Marine Accident Investigation Branch (MAIB) - Safety Digest 01/1996

Contents

1. FAILURE OF A LIFEBOAT WINCH

Narrative

On completion of a routine lifeboat drill the lifeboat was being raised using the winch motor. A total of five persons remained in the boat. It was decided to stop the operation before the lifeboat reached the housed position to allow some adjustments to be made to the bowsing tackles which were made fast at both ends. Tricing pendants were not used.

Once the boat had reached the desired position the winch motor was stopped. The winch immediately started to run back, lowering the boat until it came to rest against the ship's side with its weight taken only by the bowsing tackles.

All five persons in the boat were evacuated without injury.

A test was later performed, with no personnel in the lifeboat, during which the winch again ran back after the hoist motor was stopped and despite the application of the manually operated brake. This time the lifeboat continued to lower, under the influence of the centrifugal brake, until it reached the water.

Subsequent inspection of the winch established that the one way clutch unit showed signs of damage due to overheating and had been filled with oil of too high a viscosity.

Observations

The one-way clutch in this type of winch is required to lock during boat lowering operations in order to connect the manual brake to the rotating parts of the winch. A defective clutch renders the manual brake ineffective. However, while the lifeboat is being hoisted using the winch motor the one-way clutch is intended to run free. Hence a slipping one-way clutch is apparent only when attempting to apply the manually operated brake during a lowering operation.

Comment

The type of one-way clutch employed in this winch consisted of spring loaded rollers, trapped in converging channels, within a cylindrical casing. Oil of excessive viscosity would have the tendency of generating a dynamic film of lubricant between the rollers and cylindrical casing, so preventing the rollers from "locking". Further, should the clutch be operated for any significant time in this way, overheating could occur causing damage to the unit.

Manufacturer's recommendations on the grade of lubricating oil for these units should always be followed.

2. FOUNDERING OF TUG HIGHLIGHTS POOR MANAGEMENT PRACTICES

Narrative

A tug of 22 metres registered length was towing a crane barge on the ebb tide downriver towards an anchorage. A flat top barge was secured alongside the crane barge. Both barges were unmanned. The weather conditions were fine and clear and the wind was force 4. A small workboat was secured alongside the tug.

The Skipper of the tug intended to anchor the crane barge using a running moor. On approaching the anchorage, the workboat transferred crewmen from the tug to the crane barge and then stood by to render assistance as required. The Skipper turned the tug and tow around in order to stem the tide on a north-westerly heading and then ordered the crane barge crew to let go a stern anchor. Although the engine of the tug continued to run at full ahead, the vessel lost steerage way against the tide and was pushed around onto a more westerly heading.

As the Skipper attempted to turn the tug to starboard, the angle of the tow rope from the centreline increased to such an extent that the tow rope caused the tug to heel heavily to starboard and to take water on the starboard side of her main deck. The Skipper ordered the crane barge crew to let go the towing bridle but this proved to be impossible with the tow rope under tension. In an unsuccessful attempt to slacken the tow rope, the Skipper ran the engine full astern. He then applied port helm and returned the engine to full ahead in an attempt to reduce the angle of the tow rope from the centreline. By this time water had entered the engine-room through the open engine-room skylights and the tug progressively heeled further to starboard. The Skipper managed to kick two turns of the tow rope off the towing post before he and his crewman transferred to the workboat, which had been manoeuvred alongside the tug. The tug continued to flood and finally sank. There were no injuries to personnel.

Observations

1. The main contributory factors to the accident were:
    - The tug was insufficiently powered to manoeuvre the tow effectively in the prevailing tidal conditions;
    - No means were provided on board the tug or the tow to release the tow rope quickly and safely while it was under tension;
    - The engine-room skylights and access door from the main deck were neither shut nor effectively secured prior to the start of the towing operation.
2. Because of the lack of any stability information relating to the tug, it is unknown to what degree its stability was a contributory factor.
3. Merchant Shipping Notice No M.1531, provides recommendations aimed at preventing the capsize of tugs while engaged in towing operations. The recommendations include:
    - the provision of a towing hook having a positive means of quick release;
    - the provision and use of weathertight fittings for openings which provide access to spaces below the weather deck; and
    - minimum stability criteria.
4. The management company failed to provide its employees with appropriate instructions or with published advice pertaining to safe towing operations.

Comment

Appropriate advice for promoting good management practices is contained in Merchant Shipping Notice No M.1616, which provides a brief introduction to the International Safety Management (ISM) Code. Although the provisions of the Code are aimed primarily at seagoing vessels, their application to non-seagoing vessels is equally appropriate for the purpose of promoting good management practices. The Code states that:

> the safety-management system should ensure compliance with mandatory rules and regulations; and that applicable codes, guidelines and standards recommended by the International Maritime Organization, Administrations, classification societies and maritime industry organisations are taken into account.

3. ENGINE-ROOM FIRE DUE TO FUEL OIL LEAK

Narrative

A vessel was alongside a container berth when the alarm sounded for a fire in the engine-room. A fire had broken out on top of No 2 diesel alternator engine, flames having been observed at the aft end in the area of the exhaust trunking. The Engineers in the vicinity immediately returned to the control room, took the engine off load and stopped it.

The fire was tackled using local foam extinguishers, and several attempts to put the fire out had to be made as re-ignition continued to occur until contact surfaces in the area had cooled below ignition temperature.

Observations

1. Subsequent investigation showed that a two bolt Low Pressure (LP) fuel pipe flange had become displaced on the fuel rail due to a fracture of one of the securing bolts. This allowed fuel oil to leak into the hot box surrounding the cylinder heads and eventual ignition of oil fuel fumes by contact with the exhaust trunking.
2. Further investigation failed to establish the exact cause of the bolt failure. It was also noted that the LP fuel oil rail operated at a pressure of about 10 Kg/cm2 (or 10 bar). At this pressure, any displacement of the joint seal will result in a substantial leak.

Comment

1. As a result of this incident, the company have modified the LP fuel rail to allow a four bolt flanged connection to be fitted in place of the original two bolt flange. This modification had already been carried out by the engine manufacturers on later models in this product range.
2. Good communication between ship and shore staff immediately after this incident led to early identification of the real problem and subsequent modification of the system.

4. CREWMAN INJURED BY REVERSING TRAILER ON RO-RO VEHICLE DECK

Narrative

A Ro-Ro passenger/freight ferry of 1,250 gross registered tonnage, employed on a short sea crossing, had arrived at one of its terminal ports. Vehicle unloading operations were in progress. Some of the freight vehicles were trailers which required the use of shore based tractor units for their movement around and from the vessel.

Members of the ship's deck crew had the task of removing vehicle lashings and trailer support trestles. These crewmen usually worked in pairs. Eventually, all vehicles had been unloaded except one trailer. A tractor unit was driven onto the vehicle deck, reversed into position and coupled to the last trailer. One member of the deck crew attended this vehicle to remove the trestle. All other crew had moved to the other end of the vehicle deck to prepare for the next loading operation.

This last trailer was being reversed along the centre lane of the vehicle deck towards the stern door when the crewman who had been in attendance attempted to cross this centre lane. He was knocked over by the reversing trailer and suffered a leg injury.

Observations

1. The driver of the tractor unit/trailer had no clear view behind the trailer while reversing.
2. The injured crewman was disorientated and unaware of the direction from which any vehicle may have been moving when he crossed the deck.

Comment

1. Although company instructions required crew working on the vehicle deck to do so in pairs, the injured man's partner had left the immediate area to perform other tasks.
2. Operating in pairs, with one man signalling the vehicle's driver and the other sighting his "blind areas", would allow reversing to be accomplished much more safely.
3. The company accepted a recommendation to make their instructions more explicit, by introducing a clear direction that whenever vehicles or freight trailers are being moved in reverse, one member of each two man team must act solely as lookout and signaller for the drivers.
4. Merchant Shipping Notice No M.1507 gives guidance on the precautions required when conducting cargo operations on vehicle decks of Ro-Ro vessels.

5. GROUNDING CAUSED BY SLEEPING WATCHKEEPER

Narrative

A tug left port at 0200 hrs and proceeded on a coastal passage in fine weather with good visibility. The wheelhouse was manned by the Mate and a helmsman, with the tug on hand steering.

During the watch, the Mate periodically sat on a seat provided in the vicinity of the chart table, which was situated in an aft corner of the wheelhouse.

At approximately 0400 hrs, the Mate instructed the helmsman to alter course 10º to port with the intention of passing three cables off a shore light, which was then fine on the starboard bow at a range of four miles. He then sat down in the seat and soon fell asleep.

About 20 minutes later, the helmsman suddenly became aware of the close proximity of the shore light, instinctively shouted to the Mate and applied full port helm. The Mate awoke and saw the light dead ahead at close range. Although he immediately pulled the engine control lever back to Full Astern, the vessel grounded on rocks a few seconds later.

There were no injuries but the vessel was a constructive total loss.

Observations

1. The Master had instructed his crew to return to the vessel at midnight with the intention of departing at 0200 hrs.
2. The Mate duly arrived on board the vessel at midnight, having spent the day at home, but he had not slept since the previous night. The helmsman arrived on board at about 0120 hrs.
3. The Master was of the opinion that both the Mate and the helmsman were fit for duty. However, he made no specific enquiries as to the quantity or quality of rest each of them had gained prior to their arrival on board.
4. The Master had made no attempt to ensure that he was adequately rested himself and had assumed that the Mate would be in a fit state to take charge of the first watch.
5. Prior to the grounding, there was little conversation between the Mate and the helmsman. The wheelhouse was in darkness and the heating was on, with the wheelhouse doors and windows closed.
6. The wheelhouse was not equipped with a watch alarm.

Comment

1. A major contributory factor to the Mate falling asleep was fatigue due to lack of adequate rest. However, any tendency for him to feel drowsy would have been exacerbated by him sitting down in the warm, dark and quiet atmosphere of the wheelhouse.
2. By instructing his crew to return to the vessel at midnight, the Master allowed insufficient time to ensure that they were adequately rested for the passage. In this regard, each crew member also had an individual responsibility under The Merchant Shipping (Health and Safety: General Duties) Regulations 1984 to ensure his own fitness for duty.
3. The helmsman was under no obligation to maintain a lookout while steering the vessel. However, it is probable that had he been less fatigued, he would have realised the close proximity of the shore light at an earlier stage, in time for avoiding action to be taken.

4. If a watchkeeper is allowed to sit in a chair during the hours of darkness, with few navigational duties to perform, there will always be a tendency for him to fall asleep. He does not necessarily have to be fatigued or otherwise impaired for this to happen.

6. ENGINE-ROOM FIRE ONBOARD A SMALL BULK CARRIER

Narrative

A small bulk carrier of 3,890 gross registered tonnage was on passage in the English Channel with a cargo of coal. Shortly after dawn the fire detection system activated, indicating a fire in the engine-room. The Chief and Second Engineers made their way to the engine-room to investigate and discovered large quantities of smoke. The engines were stopped from the bridge and the quick closing fuel valves were tripped.

A fire fighting party was mustered and made an attempt to enter the engine-room to tackle the fire. Unfortunately these attempts were thwarted by very dense smoke. All ventilators and dampers to the engine-room were then closed and, after all personnel were accounted for, the CO2 flooding system was discharged. This was some 30 minutes after the fire alarm was first heard.

About five minutes later the Master made contact with the Coastguard requesting fire fighting assistance. After the arrival of shore based fire fighters it was established that the fire had been extinguished and the vessel was safely towed to port.

Observations

1. During the subsequent inspection only very limited damage was found, which would suggest that little heat had been generated and that most of the fire fighting problems had been caused by the dense smoke generated. Also at that time a small bore fuel pipe beneath a main engine turbocharger casing, and adjacent to a compression fitting, was found to have been fractured.
2. It is noted that a significant period of time elapsed between the activation of the fire alarm and the discharge of the CO2 smothering gas. Similarly, the Master delayed contacting the Coastguard until after the CO2 had been deployed. It is fortunate that the fire did not intensify and spread during this time.

Comment

The importance of screening oil pipes from possible sources of ignition is well set out in Merchant Shipping Notice No M.1456, and in its Appendix there are several examples of machinery space fires, one of which was due to the failure of a compression fitting on a fuel line. The vulnerability of this type of fitting, especially when subject to vibration, should be carefully considered when selecting pipe joining techniques.

7. INEXPERIENCE LEADS TO FINGER INJURY OF ENGINEERING CADET

Narrative

An engineer was being assisted by a cadet in reassembling a heavy oil purifier. The purifier was of the self cleaning type, having a sliding bowl within a main bowl around the periphery of which are sludge discharge ports.

The sliding bowl had been lifted, using lifting gear, into the main bowl. The lifting gear remained in place in order to position the sliding bowl correctly. Difficulty was experienced in accurately positioning the sliding bowl due to it sticking. In order to assess the position of the sliding bowl the cadet put his finger into a sludge port; at the same time the sliding bowl jumped slightly due to the residual load on the lifting gear. The cadet's finger was trapped between the edge of the sludge port and the sliding bowl causing a painful injury.

Observations

1. Careful supervision of young trainees, such as this cadet, is the immediate responsibility of the supervising engineer officer.
2. The acquisition of safe working attitudes during routine operations such as this, is as important a part of a cadet's training as anything he or she will be required to learn. Whilst on board ship these attitudes can be very heavily influenced by the more experienced officers and crew; such a responsibility should never be forgotten.

Comment

Advice against using fingers to align or test for the alignment of machinery is contained in the Code of Safe Working Practices for Merchant Seamen.

8. BATTERY EXPLOSIONS CAUSE INJURY TO SHIP'S OFFICER

Narrative

A set of lead acid batteries, which supplied emergency power to a vessel's radio installation, was being serviced by a ship's officer. This work consisted of removing terminal connections, cleaning and greasing terminal posts and remaking the connections. The batteries were situated in a well ventilated box on the wheelhouse top. With the battery box cover removed the batteries were exposed to atmosphere.

The officer had completed the work on four of the eight terminals; there were four batteries in total. He was slackening the fifth terminal when two cells on this third battery exploded spraying him with acid and causing flying parts of the battery casing to strike him. A new battery was then obtained as a replacement. While this battery was being connected to the original three, one of those exploded, again throwing acid and parts of the casing over the officer. The vent caps had previously been removed from all three original batteries before installation of the new battery was attempted.

Fortunately the officer received only minor cuts and bruising.

Observations

The damaged batteries were discarded immediately after the incident so preventing any close examination or tests from being performed.

However, the battery manufacturers made several observations and recommendations:

- Even batteries not under charge may discharge gases which have been trapped in their cells if the battery is moved or otherwise disturbed.
- Charging or discharging current should be switched off before attempting to remove terminal connections.
- Static discharges may be sufficient to cause the ignition of escaping gas.
- Always keep cell vent plugs in place, even when charging the battery.
- Full protective gear should be worn by persons working on lead acid batteries.

Comment

Some of the above points, together with further advice on working with lead acid batteries, is contained in Chapter 24 of The Code of Safe Working Practices for Merchant Seamen.

9. FATAL ACCIDENT ON A SMALL PASSENGER VESSEL

Narrative

A small Class V motor passenger vessel was built in the style of a canal barge. It had two deck levels and was capable of carrying a total of 120 passengers. There was a bar in the enclosed saloon deck below, above which there was an open deck, enclosed by wooden bulwarks. At the after end of the open deck there was a raised cambered coach roof. The conning position was directly behind the raised roof space.

It was a winter's night during which there were periods of rain. The vessel was privately chartered for an overnight river party, from 2300 hrs to 0600 hrs. In addition to the 35 fare-paying passengers in the party, there were four guests of the Skipper. The vessel departed from her berth and proceeded downriver and out of the city environs. As the vessel approached an outlying town, the Skipper decided to turn back upstream, to prevent the noise of the discotheque from disturbing the residents ashore. He then anchored the vessel in the river. There was a strong current running.

While at anchor, two of the Skipper's male guests were standing on the coach roof and talking to each other. The crew and most of the passengers and guests were below. Suddenly one of the two men slipped off the coach roof and fell into the river. His friend made an unsuccessful attempt to rescue him. The man was lost and three days later his body was found by police divers.

Observations

1. There were adequate lifebuoys around the upper deck bulwarks but none of them was used. None of the crew was keeping a watch on deck.
2. The raised coach roof did not have guard rails as the height of the roof was close to the maximum air draught for the many river bridges the vessel had to pass beneath.
3. The Skipper had warned two of his guests of the dangers of standing on the coach roof, as the rain had caused it to become slippery. He did not extend this warning to his other guests, although he would not have allowed fare-paying passengers to stand on the roof at all.
4. There was an understanding between the Owner of the vessel and his staff that the latter could, with permission, invite their own guests on board. In this case the Owner was away and the Skipper did not seek that permission.

Comment

1. There should have been clear standing instructions that nobody was to be allowed on the coach roof, and this incident illustrates the result of management having no formal and stated responsibilities and procedures in place.
2. There is no statutory requirement for an Owner to supply written standing orders to the Skipper of a Class V passenger vessel. However, while the Merchant Shipping (Operations Book) Regulations apply only to ships of Class II and IIA - essentially short-sea passenger ferries - the burden of their requirements does no more than reflect good practice, which should be followed in the management of vessels of other classes. Merchant Shipping Notice No M.1353 contains much useful advice about the contents of an operations book.
3. Operating instructions should, among other things, emphasise to Skippers of small passenger vessels that they are responsible for the safety of all on board and that they have full authority in the exercise of that responsibility including, if necessary, the restraining of passengers from hazardous activities.

10. DANGEROUS OCCURRENCE CAUSED BY TOW ROPE PARTING

Narrative

When on passage from the North Yorkshire Coast to Norway the tow wire from a 34 metre tug parted. She was towing a barge of 91 metres in length and 30 metres in beam at a speed of about 5.5 knots. The force 7 wind was from the south-southeast and the sea was rough.

At the time of the incident, the tug was about 20 miles south-east of an offshore platform when the barge started to drift down wind at a speed of 2 - 3 knots. Because the tug had great difficulties in attempting to retrieve the emergency towing arrangement, which had become snagged under the barge's fendering, a request for helicopter assistance was made. The rescue helicopter transferred the Mate from the tug onto the barge where he was joined and assisted by a helicopter crew member. However, they were unable to release the emergency towing pennant.

Meanwhile, the platform had initiated an evacuation of their non-essential personnel by helicopter, and an offshore safety standby vessel, with towing facilities, had arrived on scene to give assistance. The standby vessel fired a line across to the barge and eventually, with the assistance of the persons on the barge, a tow was established. The barge was towed clear of the oil field and the tow was transferred from the standby vessel to the tug. The wind strength decreased to force 6 and the tug completed her passage to Norway safely and without further incident.

Observations

1. During the passage, the tug had 550 metres of the 52mm diameter galvanised steel tow wire deployed from her towing winch. The tow wire was directly connected with a shackle to the main permanent chain towing bridles of the barge. Hard rubber and metal towing sleeves were fitted to the tow wire to prevent chafing at the point where the wire passed over the stern bulwark.
2. The tow wire parted between the tug's towing point and the after bulwark, and the self stowing gear for the towing winch was carried away overboard.
3. The barge was equipped with an emergency towing arrangement which had been rigged around one side of the barge. At the after end of the emergency towing wire a pick-up rope and buoy had been rigged and streamed over the stern.
4. It was reported that the wire had been tested prior to the tow.
5. The tug was operating within known, forecasted weather limits, only one day into the tow and she had towed in similar sea conditions before. The wind and seas were about four points abaft the starboard beam, and in such conditions, the tow wire can have large and sudden loads imposed upon it.

Comment

1. Some towing arrangements include a "fuse" pennant wire between the main tow wire and the towing bridle. The pennant's breaking strain is marginally less than the main tow wire and if the towing arrangement was to part, it is the pennant that usually fails leaving the main tow wire intact and thus obviating the need to rig a spare tow wire.
2. Other towing arrangements rig a large diameter double nylon "spring" between the main tow wire and the towing bridle. The spring has a greater breaking strain than the main tow wire and its function is to absorb sudden loads on the main tow wire.
3. Neither of the latter two arrangements were in place at the time of the accident.

11. ENGINE-ROOM FIRE ON SMALL PASSENGER VESSEL

Narrative

A Class V passenger vessel suffered an engine-room fire while on a river passage. When he noticed smoke issuing from the engine-room vents, the Skipper manoeuvred the vessel alongside another, which was secured at moorings, and the local fire brigade was summoned by radio. All 35 passengers were safely transferred to another passenger vessel without injury.

Attending firemen shut off the fuel oil tank suction pipe cocks. By this time, diesel fumes, rather than smoke, appeared to be issuing from the engine-room vents and subsequently the engine-room was entered.

Observations

1. When inspected, the main engine fuel oil spill/return line was found to be fractured. The line was made up of copper tubing of approximately 6mm in diameter. The two fractured ends of the tubing were found to be separated longitudinally by about 10mm, and axially by about 5mm.
2. The only evidence of a fire found outside the engine-room space was a small area of smoke-stained paintwork in the vicinity of each of the two engine-room vents.
3. The deckhead and forward and after bulkheads of the engine-room were lined with mineral wool, which provided an "A60" level of fire protection.
4. The two fuel oil tanks were located in an enclosed space outside the engine- room. Access to the shut-off cocks was by means of a duct, which was located within the enclosed space and measured approximately 700mm square. In order to shut off the cocks, it was necessary to remove a small set of steps, open an access door and then crawl a distance of approximately 7 metres. The enclosed space featured no means of ventilation or emergency lighting.
5. Merchant Shipping Notice No M.1456, entitled "Prevention of Fuel, Lubricating and Hydraulic Oil Fires in the Machinery Spaces of Merchant Ships and Fishing Vessels", provides advice on the precautionary measures that can be taken to prevent fires caused by fuel oil spillage. The Notice recommends the use of proven types of flexible oil pipes and the use of suitable screening, where practicable. It also recommends that heated surfaces, particularly the exhaust systems of main and auxiliary diesel engines, should be effectively insulated so that the surface temperature remains below the auto-ignition temperature of any oil which might come into contact with them.

Comment

1. The fire was probably caused by fuel oil from the fractured spill/return line spraying onto the unlagged exhaust manifold of the main engine. The fuel oil line fracture was probably caused by a combination of work hardening of the copper and stress in the tube, due to misalignment of the pipework.
2. The level of fire protection in the engine-room, which was in excess of the required minimum integrity and insulation standard of "A15", was effective in containing the fire within the engine-room compartment.
3. It is apparent that the fire was extinguished when the oxygen content within the engine-room had been reduced to a level at which it was no longer able to support combustion. However, fuel oil continued to enter the compartment until the fuel oil tank suction pipe cocks had been shut off. The delay experienced in gaining access to the cocks resulted in a hazardous situation being unnecessarily prolonged.

4. In an attempt to prevent a recurrence of the incident, the fuel oil spill/return line has since been replaced with an approved flexible pipe and the main engine exhaust manifold has been lagged in accordance with the precautionary measures recommended in Merchant Shipping Notice No M.1456.
5. The fuel oil shut-off arrangement has since been modified so that the fuel oil tank suction line cocks can now be readily activated from the wheelhouse.

12. OFFICER KILLED BY LACK OF OXYGEN

Narrative

A 12,000 gross registered tonnage foreign flagged Ro-Ro cargo vessel, operated by British Officers, was on passage to the UK. The vessel's fuel oil was found to contain water and during the search to find the cause, tanks were opened and inspected. The Chief Engineer carrying out the inspection was found by a watchkeeper with his legs protruding out of a tank manhole. He was removed from the tank and First Aid was carried out immediately, but without success. The pathologist who carried out the post mortem, confirmed the cause of death was due to lack of oxygen and exposure to oil fumes.

Observations

1. No forced ventilation of the tanks was used.
2. No test on the tank atmosphere was made, as the oxygen meter's battery was flat.
3. No other person was in attendance at the tank entrance.
4. Breathing apparatus was not made available.

Comment

1. There have been many similar accidents, one was reported in the MAIB Summary of Investigations 3/93 publication, page 2. For those who have not seen the guidance regarding safe entry into spaces it is contained in the following:
    - The "Code of Safe Working Practices for Merchant Seamen" (1991 Edition), Chapter 10 - Entering Enclosed or Confined Spaces;
    - A MARITIME SAFETY CARD published by the International Maritime Organization which sets out basic precautions on tank entry and provides a safety check list.
2. It is disturbing that officers who should be aware of the requirements for safe entry to spaces do not carry out basic checks and take the necessary precautions.
3. For UK vessels the legislation contained in the Merchant Shipping (Entry into Dangerous Spaces) Regulations 1988 as amended, would apply.

13. EXPLOSION AND FIRE IN BOILER WHILST ALONGSIDE LOADING FUEL OIL CARGO

Narrative

A vessel was alongside loading a cargo of fuel oil when, at 2018 hrs, the Terminal Supervisor reported a fire aboard and that the Fire Brigade had been informed. At 2026 hrs the fire was recorded as extinguished but that the Fire Brigade were still in attendance.

The Master and Chief Engineer confirmed that there had been a small explosion in the starboard boiler followed by a fire in the boiler flue. Further investigation by the Fire Brigade established that the base of the boiler was still glowing red with a small amount of smoke coming from the funnel and the funnel casing. Boundary cooling was applied to the boiler, water injected into the furnace via a small plug hole and six 9 litre foam extinguishers discharged into the flue box. The situation was monitored until about 2320 hrs when the fire was finally declared as out. The vessel sailed at 0204 hrs the following morning for her next port of call.

Observations

1. The two boilers on this vessel are vertical roof fired thermal oil boilers with a forced draught fan input at the base of the furnace. The combustion gases are led up a flue pipe by the side of the boiler via a flue box to the funnel.
2. After the fire, heavy fouling of the internal surfaces of the boiler was evident suggesting that the cause of the explosion and fire was due to excessive fuel being present prior to ignition. Earlier the same day problems had been experienced with the boiler operational control giving rise to excessive black and white smoke.
3. The fuel used was analyzed as a precaution although the port boiler, using the same fuel, has operated successfully since the incident. The Owners' opinion is that the explosion and fire were caused by operator error when bringing the boiler into service.

Comment

1. This incident could have been avoided by following the manufacturer's instructions and good engineering practice.
2. The dangers of boiler furnace explosions due to an accumulation of excess fuel prior to ignition are highlighted in the Merchant Shipping Notice No M.1083 "Explosions in Boiler Furnaces".

14. DIVING EQUIPMENT FIRE

Narrative

A commercial craft of 10 metres registered length was proceeding to sea with a group of divers on board. While on passage, the dive marshal decided to check the contents of an oxygen cylinder. As he opened the cylinder valve, the high-pressure hose connected to the contents gauge failed, which caused oxygen to escape under pressure. The oxygen ignited and a fire started. The cylinder valve was then shut and the fire was extinguished using water and portable fire extinguishers.

Observations

1. The dive marshal suffered momentary deafness and one other person on board sustained superficial burns to his right forearm and left elbow.
2. The fire caused damage to an awning and to equipment belonging to the group. The source of ignition is unknown.
3. The failed high-pressure hose was damaged by the fire and was unavailable for subsequent inspection.
4. The oxygen cylinder was intended to be available for use during diving operations but was not part of a standard therapeutic oxygen set.

Comment

1. The cause of the high-pressure hose failure is unknown. However, compliance with the appropriate British Standards relating to diving equipment will ensure that equipment failure is kept to a minimum.
2. The British Sub-Aqua Club (BSAC) and the National Federation of Charter Skippers (NFCS) recommend the provision of therapeutic oxygen on board vessels chartered for diving operations. The equipment used for this purpose is generally quite small and has an oral/nasal mask already fitted. It should not be confused with larger oxygen equipment normally used during diving operations.
3. The carriage of therapeutic oxygen, as recommended by the BSAC and the NFCS, is intended to provide first aid to a diver suffering from decompression illness. Its provision can only enhance the level of safety offered to divers by the operators of such vessels.

15. ACCIDENT WHILST MOORING ALONGSIDE A VESSEL

Narrative

A lighter was being manoeuvred along the side of a vessel. A polypropylene mooring rope had been made fast on board the lighter and then led around a set of bitts on the vessel to a capstan. As the capstan hauled on the rope, the lead angle from the bitts to the lighter progressively increased. The rope eventually flipped over the top of the bitts and struck a crew member.

Observations

1. The freeboard of the lighter was much greater than that of the vessel.
2. The injured crew member was lifted into the air by the rope and, despite wearing a safety helmet, sustained a fractured skull when he landed on the deck.

Comment

1. Although the lead of the rope was satisfactory at the start of the manoeuvre, no account was taken of the inevitable increase in the lead angle from the bitts as the lighter moved along the side of the vessel.
2. If available, appropriate roller or panama fairleads should have been used. Alternatively, a different set of bitts should have been used so as to ensure the lead angle remained minimal throughout the manoeuvre.

16. LOSS OF OLDER WOODEN FISHING VESSEL

Narrative

An 18 metre wooden fishing vessel was operated by the Owner/Skipper and a crew of four. She was pitching heavily in conditions of about force 8/9, when she came down hard on her starboard side. Shortly after this incident, the forward cabin started to flood rapidly. Flooding was restricted to the cabin. The vessel's own bilge pump, plus portable pumps from the Coastguard and another vessel, contained (but was unable to reduce) the flood water level. After some 11 hours the aft wooden bulkhead of the cabin started leaking water into the adjacent fish hold. With the use of a liferaft all the crew transferred safely to another fishing vessel. The vessel sank by the head about four hours later. All the crew were safely returned ashore.

Observations

1. This 34 year old oak on oak, wooden vessel was one of the top earning fishing vessels in its area. She had experienced flooding to the same forward cabin six months before this incident, after which she was slipped and caulking repairs were carried out.
2. She remained afloat in the flooded condition, in heavy seas, for a long time. The salvage pumps and the watertight integrity of the forward wooden bulkhead contributed to the vessel's survivability. This bulkhead maintained its watertight integrity for some 11 hours in heavy sea conditions and with a large head of water on the forward side.
3. It is reported that it was necessary for this vessel to have fished in all sea conditions to have become a top earning vessel.
4. The wooden structure failure is thought to have been caused by the very heavy load exerted on the fore structure as she rolled heavily on her starboard side when operating in very rough seas. Identifying the actual cause of the structural failure, eg a sprung plank or loss of caulking, or both, was not possible.

Comment

1. It is strongly recommended that a portable diesel driven salvage pump of suitable output, and fitted with an adequate length of suction hose, should be carried and stowed in a readily accessible position.
2. This incident shows the importance of a vessel staying afloat long enough to enable the crew to abandon ship safely. One important factor in this case was that the wooden bulkheads on this fishing vessel had been made as watertight as possible.

17. FATIGUE CAUSES GROUNDING OF TRAWLER

Narrative

Having departed her home port at about midnight, a trawler of 20 metres registered length was steaming towards her intended fishing grounds with two crew members on watch. The weather was good with variable light winds and clear visibility. The auto-pilot was in use.

One of the watchkeepers left the wheelhouse and went to the forward cabin to make some tea. In his absence the second watchkeeper, who was sitting in the fixed wheelhouse chair, fell asleep.

While the first watchkeeper was still below, the vessel grounded. Fortunately there were no injuries and, although some resultant flooding was sustained forward, the vessel was able to refloat and return to port under her own power.

Observations

1. The vessel had spent only three hours in port, during which time the crew were engaged in landing the previous catch and in icing up.
2. The second watchkeeper had not slept for about 24 hours.
3. The wheelhouse windows and outside door were shut.
4. The vessel was not fitted with a watch alarm.
5. The Skipper had not told the two watchkeepers who was to be in charge.
6. The vessel grounded because the auto-pilot had not been re-set to the original course after a navigational alteration.

Comment

1. Neither the Skipper nor the second watchkeeper appreciated the extent to which the latter was fatigued and a major contributory factor was that he was inadequately rested. Any tendency for him to fall asleep was probably exacerbated by his prolonged seated position and by the effect of the battened down wheelhouse.
2. Although the provision of a watch alarm would not necessarily have prevented the watchkeeper from falling asleep, it would have alerted him or the rest of the crew in sufficient time to prevent the vessel from grounding.
3. Appropriate warnings concerning the danger of fatigue with respect to watchkeepers are provided in Merchant Shipping Notice No M.1190.
4. Skippers and watchkeepers must ensure that the latter are adequately rested and fit for duty before taking charge of a navigational watch. Full account should be taken of both the quantity and quality of rest taken in this regard.
5. When there is more than one watchkeeper, the Skipper should make clear to them who is to be in charge.

18. MAJOR INJURIES TO FISHERMEN DURING HEAVY WEATHER

Narrative

Two recent incidents highlight the ease with which fishermen can be seriously injured when fishing operations are undertaken in heavy weather.

Case 1

During a hauling operation on board a stern trawler, the vessel shipped a large sea which caused a crew member to be washed into the trawl gantry. He was subsequently air-lifted from the vessel with a broken arm and transferred to hospital ashore.

Case 2

A crew member was proceeding towards the winch of a stern trawler in preparation to haul the gear. The vessel shipped a large sea which struck him from behind and forced him into the side of a shelter deck door. He was subsequently air-lifted to hospital where he received 25 stitches to a head wound.

Observations

1. Both accidents occurred in force 10 to 12 weather conditions.
2. Both vessels were of less than 24 metres registered length.

Comment

1. The working deck of a fishing vessel is a potentially dangerous place, even in calm conditions. These incidents highlight the additional dangers encountered by fishermen during periods of heavy weather.
2. It is essential that Skippers keep up to date with the latest weather forecast so as to be able to cease fishing in good time and to take precautionary action should the continuing suitability of weather for fishing become doubtful.
3. It is the Skipper's responsibility to ensure that a sharp lookout is maintained on all fishing operations, particularly when heavy oncoming seas are encountered. All signals given to crew members working on deck should be positive and clearly understood.
4. Further advice on the safety of fishing operations is provided in the Department of Transport publications "Fishermen and Safety" and the "Recommended Code of Safety for Fishermen".

19. LIFERAFT AND FLARES SAVE A 10 METRE FISHING VESSEL CREW

Narrative

A five year old 10 metre double chine steel hulled beam trawler was operating about six miles off the coast when flooding in the fish hold was discovered. The weather was fine with good visibility, and a gentle breeze. After flooding she listed quickly to port when the ice carried on board shifted. When the bilge pump became blocked, pumping was continued by hand and the four-man liferaft was taken from the wheelhouse locker and inflated. Contact was made with a local fishing vessel about two miles away. An RAF jet was seen and a red parachute flare released. The pilot saw the red flare and contacted the rescue services. Two crew boarded the liferaft directly from the fishing vessel but the Skipper jumped into the sea and then pulled himself into the liferaft. All the crew were safely recovered from the liferaft by a rescue helicopter.

Observations

1. The cause of the flooding was thought to be a leak from the stern gland. The bilge alarm failed to operate, resulting in the flood water not being discovered until the water was about one metre deep.
2. The cause of the vessel's sudden list was the shift of the ice carried on board.
3. The liferaft in this incident served the crew well. However, had the beamer capsized very quickly there would have been no time to have taken the liferaft out of the wheelhouse locker on to the deck.

Comment

1. Comments from the Skipper: "This incident brought home to me and my crew how quickly the cold can take effect, and that an immersion or survival suit would have been very beneficial." He went on to express the view that an EPIRB should be standard equipment on all vessels irrespective of size.
2. This incident highlights the importance of carrying lifesaving equipment and in particular liferafts and flares on all sizes of fishing vessels.