with loss of life on the River Thames on 20 August 1989.
ISBN 0-11-551027-7 £11.00 — 15 August 1991

Report on the Grounding of the British Ro-Ro vessel EARL GRANVILLE off Cherbourg on 19 August 1989.
ISBN 0-11-551076-1 £3.50 — 17 September 1991

Report of the Investigation into the over-pressurisation of a cargo tank on the Oil Tanker MOBIL PETREL at Fawley Oil Terminal on 7 November 1989.
ISBN 0-11-551085-0 £11.00 — 28 November 1991

Report of the Chief Inspector of Marine Accidents into the capsize and sinking of the Fishing Vessel MAJESTIC with the loss of five lives West of the Shetlands on 13 June 1989.
ISBN 0-11-551087-7 £7.50 — 19 December 1991

Report of the Investigation into the Sinking of the Fishing Vessel PREMIER with the loss of six lives on 12 December 1990.
ISBN 0-11-551095-9 £3.95 — 27 February 1992

RMS TITANIC Reappraisal of Evidence Relating to SS CALIFORNIAN.
ISBN 0-11-551111-3 £7.50 2 April 1992

Report on the abandonment and subsequent sinking of the Motor Vessel IRVING FOREST in the North Atlantic Ocean in January 1990.
ISBN 0-11-551102-4 £4.95 30 April 1992

Report of the Investigation into the loss of MFV MARGARET AND WILLIAM II with two lives in the Western Approaches on 4 September 1991.
ISBN 0-11-551118-0 £4.95 29 May 1992

MAIB Annual Report 1991.
ISBN 0-11-551124-5 £6.50 25 June 1992

Report of the Chief Inspector of Marine Accidents into the collision between the Fishing Vessel ANTARES and HMS TRENCHANT with the loss of four lives on 22 November 1990.
ISBN 0-11-551128-8 £10.00 9 July 1992

Report of the Investigation into the loss of the Fishing Vessel OCEAN HOUND with the loss of five lives on 10/11 August 1991.
ISBN 0-11-551142-3 £9.00 10 September 1992

Report of the Chief Inspector of Marine Accidents into the collision between the Fishing Vessel WILHELMINA J and ZULFIKAR with the loss of six lives on 10 April 1991.
ISBN 0-11-551140-7 £15.00 10 September 1992