# Marine Accident Investigation Branch (MAIB) - Safety Digest 02/1996

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# 1. MAIN ENGINE FAILURE AT SEA

## Narrative

A 1,908 gross registered tonnage Ro-Ro vehicle passenger ferry was on passage when the starboard main engine started to overheat. A rapidly increasing knock developed together with vapour emissions from the crankcase. The engine was stopped and with a cracked cylinder liner suspected, a decision made to proceed on passage on the port main engine only. The vessel arrived in port later that evening.

## Observations

1. On arrival in port, after a suitable cooling down period, the crankcase doors on the port main engine were removed and a full examination undertaken. This showed that No 1 unit cylinder liner had a cracked lower edge, all piston rings solid in their grooves and the piston crowns heavily scored. The gudgeon pin was scored and the crosshead bearing distorted. When the lub oil pump was run to test the system, only a trickle of oil emerged from the bottom end bearing outlet suggesting a blockage. The bottom end bearing was removed and found satisfactory.
2. In order to find the blockage, the supply pipe from the oil manifold to the main bearing housing was then uncoupled. Again only a dribble of oil appeared indicating that the blockage still existed. On removing the supply pipe from the oil manifold, a twenty pence coin dropped out followed by the full flow of oil. Further examination of the crankshaft pin, journal and bearing shells showed that they were undamaged.
3. The liner was replaced with a new spare, a reconditioned piston assembly fitted and all ancillary fittings replaced. The lub oil was purified and the engine run on test for 30 minutes. The oil flow was confirmed and bearings checked for overheating. On satisfactory completion of engine tests, the vessel re-entered service some 20 hours after the problem was encountered.

## Comment

1. The lub oil system draws from the wet sump through a coarse filter to the circulating pump, thence through a magnetic filter, fine filter and into the external distribution manifold. Oil then passes into the internal oil manifold from which each main bearing is fed. The twenty pence coin is capable of passing through the external distribution manifold, the internal oil manifold, and supply pipes to the main bearings, but would be too large to pass through the coarse or fine filters. It would seem likely therefore that the coin entered one of the lub oil manifolds during a recent partial main engine overhaul.
2. This potentially dangerous situation was averted due to the prompt and correct action taken by the Chief Engineer and his staff. It highlights the need for care and cleanliness when assembling machinery and machinery systems. The accidental inclusion of foreign bodies can lead to a dangerous situation developing, involving not only possible serious injuries to staff but also severe damage to the vessel.

## 2. COLLISION BETWEEN A LOADED TANKER AND A TRAWLER

### Narrative

This collision happened in the North Sea, 60 miles north-east of Fraserburgh. The trawler was towing her gear in a north-easterly direction at about 2 knots. It was night time and she was showing the appropriate navigation and trawling lights. Her working deck lights were off. The tanker, which was loaded with over 80,000 tonnes of crude oil, was being steered by autopilot on a heading of 285° at a speed of about 11 knots. There was a strong south-south-westerly wind but the visibility was good.

A deckhand was alone on watch in the wheelhouse of the trawler. He noticed the tanker on his starboard side when it was at a range of two miles. He could see the vessel's red sidelight and masthead lights and he judged that it was going to pass clear ahead. Subsequently when the tanker was about half a mile away he noticed her masthead lights almost in line and realised that the two vessels might collide. He tried calling the vessel on VHF channel 16. Receiving no response, he took avoiding action by turning to port away from the tanker but, being hampered by the trawl, this action was insufficient to avoid the contact that ensued. The tanker scraped passed the trawler's starboard quarter damaging both the trawler and her fishing gear.

The fishing vessel tried to call the tanker on VHF Channel 16 a number of times immediately after the accident but received no reply. She retrieved her damaged gear and, although taking water slowly, was able to return safely to port without assistance.

It was some hours later, after having been contacted by the Coastguard, that the Master of the tanker realised that his vessel had probably been involved in a collision.

### Observations

1. At the time of the accident, about 1900 hrs, the Chief Officer was on watch on the bridge of the tanker, assisted by a seaman lookout. The Chief Officer visited the toilet at about 1900 hrs but stated that, except for that time, "a few minutes", he remained on the bridge. Neither he nor his lookout remembered anything untoward happening during the watch.
2. The radars on the tanker were not being used even though the vessel was passing through an area where fairly heavy fishing, commercial and oil related traffic could have been expected.
3. The seaman lookout on the tanker had already worked a full twelve hour day before going on watch at 1600 hrs.
4. The watchkeeper on the trawler did not detect the presence of the tanker until it was two miles away and then did not closely monitor the developing situation and did not call the Skipper until the collision was imminent.
5. The tanker was clearly the give-way vessel under the Collision Regulations.

### Comment

1. A proper lookout was not being maintained on either vessel and, in the case of the tanker, it is questionable whether there was anyone on the bridge and alert during the period 1830 to 1930 hrs.
2. The radars on the tanker should have been on and used to supplement the visual lookout.
3. The watchkeeper on the trawler should have detected the tanker earlier and monitored the situation efficiently. Had he done so he would have realised at a much earlier stage that the tanker was not taking action to keep clear and that risk of collision existed. At that time he should have called the Skipper and taken action himself to avoid the collision. Rule 17(a)(ii)

of the Collision Regulations allows for this. As it was he left it too late to call the Skipper and too late to avoid the contact.

4. Under Rule 8 of the Collision Regulations the give-way vessel must take early and positive action to avoid a close quarters situation. It is especially important to positively resolve the situation at an early stage if the other vessel is hampered in her ability to take last minute avoiding action herself.

## 3. FATAL ACCIDENT ON BOARD A SUPPLY VESSEL

### Narrative

A supply vessel was required to load cargo from an offshore platform in Liverpool Bay. The cargo included a bridge walkway with the following dimensions:

Length:15.15 metres
Breadth: 1.85 metres
Height: 2.90 metres

The walkway weighed six tonnes.

Cargo from another platform had already been stowed on the aft deck of the vessel and it was intended by the Master that the walkway should be loaded upright, longitudinally and immediately inboard of, and adjacent to, the cargo stowed on the port side of the deck. During the loading operation, the Chief Officer manoeuvred the vessel from the port aft conning position on the bridge. The Master was also on the bridge and was checking to make sure that the vessel remained sufficiently clear of the platform during the loading operation.

The walkway was loaded using one of the platform cranes and was guided into the required position by two crewmen on deck. The weather conditions were calm and both the Master and the Chief Officer considered that it was unnecessary to secure the deck cargo for the short passage to Liverpool.

As the vessel proceeded up the River Mersey, the two crewmen were engaged in preparing the aft deck for a towing operation, which was required to be undertaken immediately after discharge of the deck cargo. While approaching Langton Lock, the walkway fell onto its side and trapped the two crewmen underneath it.

The emergency services attended the vessel in the lock. One of the crewman died as a result of the accident and the other was seriously injured.

### Observations

1. When upright, the walkway was supported at two points on its underside; a fixed locating pin situated at its forward end, and a locating pad, with freedom to swivel about an athwartship axis, situated at its aft end. The locating pin and pad projected vertically below the underside of the walkway at distances of approximately 0.4 metre and 0.6 metre respectively.
2. The Master was aware of the locating pad at the aft end of the walkway but neither he nor the Chief Officer had noticed the locating pin at the forward end during the loading operation and their restricted view from the bridge had prevented them from noticing that the forward end of the walkway had not landed fully onto the deck.
3. The two crewmen were experienced in offshore cargo operations and it was normal for them to secure deck cargo only if they deemed it necessary to do so, without having to await instructions from either the Master or the Chief Officer. Although they were aware that the forward end of the walkway had not landed fully onto the deck, they decided that it was unnecessary to secure the walkway in the prevailing calm weather conditions.
4. Both the Master and the Chief Officer were satisfied with the stowage of the walkway and did not consider that any securing arrangements were necessary in view of the gangway's

apparent stability, its location immediately adjacent to other cargo on its port side, the prevailing calm weather conditions and the fact that the vessel had a slight list to port.

## Comment

1. The walkway probably fell onto its side due to the motion of the vessel. The main contributory factors were:
    - the inherently inferior stability of the walkway when in its upright condition and supported only by the locating pin and pad; and
    - the absence of any action taken to secure the walkway in its stowed position.
2. The walkway was an unusual item of cargo for the vessel to carry. When loaded in its upright condition, the height of the walkway in relation to its breadth should have given some cause for concern. However, there was a failure on board to appreciate the danger of allowing the walkway to remain in its upright condition without being secured.
3. Although the Master and the Chief Officer regarded the two deckhands as being competent with regard to cargo stowage and securing, it would have been prudent for one of them to have personally inspected the aft deck after loading in order to check that the walkway was stowed safely, particularly as there was no intention to secure it in the prevailing circumstances. Such action would have accorded with the advice provided in the IMO Code of Safe Practice for Cargo Stowage and Securing.
4. It is clear that the accident would have been avoided had the walkway been adequately secured in its stowed position, in accordance with the Owner's written Standard Procedures and with the United Kingdom Offshore Operators Association (UKOOA) Code of Practice entitled "The Safe Management and Operations of Offshore Support Vessels".
5. The nature of supply vessel cargo loading operations at offshore platforms generally prohibits prior inspection of the cargo by the crew. Therefore, it is important that the Master is advised of the details of any unusual items of cargo to be loaded and that, where possible, efforts are made prior to loading to reduce any foreseeable difficulties that might arise in stowing and securing those items on board the vessel. Appropriate advice in this regard is provided in the UKOOA Code of Practice.

# 4. SHIFT OF CARGO CAUSES HEAVY LIST

## Narrative

The 1400 gross registered tonnage general cargo vessel left port on a winter evening at 1725 hrs, having loaded a cargo of 1500 tonnes of loose steel plates in freezing conditions. The weather was moderate with east-south-easterly winds force 4 - 5 and a heavy swell. The vessel's course put the swell on the beam and she rolled heavily.

At 1958 hrs the vessel took up a list to starboard of about 10°. The vessel was brought around into the swell and the crew were mustered. The holds were inspected and it was found that the plate cargo had shifted, though there was no visible damage to the hull side or any indication of water ingress. The Coastguard were informed and the vessel was turned back towards her port of departure. The local RNLI lifeboat was launched to escort her in. Weather conditions had deteriorated to winds south-easterly 7 - 8 by the time she reached a safe anchorage.

Shift of Inadequately Secured Cargo

Cargo Securely Lashed in Place

## Observations

1. The steel plate was distributed equally between the two holds and secured with timber wedges/shores.
2. Friction would have been effectively reduced between the steel plates and the dunnage because it is likely that both would have been covered by ice to some extent, given the freezing conditions in which the cargo was loaded.
3. The original loading plan required that the steel plate cargo would be overlaid by steel pilings but this did not occur.

4. Vessels which are carrying steel cargoes can be very stiff and roll violently in a seaway and consequently any weaknesses in securing the stow will be quickly revealed. The fact that the steel pilings were not carried would exacerbate this tendency.

## Comment

1. Movement of the cargo could have been avoided if it had been securely lashed in place with wire ropes set taut. This was indeed done before the vessel resumed her voyage with the overload of steel pilings.

# 5. ENGINE-ROOM FIRE CAUSES FATALITY

## Narrative

A UK coastal vessel, of 833 gross registered tonnage, built in the late 1960s, was at a loading berth taking on a cargo of waste material. The vessel's Chief Engineer and one other person were working on the main engine. This work required that the engine's fuel pumps were purged of air. This operation resulted in a small quantity of fuel, which was gas oil, being spilt onto the engine-room floor plates just beneath the main access ladder from the lower part of the engine-room. Apart from this fixed ladder the only other route to or from the lower floor plates was by way of a wire rope emergency escape ladder at the aft end of the main engine.

The work had reached a stage where the main engine needed to be rotated slightly. To do this both men went to the aft end of the engine in order to bar the engine over by hand. While they performed this task they heard a noise similar to that caused by tools being dropped onto a steel deck and thus placed no significance on this sound. However, once they had completed the engine turning these men looked towards the forward end of the engine and saw smoke and flames coming from the lower end of the access ladder.

An immediate attempt was made to extinguish the fire with a dry powder extinguisher. This extinguisher failed to function. The smoke levels in the engine-room prevented any further local attempts to fight the fire and both men decided to evacuate the engine-room. The Chief Engineer evacuated the space by way of the wire rope emergency escape ladder, the other man used the main access ladder thus stepping through the fire.

The Chief Engineer reached the open deck safely but only after experiencing some difficulty opening the escape hatch at the top of the emergency escape ladder. The other man reached the open deck with his boiler suit in flames. Once these flames were extinguished, and medical help requested from ashore, the engine-room was completely closed down and the CO2 flooding system activated.

After allowing several hours for cooling and ventilation, subsequent inspection of the engine concluded that a wandering lead lamp, which had been in use, had fallen into the spilt oil beneath the main access ladder causing ignition. The sound of this lamp falling had been heard by the men but had been ignored. The man whose boiler suit had ignited suffered serious burns and died the following day.

## Observations

1. The deceased's boiler suit was manufactured from a material consisting of 65% polyester and 35% cotton.
2. The dry powder fire extinguisher was subsequently tested. It was established that while the canister still contained its full charge of powder, the C02 gas cartridge was empty. It could not be established whether this cartridge had been discharged at the time of this incident or previously. No indicator is fitted to this type of extinguisher to indicate whether it has previously been operated by accident, or otherwise.
3. The wandering lead lamp was of the non-safety type having its bulb protected by only a wire cage.
4. When the Chief Engineer used the wire ladder its lack of rigidity made it difficult for him to generate sufficient purchase to open the escape hatch at the top of the ladder. This problem

was compounded by the effects of smoke inhalation which very nearly resulted in two fatalities from this incident.

5. The vessel's engine-room was rapidly and very efficiently closed down and flooded with CO2.

## Comment

1. A vessel built since 1980 is required to have its portable fire extinguishers so designed that it is apparent whether or not they have been operated. On older vessels this feature is not mandatory but is clearly advisable.
2. The "Code of Safe Working Practices for Merchant Seamen" advises that only approved safety lamps should be used in spaces where oil or oil vapour is present. Such a lamp may have prevented ignition of this fire.
3. Materials having a large polyester content are commonly used in the manufacture of workwear. However, the behaviour of such materials in a fire can sometimes lead to the wearer suffering more serious burn injuries than if there had been a small polyester content.
4. This incident further demonstrates the value of keeping working areas clean at all times.

# 6. LOSS OF PASSENGER OVERBOARD

## Narrative

When a ferry of 33,336 gross registered tonnage sailed from a south coast port one night, amongst her passengers was a group of four young men who spent most of their time on board in the bar consuming alcoholic beverages.

At about 0325 hrs the four young men went out on deck for some fresh air. Whilst they were there one of the group climbed over the ship's rails enclosing the lifeboat ladder, and sat on the edge of a lifeboat boarding bridge with his legs dangling over the ship's side. When his friends asked him what he was doing he turned round to face them. The change in disposition of his weight caused the hinged boarding bridge to rotate vertically through ninety degrees, which in turn caused him to fall overboard.

The alarm was raised and shortly afterwards a lifebuoy with a light attached was thrown overboard and the ferry started a man overboard search. The French authorities were alerted and also conducted a thorough search using helicopters, naval vessels and a lifeboat. Despite their efforts, the young man's body was not recovered.

Boarding Bridge in "Closed" Position

Boarding Bridge in "Open" Position

## Observations

1. Before boarding the ferry, the four young men had consumed one pint of lager/beer each, and they each drank at least a further five pints while on the vessel. It is therefore highly likely that they were all affected to some degree by alcohol.
2. The deceased had climbed over the ship's rail earlier on, probably "showing off". It is probable that he climbed over a second time as an act of bravado but with fatal consequences. It is doubtful that he would have acted in such a manner if he had not been drinking.
3. It is unlikely that he would have survived even if he had been located within a reasonable time. The shock of hitting the cold water, followed by hypothermia accelerated by the effects of alcohol would have reduced his chances considerably. The distance from the boat deck to the sea is about 18.6 metres and the young man's body may have hit the ship's side as he fell; it is therefore possible that he could have been knocked unconscious before he entered the water.
4. The height of the railings surrounding the stowage position of the lifeboat ladder and the boarding bridge is 1.10 metres. This height is quite sufficient for normal safety.

# 7. DEATH OF WORKER IN SEWAGE SPACE

## Narrative

A 20,200 gross registered tonnage passenger vessel was in dry dock undergoing a repair and maintenance period in an overseas port. Nobody was living aboard and the vessel was in the hands of the dry dock company. Amongst the work to be carried out was the cleaning and repair of various sewage tanks sited in void spaces. Each tank is divided by a central bulkhead plate into a grey sewage collection part and a black sewage storage part - the dividing bulkhead being open at the top to allow carry over of liquid from the black to the grey. Prior to dry docking, both the grey and the black tanks had been pumped out although some residue still remained in the black tanks.

Several tanks were opened, the internal atmosphere tested for oxygen and flammable gas, and working permits issued. No test was made for hydrogen sulphide. The grey side of one tank had been cleaned during the morning with work continuing during the afternoon. Two workmen were on top of the tank in the void space, another was in the tank removing the access plate between the grey and black sections whilst two others were outside by the tank access manhole.

When the access plate was removed, black sewage overflowed into the grey tank area. The workman in the tank shouted a warning of gas but collapsed before he could escape from the tank. The two workmen by the access manhole raised the alarm and came out of the void space. Of the other two workmen, one came straight out whilst the other entered the tank and pulled the collapsed workman from the grey tank bottom. On climbing out of the tank, both became unconscious and collapsed, one became entangled with the ladder whilst the other fell head first down into the bilges at the bottom of the void space with only his feet showing.

The alarm was raised and a yard safety official arrived at the entrance to the space with a SCBA unit but without any backup team. Once aware of the problem, a member of the ship's crew called out the ship's emergency tank rescue party. Wearing breathing apparatus, two of the party entered the space carrying "MARS" resuscitators. On finding the workman entangled by the ladder, the resuscitator was applied and with the aid of rope slings, the man was removed through the manhole. He was subsequently evacuated to hospital and recovered. The rescue team then re-entered the space, pulled the second man clear of the bilges and attempted resuscitation. This workman however was already dead.

## Observations

1. The residue of black sewage had remained undisturbed and un-aerated for the preceding five and a half days and it is likely that over this period the level of toxicity would rise. The amount of black sewage falling into the grey tank amounted to about five to ten litres, which although very small was sufficient to release the lethal gas, hydrogen sulphide.
2. The compartment had been tested for oxygen and flammability prior to entry and a work permit issued. Testing for hydrogen sulphide however was not carried out but, it is doubtful if any hydrogen sulphide would have been present, as at that time there had been no spillage of black sewage.

## Comment

1. The standard procedure prior to entering any enclosed space or tank should follow the guidelines given in Chapter 10 of the "Code of Safe Working Practices for Merchant Seamen". Essentially this requires that precautions should be taken as appropriate before a potentially dangerous space is

entered so as to make the space safe for entry without breathing apparatus and to ensure that it remains safe whilst persons are within the space.

2. In this case, although gas tests were conducted prior to entry and a permit issued, the potentially lethal consequences of subsequently opening an access into tanks containing black sewage had not been considered or the appropriate precautions taken.

# 8. INJURY CAUSED BY A REVERSING TRAILER ON A RO-RO VEHICLE DECK

## Narrative

Discharging operations were in progress through the stern door of a 5,897 gross registered tonnage freight ferry. On the main vehicle deck two crewmembers, A and B, were working together unlashing semi-trailers for towing ashore by Tugmaster tractors. One of the trailers was on the starboard forward side of the space and it was found that there was excessive tension on the lashing chain on the nearside rear end of the trailer, making it difficult to release. Crewmember A requested the Tugmaster driver to slowly reverse to ease the tension on the chain. He shouted across to crewmember B to tell him what he had asked the driver to do. He was standing on the offside of the trailer and, assuming that crewmember B had moved aft along the clear space between the trailer and the ship's side, signalled the driver to reverse. At that instant crewmember B appeared from around the nearside of the trailer, leaned over a king frame and started to attempt to release the chain. He was caught between the rear of the reversing trailer and the king frame and suffered crush injuries, including several broken ribs.

## Observations

1. It is highly likely that crewmember B had not heard or understood what was shouted to him by crewmember A, due to the high level of noise on the vehicle deck.
2. The two crewmembers had worked successfully for many months as a two-man team and they were well versed in lashing and unlashing procedures.

## Comment

1. Whenever possible crewmembers should avoid placing themselves in restricted positions where they could become trapped.
2. Carelessness in this instance demonstrates how a simple failure in communication and concentration can result in a serious and possibly fatal accident.
3. This sort of accident is happening too frequently. It cannot be emphasised too strongly that the crewmember acting as signaller MUST have the other crewmember in sight and be satisfied that he is in a safe position, before signalling the driver to proceed.

# 9. LIFEBOAT FIRE DURING TESTING

## Narrative

The hyperbaric lifeboat from a diving maintenance vessel was deployed for a test run and regular maintenance. Some 20 minutes after starting the lifeboat engine, a fire was discovered in the aft cabin.

## Observations

The incident was investigated by the vessel's managers who reported the following:

1. The engine was stopped immediately.
2. Thick black acrid smoke restricted access to the fire.
3. Use of an available 2.5 kg portable dry powder extinguisher failed to extinguish the fire.
4. A workboat was used to tow the lifeboat alongside the vessel and hoses were then directed from the vessel into the lifeboat until the source of the fire became submerged.
5. During the fire, there was an explosion from the oxygen, heliox and air gas supplies on board the lifeboat.
6. In consultation with specialists, the cause of the fire has been attributed to a fuel oil return line failure, which permitted fuel oil to be sprayed onto the engine exhaust.
7. The stored gas on board the lifeboat fuelled the flames and caused most of the resultant damage.

## Comment

The following actions were recommended by the managers:

1. Status of fuel oil lines and engine exhaust cladding to be checked at regular intervals not exceeding 3 months;
2. More portable dry powder fire extinguishers to be installed.

# 10. FALL FROM MAST

## Narrative

An offshore supply vessel was alongside in port. A deck rating was painting the foremast. He was standing on the fixed mast ladder and was holding onto the ladder with one hand while painting the mast using the other. He wore a safety harness with a lanyard attached to a ladder rung. As he worked downwards, he periodically transferred the lanyard clip to a lower rung. At a height of approximately 20 feet above the deck, while transferring the lanyard clip, the rating fell from the ladder and sustained resultant major injuries.

## Observations

1. The rating was an experienced seaman. He was fit and completely sober.
2. He was wearing a safety harness with an attached lanyard in accordance with the "Code of Safe Working Practices for Merchant Seamen".

## Comment

1. The accident could have been avoided if the safety harness had incorporated two lanyards such that, while transferring one lanyard to a lower rung, the harness would still have been attached to the ladder by the other lanyard.
2. The Merchant Shipping (Protective Clothing and Equipment) Regulations 1985, in association with Merchant Shipping Notice No M.1195, require a safety harness and its associated lanyard to meet the standards of BS EN 358: 1993 & BS EN 354: 1993 or equivalent. BS EN 358: 1993 provides for one or more lanyards to be used with a safety harness. However, a safety harness incorporating more than one lanyard can normally only be supplied by special order.
3. An alternative means of protection from falling when using a fixed ladder is the provision of a vertical rail system. The rail is attached to the inside of the ladder and is used in conjunction with a safety harness, lanyard and inertial clamp device. Such a fall arrest system (BS EN 363: 1993) permits the user greater freedom of movement.

# 11. GENERATOR FIRE IN PORT

## Narrative

A 1,819 deadweight tonne oil tanker was alongside and discharging her cargo. The lights suddenly flickered and the Second Engineer, who was in charge of the engine-room watch, saw smoke and flames being emitted from the starboard main engine shaft-driven generator. He immediately raised the alarm and then attempted to extinguish the fire until dense smoke forced him to evacuate the engine-room.

The crew were mustered and the ship's emergency procedures were put into effect. The Second Engineer and the Second Officer, both wearing compressed air breathing apparatus (CABA) sets, re-entered the engine-room. They stopped the starboard main engine and generator and then successfully extinguished the fire using the vessel's own fire-fighting equipment.

The local fire service attended the vessel shortly afterwards and confirmed that the fire had been extinguished.

## Observations

1. The cause of the fire was determined to be the failure of a commutator component. The resulting dense smoke was created by the varnish and insulation within the generator windings.
2. Although the engine-room was illuminated and safety lamps were being used during the incident, the Second Officer was, at times, unable to see the Second Engineer due to the dense smoke. In an attempt to overcome this problem, the owners of the vessel intend to fit retro-reflective tape to all CABA cylinders and is considering the fitting of high-visibility plastic covers.

## Comment

1. Retro-reflective material is not readily found on protective clothing and CABA cylinders used on board ship. However, it is commonly fitted to the protective clothing of fire-fighters ashore and is reported to enhance detection significantly in dense smoke.
2. The fitting of retro-reflective tape or high-visibility covers to CABA cylinders will also enhance detection. However, for all-round detection, the fitting of retro-reflective material around the outside of protective clothing might be preferable.

# 12. FLOODING AND FOUNDERING OF A 32 METRE FISHING VESSEL

## Narrative

A 32 metre registered side trawl fishing vessel operated out of a Scottish east coast port. The vessel sailed with a crew of 10 (Skipper, Mate, two Engineers and six deckhands) and arrived at the fishing grounds off north west Ireland the following day - the weather during the voyage being easterly force 6 - 7. On arrival, she started fishing in company with two other vessels, pair trawling in rotation with them. After two days she assumed the "port" station, and shot her nets at 2000 hrs.

The main trawl winch was situated on the port side forward in the tweendeck with the trawl wires passing out onto the shelter deck starboard side, through spurling pipes. The wires then separated before passing aft via the gantry. At approximately 2040 hrs the winch operator, when going forward to adjust the wires, found that water was covering the tweendeck deck to a depth of about 75 - 100mm. The Skipper was notified but it was not until about 2130 hrs that one of the Engineers was instructed to inspect the area for water. At that time he reported that the amount was not significant but on inspecting the area again at 2200 hrs found some water draining aft via the drain lines to the bilge aft. This was removed by the bilge pumping system.

At 2230 hrs the vessel had a 3° - 4° list to starboard with a rising water level and more water coming in via the spurling pipes. The water not only flowed aft through the drain lines but also started to spill over the door sill into the starboard alleyway and aft into the refrigerated space. Although the bilge pump continued to remove the water flowing aft and the strainers were checked for debris, the water level forward continued to rise. By 2300 hrs the tweendeck forward contained a significant amount of water and, with the vessel assuming an increasing head trim, the drainage aft ceased.

The crew started preparations to launch the liferaft and assembled at the stern leaving just the Skipper in the wheelhouse and one of the Engineers down below. At about 2300 hrs Malin Head Radio was advised by the Skipper that the vessel was flooding with a MAYDAY being broadcast at 2305 hrs. One of the other fishing vessels came close in and the Skipper and the rest of the crew abandoned their vessel, some directly onto that fishing vessel, and some into the sea or a liferaft. All were wearing life-jackets and all were picked up without injury.

## Observations

1. The loss of this vessel was undoubtedly due to internal flooding causing the vessel to adopt an increasing head trim until such time as the shelter deck forward became immersed and down flooding occurred. With the bilge well situated aft, the effect of this head trim was to cause the water to drain forward, away from the bilge pump suction.
2. Whether this initial internal flooding was caused by back flooding of the bilge system due to human error or by the operational failure of defective or jammed valves it is not possible to say. With full refrigerated sea water tanks and their drainage system interconnected with the normal vessel bilge system, back flooding is a real possibility. There is no record of any previous flooding and the vessel was considered to be in good condition prior to the sinking. The loss of the vessel due to down flooding via the spurling pipes or by an open shelter deck hatch is discounted on the basis that if the vessel's normal trim by the stern had been maintained, the bilge system as fitted would have removed excess water. That it did not, suggests that the vessel had started to trim by the head before significant water was entering the forward tweendeck. For that to occur flooding must have already been occurring below decks.

## Comment

1. The fitting of a high level bilge alarm within the fish hold space would have given early warning of internal flooding with the possibility of preventing the sinking of the vessel.
2. The installation of a bilge pumping system that relies exclusively on a particular vessel trim to be effective is not good engineering practice. It should be noted however, that even if the system installed had not relied on a stern trim, the tweendeck flooding was not the cause of the vessel sinking.
3. Weather deck closing devices fitted to openings used at sea, eg towing wires through spurling pipes, should be regularly checked for effectiveness.

# 13. ENGINE FAILURE AND EVENTUAL LOSS OF VESSEL

## Narrative

This 37 metre, 20 year old wooden fishing vessel operated with a crew of four, Skipper/Engineer, two fishermen and one fisherman/cook. Watch keeping was usually single handed except in periods of bad weather when the watch was doubled up.

The vessel took a full load of fuel aboard and sailed early in the morning for the fishing grounds where she shot four hauls during that day. On the following morning during the first haul, it became obvious to the crew that the net was torn, with the cod end hanging on the dog rope. The remains of the net were hauled as usual whilst the cod end was pulled in using the dog rope over the power block.

Once the nets were aboard, the vessel started making for a small local port to undertake net repairs. The weather was south-westerly to south-south-westerly force 7 and freshening. The crew went forward to the mess while the Skipper remained in the wheelhouse steering the vessel. At the start of the passage, all the engine and gear box gauges indicated that the main engine was working normally but after some 15 minutes, the main engine suddenly stopped without warning. The engine was put into neutral and the Skipper tried to restart the engine. Although the battery was fully charged and the drive engaged, the engine failed to turn. The Skipper and crew therefore put the anchor out using an extended line but the weather was such that it failed to hold. Further attempts were made to re-start the main engine but none were successful. With the vessel slowly closing a rocky lee shore the Coastguard and other vessels in the area were notified and the rescue services tasked.

The Skipper and crew donned life-jackets and assembled aft. Due to the sea state and the proximity of the cliff shore, a decision was made not to use the liferaft. Eventually when the vessel was about 50 metres off the cliffs, the Skipper and crew jumped into the sea. The Skipper and two of the crew made the shore and climbed to the cliff top but the fourth member of the crew was swept parallel to the shore line and lost consciousness due to the cold. At that moment, a Coastguard helicopter appeared and winched this crewman out of the water before picking the rest of the crew off the cliff top. All the crew were taken to hospital for a check up but no injuries were recorded.

The vessel eventually grounded on the rocks and broke up, the remains being in about 10 metres of water.

## Observations

1. The reported circumstances of the engine failure are unusual in that the main engine stopped dead with no reported evidence of slowing down or the sounding of any alarms. Notwithstanding the actual causes of the engine failure, the pressure and/or temperature alarms should have sounded at or prior to the stoppage. It is reasonable therefore to suggest that the main engine alarms could not have been switched on prior to departure from the last port. If they had been, there is the possibility that the conditions leading to the engine failure might have been avoided and the vessel saved.
2. The actual cause of the engine suddenly stopping cannot be stated with certainty. With the gearbox clutch disengaged, the engine should at least have turned over. That it did not suggests that the propeller was not fouled, nor was the gearbox jammed. What it does suggest is that the main engine had seized, although whether from overheating or lack of lubrication cannot be established.

3. The decision of the Skipper and crew not to use the liferaft is unusual but reflected their assessment of the shore, swell and weather conditions prevailing at the time. The cliffs on shore are sheer with deep water until quite close in which, with south to south-westerly force 6 - 7 winds gives rise to a heavy swell and back wash. All the crew wore life-jackets and had prepared for the abandonment of the vessel.

## Comment

This incident illustrates how important it is to carry out a thorough check of the main engine and auxiliary systems prior to putting to sea. Alarm systems are fitted to give warnings of possible malfunction with the aim of preventing accidents such as this - fortunately no lives were lost but the loss of the vessel might well have been prevented had the alarm system been operational.

# 14. GROUNDING OF A 23 METRE FISHING VESSEL

## Narrative

A 23.14 metre twin beam trawler, constructed of steel, was being operated by a crew of four in northern waters around the UK.

Whilst the vessel was on passage to the fishing grounds, both main and auxiliary power were abruptly lost. After changing lubricating and fuel oil filters, and bleeding the fuel supply lines, the main and auxiliary engines were started about one and a half hours after they had first stopped. The vessel then continued its passage to its chosen fishing grounds.

Fishing operations had been under way for several hours when the main and auxiliary engine stopped again. The Skipper and Engineer went to the engine-room to investigate. Both of the other crewmen also made their way to the engine-room. All four men remained in the engine-room for the next one and a half hours changing fuel filters and bleeding fuel lines. Their efforts resulted in the auxiliary engine being started; at the same time noises were heard from the area of the bows. Investigation of these noises established that the vessel had run aground on the rocky coast of an isolated island.

After transmitting a MAYDAY, all four men abandoned the vessel using an inflatable liferaft and were swept ashore from where they were later recovered by helicopter.

## Observations

1. On the second occasion that power was lost all four men went to the engine-room and left the wheelhouse unmanned and made no effort to establish and monitor the position of the vessel before it grounded.
2. Had the vessel's drift towards the lee shore been identified, little direct action could have been taken to prevent the grounding as the stowage arrangements of the anchor required power to move it from its stowed position; none was available. However, a request for assistance could have been made sooner.

## Comment

1. Failure to monitor the vessel's position whilst off a lee shore must be considered a fundamental error in seamanship.
2. Contamination of the common fuel system with water is the most likely cause of the engines' failures.
3. The logic which prompted the Engineer to change the lubricating oil filters on main and auxiliary engines, during his attempts to restart these engines after they first stopped, is unclear.

# 15. FATAL CRUSHING OF FISHERMAN IN POWER BLOCK

## Narrative

A 52 metre purse seiner, operated by a crew of eleven, was in the process of hauling its net on board. The net was being passed through the three powered rollers of a triplex block, thence onto a net chute, over two other power blocks and then into the net bin aft.

The triplex block was mounted over the starboard bulwark and its controls were fitted to the outside of the wheelhouse structure. The distance between the rollers of the triplex block and its controls was about 3 metres. The Mate was in charge of the triplex block and the total operation was under the supervision of the Skipper in the wheelhouse.

The Mate was guiding the last section of the net into the triplex block and was heard to call out "stop the block". Before the hydraulic power supply to the block could be stopped from inside the wheelhouse, the Mate was dragged between the first two rollers of the block and crushed. The bulk of his body, in addition to that of the net, brought the rollers to a halt.

The block's rollers were reversed by other crewmen and the Mate's body fell into the sea. Efforts to recover him failed.

## Observations

1. The block's rollers were allowed to run under power, with the Mate guiding the net onto the rollers but without any person attending the controls of the block. At the time of this accident a fisherman was on the forward deck performing a task which was not essential to the net recovery operation and he could have been employed to stand by the block's controls. Although this spare hand had several years previously been used for this purpose, it had more recently become the practice for him not to do so. It is not clear why this change in operational procedure occurred.
2. The block's controls, and any stop button, were beyond the reach of the Mate when he was in his working position guiding the net into the block. Although the Skipper was standing adjacent to the power shut off push button in the wheelhouse he, naturally, had tasks to occupy his mind in addition to monitoring the activities of the Mate working the triplex block. In the instant between the Skipper hearing the Mate call "stop the block" and his being able to move to the push button the Mate had already been pulled into the block.
3. All persons on this vessel had been supplied with "Crewsaver" inflatable life-jackets. Inexplicably the Mate had elected not to wear his on this occasion and this certainly contributed to the difficulties which were experienced in attempting to recover his body.

## Comment

1. The vessel involved in this accident was observed to be very well equipped, manned by a highly professional and well qualified crew. In particular the crew were noted as having an excellent attitude to safety related matters.
2. Clear and sensible advice is contained in Merchant Shipping Notice No M.1561 on the safe operation of deck machinery and fishing gear. In particular this notice advises fishermen not to leave capstan or winch controls unattended when hauling or shooting gear.
3. It must also be recognised that unless an emergency stop button is within the reach of the person operating the machinery, it may be of little value.

4. If it is essential for crew to manhandle gear which is being controlled by a powered block or winch, it is considered vital that another person is standing by the machine's controls ready to stop it. This second person should have no other duties to distract him.

## 16. THREE CREW MEMBERS WASHED OVERBOARD BY UNEXPECTED WAVE

### Narrative

A 20 metre fishing vessel left port in the early morning bound for fishing grounds 18 miles to the east. The Skipper and three crew members were on board. By late afternoon they had made three hauls. The Skipper decided not to shoot the net for a fourth time but to return to harbour as the tide was about to turn and he wanted to avoid the steep seas that would be caused by the southerly wind against the southerly flowing flood tide.

During the passage back to port the vessel encountered moderate seas and force 5 - 6 wind, and spray was taken frequently over the port quarter. The crew sorted the catch forward and then went to the after deck to mend nets and secure one of the otter boards. When they were about 4 miles from port the vessel was hit by two unexpected high waves. The first washed one of the crew across the after deck. Before the water could be freed off the deck, a second, steeper wave broke over the vessel and the three crew members were washed overboard.

The vessel had been slewed to port by the waves and was then head to wind. The Skipper who was in the wheelhouse and had not seen the accident, noticed one of the nets trailing astern and two men in the water. He was able to manoeuvre the vessel and drifted down towards the men. While he was doing this he alerted the Coastguard and another fishing vessel, which was in the vicinity.

The vessel drifted down to the first man and a lifebuoy was thrown. The man was found to be floating unconscious and although the Skipper tried shouting at the man there was no response. The Skipper realised that he could do nothing for that man at the time and so he turned his attention to the second man who was about 6 metres away. The second man was able to grasp another lifebuoy which was thrown towards him. Then, as the vessel got closer to him, the man was able to hold on to the net which was still trailing astern. The Skipper, using the power block and crane, was able to lift him on board.

The other fishing vessel, rescue helicopters, cargo and warships were involved in a search for the other crew members but they were not found.

Subsequently the bodies of both men were recovered by other fishing vessels in their trawls.

### Observations

1. The vessel encountered two waves of abnormal height for the prevailing conditions. The Skipper had made a prudent decision to return to harbour earlier than was his normal custom in order to avoid such waves. At the time of the accident the predicted tidal stream had just begun to set to the south and therefore seas of the size encountered might not have been expected.
2. The surviving crew member acted sensibly when he found himself in the water in that he tried to remain calm and restrict his motion. He had on plenty of clothing for insulation. He stated that he used the lessons learnt during a sea survival course to improve his chances of survival. After getting back on board he realised that he was suffering from hypothermia and took the appropriate action, stripping off his wet clothes, wrapping himself in a sleeping bag and going to the engine-room for warmth.

## Comment

1. This incident graphically illustrates that sea conditions cannot be predicted with any certainty. It is dangerous to make the assumption that it is safe to work on deck in marginal conditions. Abnormal or freak waves can and do occur. In such conditions only essential tasks should be carried out and then precautions such as the wearing of buoyancy aids and the use of lifelines should be taken.
2. Had the crew members in this case been wearing working buoyancy aids this would have substantially increased their chances of survival.

# 17. DECKHAND FALLS OVERBOARD FROM TRAWLER

## Narrative

The incident happened in the North Sea in May. The weather at the time was fine with a north-westerly wind of about force 3, an air temperature of 13°C and a sea temperature of 8°C. It was daylight and the visibility was good.

The trawler, of 15.63 metres registered length, was on passage towards a port on the east coast of England when the Skipper, who was in the cabin, was called by a crew member and told that a deckhand was missing and had probably fallen overboard. The Skipper raced to the wheelhouse and turned the vessel. The Skipper estimated that the vessel had only travelled 4.5 miles since the deckhand had last been seen on board. He notified the Coastguard and using information from the satellite navigator and video plotter he began to retrace the vessel's track. On arriving back at the position at which the missing deckhand had last been seen and not having found him, the Skipper turned the vessel again and steered to make a second search track parallel to, and slightly to the north, of the one just searched. By this time an RAF rescue helicopter had reached the position and had begun its own search. Soon after starting on their second track the Skipper and crew of the trawler saw the deckhand in the water. The Skipper brought the trawler alongside the man who was thrown a lifebuoy. He was subsequently airlifted to hospital by the helicopter. The deckhand had been in the water for nearly an hour, he was cold but conscious and otherwise uninjured.

## Observations

1. The deckhand had been standing on the gunwale washing the wheelhouse side when, due to the vessel rolling, he overbalanced and fell overboard. He had not been using a safety harness.
2. No-one else was on deck at the time of the incident and no-one else was aware of what the deckhand was doing
3. Since the incident the Skipper has ruled that, on his vessel, nobody is to stand on the gunwale while the vessel is at sea and that nobody should work out on deck unless someone else is aware of what he is doing and is looking out for his safety.

## Comment

1. Safety advice which, had it been heeded, would have avoided this accident is given in the Department of Transport's booklet "Fishermen and Safety". This is available free of charge from any Marine Safety Agency Marine Office.
2. The basic rules of safety, although well known and based on common sense, are sometimes ignored by the over enthusiastic or inexperienced mariner. In this case the deckhand was very fortunate indeed not to lose his life.

# 18. SKIPPER LOSES LEG IN WINCH ACCIDENT

## Narrative

A 10 metre fishing vessel was returning to its mooring on the west coast of Scotland at 1100 hrs having been trawling for shrimps since the early hours of the morning. The Owner/Skipper was operating the vessel on his own. The weather was good with a northerly force 4 wind.

The Skipper allowed the vessel to drift with the tide towards his home port while he end-for-ended the main trawl warp. He was spooling the end-for-ended wire back onto the trawl winch via a roller fairlead on the after "A" frame when a sudden slight lurch, possibly caused by the vessel touching bottom on a sandbank, caused him to lose balance and step into a bight of wire. The Skipper's right leg was caught in the bight causing him to be dragged aft away from the winch control lever.

The Skipper's leg was severed as the wire passed through the roller fairlead at the top of the towing frame some two metres above the deck. At the same time the winch cut-out under overload leaving the Skipper suspended upside down above the deck. The Skipper was able to reach his knife and cut away the clothing that attached him to his severed leg and, after removing his oilskins and the wellington boot from his left leg, he was able to drop to the deck. He hopped to the wheelhouse where he used his mobile phone to request help. An RNLI lifeboat was dispatched to the scene and another fishing vessel also assisted. The injured Skipper was landed ashore from where he was flown to hospital by air ambulance.

## Observations

1. The Skipper was a very experienced fisherman. He was carrying out a task that, while not being in itself a frequent operation, was a straightforward one. He was the only person on board the vessel.
2. The accident occurred because when his leg became caught in a bight of wire the Skipper was unable to reach the control lever to stop the winch.
3. Other contributory factors were:
    - The deck was wet and slippery as the vessel had just completed fishing operations;
    - The Skipper was tired as he had been working for nine or ten hours prior to the accident;
    - The wire was in a generally poor condition making it more difficult to control;
    - The vessel was moving in slight seas caused by the northerly force 4 wind;
    - The vessel probably lurched slightly as it touched bottom on a sandbank.
4. The Skipper acted purposefully and with remarkable calmness after the accident in order to first free himself and then to seek assistance. His stoicism probably prevented the accident resulting in fatal consequences.

## Comment

1. It is clearly stated, in Merchant Shipping Notice No M.1561 that machinery should not be operated alone unless an emergency stop button is within reach of either hand. Further, in the Department of Transport's publication "Fishermen and Safety", fishermen are warned to always be prepared for the ship to roll or lurch unexpectedly. Within these and other publications there are also warnings about maintaining wires and equipment in good condition and being alert to the dangers of fatigue.
2. This was a "text book" accident which could have been avoided had well documented and circulated safety advice been adhered to.