

# OUTCOME OF THE SEVENTEENTH SESSION OF THE SUB-COMMITTEE ON FLAG STATE IMPLEMENTATION

## LESSONS LEARNED FOR PRESENTATION TO SEAFARERS

### 1 CAPSIZING

#### What happened?

The fishing vessel was engaged in trawling about three cables from shore with seas broad on the beam when it was struck by a large breaking wave and capsized. The master, who was alone in the wheelhouse, had noticed the approaching wave was much larger than the others and had begun turning the vessel to port to meet it. The master was thrown into the sea and managed to swim ashore. Two other crew members who were resting below in the accommodation did not survive.

#### Why did it happen?

The master was alone on the bridge engaged in both navigating the vessel and fishing. The vessel was in close proximity to the shore and in an area of shallow waters known for its large breaking waves. Guard rings were set up on the radar to maintain a course along the limit of the zone, but the alarms were not enabled.

#### What can we learn?

- To recognize and take into account the risks associated with the operating conditions of the area to be fished.
- The importance of making full use of navigational equipment alarms.
- The importance of keeping watertight doors closed when at sea.

### 2 CAPSIZING

#### What happened?

The offshore anchor handling tug and supply vessel capsized while attempting to lay one of eight anchors for the drilling rig. Eight of the 14 persons on board lost their lives.

#### Why did it happen?

The anchor handling capabilities of the vessel did not match the physical and environmental challenges of the task on which it was employed and the crew was not sufficiently familiarized with the vessel to recognize its limitations. The plan for the rig move was made on the false expectation that the vessel was capable of retrieving the situation when it drifted off position, rather than having conducted a detailed risk assessment for the move, which should have included calculating the physical forces that could potentially be imparted to the vessels engaged in the operation and each vessel's capability to withstand them.

#### What can we learn?

- Special marine operations must be carefully planned to take account of all identifiable risks, must include contingencies and ensure the operation is appropriately resourced.

- Crews of specialized vessels need to be fully familiarized and practiced with the vessels they are operating.
- Effective communication between all parties involved in multi-vessel operations is critical to a safe outcome.
- The stated design capability of a vessel is not always the same as its actual capability under all circumstances.

### **3 CAPSIZING**

#### **What happened?**

The ship was a whelk fisher. The Skipper had taken over the ship the day before the capsized. They were two men on board, both experienced fishermen, when they sailed for fishing on a summer morning in fine and calm weather.

While they were preparing to lay a line of whelk pots, the vessel suddenly, rapidly and without warning, capsized and sank.

The two fishermen ended up in the water and swam for several hours until one of them, the crew man, drowned. The other one, the skipper, reached the shore after about 10 hours in the water. He survived.

The vessel was subsequently found and salvaged.

#### **Why did it happen?**

The vessel had a low freeboard and water on deck. Through several open bolt holes in the deck, the seawater, unnoticed by the crew, down-flooded into the fish hold and the aft compartment. The fishermen were not warned because there was no bilge alarm fitted to the vessel, and because the bilge pumps were in a poor condition and wrongly wired for automatic operation. Finally the vessel had a low level of inherent stability.

No alarm was raised from the vessel, because it was not equipped with EPIRB.

The vessel was not equipped with a life raft.

The crew did not use lifejackets.

#### **What can we learn?**

When you take over a vessel, you should acquaint yourself with it, its equipment and its weaknesses before you use it.

High freeboard, watertight integrity and a good stability are indispensable safety factors for the work of fishermen.

In case of an accident, well-kept life appliances, life raft and lifejacket can save your life and the lives of your crew members.

### **4 SINKING**

#### **What happened?**

A stern trawler engaged in fishing developed a list after the drag net had snagged. After manoeuvring the vessel so as to disengage the net, the list remained and it was discovered that there was ingress of water in the engine-room space. The four crew members abandoned into two life rafts. The vessel sank shortly afterwards in 100 metres of water.

### **Why did it happen?**

The ingress of water into the engine-room compartment was likely the result of corroded piping that ruptured. There was no remote means to close the intake. At the time the ingress of water was discovered, the quantity of water in the compartment prevented the closing of the sea water intakes. The failure of the audible/visual alarm to indicate the presence of water in the engine-room compartment prevented early detection of the water.

### **What can we learn?**

- The importance of taking measures to ensure the early detection of any ingress of water into the hull.
- Verify that alarms fitted for detecting water ingress are in good working order prior to each departure.
- Installation of a remote means for closing a sea intake valve provides a precautionary measure should the compartment become inaccessible.

## **5 SINKING**

### **What happened?**

While performing a routine maintenance job on a fishing vessel's main sea suction strainers, water entered into the engine-room. This water could enter the engine-room because one valve was not properly closed. This ingress of water could not be stopped, and the vessel partly sank alongside the quay on which it was moored.

### **Why did it happen?**

The engineer who had changed over the valves to carry out the maintenance job had not checked the position of the outboard valve. The open-close indication on the valve could not be seen easily from the location of operation of the valve.

### **What can we learn?**

The importance of checking thoroughly the position of valves, especially in the case of outboard valves, must be stressed. Routine jobs should not slacken the awareness of dangers involved.

## **6 FIRE OR EXPLOSION**

### **What happened?**

A boiler had undergone repairs and during the chemical cleaning process following the repairs, two chemical cleaning specialists were inspecting the inside of the boiler's steam drum when an explosion occurred. One of the specialists later died as a result of his injuries; the other was seriously injured but survived. There was minimal damage to the ship.

### **Why did it happen?**

Hydrogen gas was allowed to accumulate in the steam drum because it had not been adequately vented to the atmosphere during the cleaning process.

The accumulated hydrogen gas mixed with air that was sucked into the boiler steam drum when the door was opened and ignited when a non-intrinsically safe halogen lamp was placed inside the drum.

## **What can we learn?**

- Boiler cleaning is an inherently dangerous process for which an agreed plan that accounts for all identified risks should be followed.
- Product Data or Material Safety Data Sheets for boiler cleaning chemicals should highlight the risk of evolving hydrogen gas during the cleaning process.
- Adequate ventilation is essential when chemical cleaning boilers to prevent the accumulation of harmful and/or explosive gases.
- The atmosphere in enclosed spaces should be tested for explosive mixtures and/or harmful substances before anybody enters or introduces non-intrinsically safe devices into a space.

## **7 FIRE OR EXPLOSION**

### **What happened?**

A fire started in the engine-room adjacent to the oil-fired thermal fluid heater while the vessel was berthed. Ship staff operated the engine-room fixed fire extinguishing system to extinguish the fire but in vain. The fire was finally extinguished by shore fire brigade using high expansion foam. The engine-room and accommodation were significantly damaged by the fire and the vessel had to be towed to Singapore for permanent repairs.

### **Why did it happen?**

A leakage of hot pressurized thermal fluid in the form of a spray, ignited when it came into contact with an unprotected section of the oil-fired thermal fluid heater's exhaust piping. The fire was further fuelled by the contents of other oil tanks, as their quick closing valves were not operated.

### **What can we learn?**

- There were no operations, maintenance or emergency procedures/manuals available on board outlining the hazards associated with the ship's thermal fluid system.
- There was no record of shipboard routine inspection and testing of safety equipment consistent with the ship's safety management system requirements.

## **8 FIRE OR EXPLOSION**

### **What happened?**

A fire started in the engine-room when a leak of diesel fuel occurred from a temporary blanking arrangement on the starboard main engine fuel system. The fuel ignited when it came into contact with hot surfaces of the starboard main engine. The fire was finally extinguished using the ship's fixed fire extinguishing system by crew members and the vessel safely returned to port under her own power.

### **Why did it happen?**

The fitting of a gasket in an open-ended cap to blank off a fuel pipe was ineffective for the task because the discs probably became loose due to the effect of pressure pulses within the fuel pipe.

## **What can we learn?**

The quick decision by the Master and crew members, and the prompt use of the engine-room fixed fire extinguishing system, controlled and extinguished the fire quickly and prevented it from spreading.

The practice of re-opening the fuel quick closing valves after the fire, without first isolating individual fuel circuits, may expose the ship to the risk of another fuel leak and possible re-ignition.

The ship's procedures for re-entry into the engine-room after the operation of the fixed fire extinguishing system did not adequately consider the time required to cool the fire scene and did not provide crew members with adequate guidance about when to safely re-enter the engine-room to prevent potential risk of re-ignition.

## **9 FIRE OR EXPLOSION**

### **What happened?**

While fishing, a fire broke out in the engine-room. The skipper noticed the fire because of its smell. When he opened the door to the engine-room, smoke billowed out. He woke up the crew to inform them and told them to put on their lifejackets. He did not remember whether he had closed the door again. The skipper tried to send a Mayday message by main VHF transmitter on main and emergency power, but this failed. By mobile phone a relative was warned, who in his turn warned the MRSC. Before abandoning the ship, the skipper managed to broadcast a message to the MRSC himself. The message was relayed to a fishing vessel in the vicinity, which later picked up the crew from their life raft.

### **Why did it happen?**

Since the vessel sank in deep waters, the source of fire could not be determined. Since no oil spill was sighted, it is assumed that the oil fed the fire at a certain point. Leaving the door to the engine-room open may have aided the fire to spread.

### **What can we learn?**

It has been declared that (non-compulsory) fire detection was installed in the engine-room, but no alarm was heard. Maintenance of this vital equipment, as well as the GMDSS installation is of utmost importance.

The crew did not make any attempt to fight the fire, although fire-fighting appliances were available. The investigation has revealed that no fire or abandon ship drills were held for a considerable time. This had a major influence on how the crew responded to both fire and abandon ship situations.

## **10 COLLISION**

### **What happened?**

A trawler suffered a mechanical failure and the master requested a tow. While setting up the tow arrangement in winds of force 8-9 on the Beaufort scale and seas of 8-9 metres, the vessel providing assistance and the disabled trawler collided. A crew member on the assisting vessel was crushed to death between the bulwark and the side of the wheelhouse.

## **Why did it happen?**

- The assisting vessel was upwind from the trawler when two successive waves caused the vessels to collide with each other. The crew member handling the towline on board the assisting vessel was unable to move quickly out of the way before the collision. A line throwing apparatus was available on board both vessels, but was not used.

## **What can we learn?**

- Rendering assistance in adverse weather can be a high-risk situation, requiring sound preparation and rigorous execution.
- Appliances and methods, such as line throwing apparatuses and drift buoys, can be used to reduce the risk of collisions and contacts between vessels setting up towing arrangements in adverse weather.

## **11 NEAR COLLISION CLOSE-QUARTERS BETWEEN A TANKER AND A FISHING VESSEL**

### **What happened?**

A: The first round of close-quarters between the tanker and a passenger ship.

At 2020 hours a tanker was proceeding northwards through Cook Strait. A fishing vessel was engaged in trawling in the strait while her heading was 130° (true) at a speed of 3.5 knots. The fishing vessel attempted to attract the attention of the tanker by VHF and flashing light since her ARPA showed a CPA of 0.3 miles. The attempt resulted in failure and therefore the fishing vessel commenced hauling her net, which reduced her speed to 1 knot. Consequently the tanker passed ahead of the fishing vessel with a CPA of 0.4 miles.

B: The second round of close-quarters between the tanker and a passenger ship.

After the first round of close-quarters the tanker was still proceeding northwards through the strait. A passenger ship was proceeding northwest through the strait at a speed of 19.1 knots. The passenger ship called the tanker on VHF to advise of a CPA of 0.3 miles and to request intentions when the distance between the two ships was about 2.9 miles. The tanker replied that she would alter course. But she did not alter course. Three minutes later, when the distance between the two ships was about 2.1 miles, ARPA of the passenger ship indicated a CPA of 0.1 miles in 7.9 minutes. The passenger ship called the tanker again to advise of the CPA and request intentions of the tanker, which replied that she would alter course to port (across the bow of the passenger ship). Actually she altered course 26 degrees to port, which did not significantly increase the distance of the CPA and therefore the passenger ship stopped both her engines. Consequently the tanker passed ahead of the passenger ship with a CPA of 0.9 miles.

### **Why did it happen?**

A: The first round of close-quarters between the tanker and the fishing vessel occurred because the OOW of the tanker failed to comply with COLREG Rule 8 (action to avoid a collision) and Rule 18 (a) (a power-driven vessel shall keep out of the way of a vessel engaged in fishing) due to the following reasons:

- A-1: The master of the tanker was not on the bridge while proceeding in Cook Strait, a narrow channel, where the vessel was likely to encounter significant other traffic including fishing vessels and a crossing passenger ship.
- A-2: Although there was another watchman (lookout) on the bridge, the OOW of the tanker did not seem to have noticed the VHF radio call and flashing light by the fishing vessel that had a significant concern about a CPA with the tanker.
- B: The second round of close-quarters between the tanker and the passenger ship occurred because the OOW of the tanker failed to comply with COLREG Rule 8 (action to avoid a collision) and Rule 15 (action by give-way vessel) although he understood that his ship was a give-way vessel and he could reduce speed or take a turn out of the vessel due to the following reasons:
- B-1: The master of the tanker was not on the bridge while proceeding in Cook Strait, a narrow channel, where the vessel was likely to encounter significant other traffic including fishing vessels and a crossing passenger ship. (As the second officer had made a large notation on the chart, the area was a “Ferry cruising area”.)
- B-2: Although the experience of the OOW of the tanker was not stated in this incident report, considering the description indicating that it was the first time for the master to visit New Zealand, the OOW seemed unfamiliar with Cook Strait.
- B-3: The OOW of the tanker did not notify the master of the close-quarters situation with the passenger ship in Cook Strait.
- B-4: The OOW of the tanker misunderstood the voluntary code on chart NZ46 stating “vessels laden with oil in bulk are to keep at least five miles off the land” and he was preoccupied with it when he was requested to alter course to starboard (toward the land) by the passenger ship.
- B-5: It was difficult for the OOW of the tanker to identify the navigational lights of the passenger ship from a safe distance due to the bright line of deck lights of the passenger ship that merged with the bright shore lights that camouflaged the sidelight of the vessel.
- B-6: The OOW of the tanker did not carry out a trial manoeuvre on the ARPA to ascertain if his action of altering course 26 degrees to port would be effective, although he appeared to be able to demonstrate his ability to use the ARPA.

### **What can we learn?**

- 1) The master of the tanker proceeding in the narrow channel should have been on the bridge and in command of the ship, as a good practice of seamen because there was a need for extra vigilance while proceeding in the narrow channel.
- 2) The OOW of the tanker should have notified the master of the close-quarters situation with the passenger ship in Cook Strait.
- 3) The vessel, even though she was proceeding in a narrow channel, should have taken action to avoid a close-quarters situation positively in ample time if she was a give-way vessel.
- 4) The voluntary code on chart NZ46 stating “vessels laden with oil in bulk are to keep at least five miles off the land” should have been understood properly by the deck officers

(including the master) of the give-way vessel proceeding in Cook Strait, in order to prevent needless confusion which might preoccupy the mind of the OOW of the tanker who would alter course toward the land to avoid a close-quarters situation with the stand-on vessel.

- 5) The OOW of the tanker, who replied that he would alter course by VHF radio to the stand-on vessel, should have altered course positively in ample time (or should have stopped engine) to avoid a close-quarters situation with the stand-on vessel in order not to give anxiety to it.
- 6) The OOW of the tanker should have carried out a trial manoeuvre on the ARPA to ascertain if his action of altering course 26 degrees to port would be effective.
- 7) On a positive note, both the fishing vessel and the passenger ship took measures to avoid a close-quarters situation with the tanker in accordance with the COLREGs.
- 8) It seemed admirable that the OOW of the passenger ship called the tanker to clarify the intentions twice and notified the master when doubt still existed and finally took the necessary action (to slow down) in order to avoid a close-quarters situation before the master arrived at the bridge.

## **12 OTHER (major LPG leak during cargo sampling)**

### **What happened?**

While taking a sample of the loaded LPG cargo, the sample valve assembly suddenly came off, causing a leakage that turned out to be about 66 tonnes of LPG. Only after 29 hours a specialized company managed to close the leak.

### **Why did it happen?**

The chief officer, who was still busy securing the first sampled tank, did not accompany the cargo surveyor. The cargo surveyor thought that there were two safety valves separating the cargo from the sample device. When he accidentally loosened the sample valve assembly, it fell off. Due to the fact that there was an open connection between the cargo and sample device, LPG started leaking away. Because of the pressure and ice formation he was not able to put the assembly back. The ESD valve, which should stop the flow of gas was then activated but did not fully close.

### **What can we learn?**

Thorough knowledge of the working of safety devices is important. The particular ESD valves used on board do not positively indicate the position of the valve. After activation, the valve will indicate “closed”, although in fact the valve is jammed still in open position. The valves were only tested visually, no pressure tests were performed.

The briefing and supervision of the cargo surveyor did not provide an adequate means for ensuring cargo sampling could take place safely.

## **13 GROUNDING**

### **What happened?**

A big partly laden oil tanker was approaching a ship channel. She had a draught of 11.5 metres. The Pilot boarded directly on arrival for the transit from sea to the port anchorage area.

During passage, there was a swell which caused the ship to roll about 5 degrees. There also was a strong southerly tidal flow (5-6 knots). To counterbalance the southerly drift and to keep the ship out of the main body of tidal flow as much as possible, the pilot planned the ship to stay west of the main channel. But the ship was more to west than planned. As the draft increased about 1.35 metres due to squat effect and a further 1.8 metres due to rolling, the maximum instantaneous draft during the passage from ship channel increased to about 14.65 metres. This would not have caused any grounding if the ship had stayed in the main channel. But as the ship was about 100 metres more to west than the planned track, the depth was not sufficient and the ship touched the bottom several times, which was not noticed by anyone during the passage.

The crew noticed seawater in the forepeak tank after anchoring in the port roads. Further investigation revealed a hole in the forepeak ballast tank and several indents in various parts of the flat bottom. Temporary repairs were carried out in the port and permanent repairs were done later in dry-dock.

### **Why did it happen?**

The pilot made a handling error which was not noticed and corrected by the bridge team. Moreover, the increase of draft due to squat effect and rolling of the ship was not noticed and duly taken into consideration by the master or the pilot.

The planned track was to the west of the channel to counterbalance the drift by tidal flow. But the ship transited the channel about 100 metres more to the west than planned. This was not noticed or corrected by the bridge team. Bridge resource management (BRM) principles were not properly applied by master or pilot.

Although the echo sounder was in operation, it was not properly monitored by the bridge team.

### **What can we learn?**

The presence of a pilot does not relieve the officer on watch and the bridge crew from their responsibility for safe sailing of the ship. Pilots are advisors to masters and they act as ship handlers during manoeuvres. They have the local knowledge of tides, currents, local conditions, channels, etc. In this case, the pilot made a handling error which was not noticed and corrected by the bridge team. The decisions whether to pilot the ship, or not, or how to pilot it, was left entirely in the hands of the pilot. The bridge team was relying entirely on the pilot's training, experience and judgment. There was only one barrier (the pilot) between the accident and safety. If the pilot had made a slightly bigger error that day, the result could have been more serious.

The human resources on the bridge can be effectively organized if Bridge Resource Management (BRM) principles are applied properly. All human beings are subject to errors. One-man errors may turn into chain errors and lead to accidents if proper and effective corrective measures are not taken. BRM, if effectively implemented, is a useful tool to discover and correct single person errors. If a proper master-pilot exchange, under keel clearance calculation and bridge team briefing had been carried out, the accident could have been avoided. The OOW was monitoring the passage, but did not know when to interact with the pilot. The bridge team was not aware that the ship was more to the west of the passage than planned.

If they had been fully briefed, and fully understood the pilot's plan for the passage, they would have been in a better position to assist him.

Owners, managers and crew of ships should apply the BRM principles properly and interact with the pilots effectively.

Echo sounders, if used and monitored properly, may indicate the approach of dangerous situations.

## **14 FATALITY INVOLVING LIFEBOAT AS TENDER**

### **What happened?**

A passenger vessel was preparing to depart from a port anchorage area. As it was too big to berth alongside, it was an established practice to transport passengers to and from the shore by the ship's lifeboats operating as passenger tenders. Passengers were on board when the passenger tenders were being recovered.

When one of the passenger tenders was being positioned on the ship's side to be lifted up, the coxswain was unable to bring the tender to exact position under the falls, partly due to the effect of 1.5 knot tidal current and partly due to "slack" in the tender's steering system. The tender lost position and headed towards the ship's side. The falls were positioned too low and the blocks presented a danger to damage the coach house windows. The AB seaman, realizing the danger, left his position aft and moved to the side of the tender to guide the aft block clear. But the tender was moving towards the ship and while the AB seaman was between the coach house and the ship's side, tender set hard onto the side of the ship. The AB was trapped in between and sustained severe crush injuries to his chest. He staggered a few steps before he collapsed in the passenger area of the tender.

The tender was then brought alongside the platform and the ship's doctor was notified. The AB seaman was sent to shore with the tender and transferred to a nearby hospital. Efforts to resuscitate him were not successful and he was pronounced dead at the hospital.

### **Why did it happen?**

The major reason for this accident is the improper adherence to rules and instructions. If the tender crew had had sufficient training in compliance with existing rules, the accident would most likely not have happened.

The training manual states that the tender should be manned by five crew members during recovery. In this case, there were only three crew members in the tender.

There was a small oil leak in the tender's steering system. Although crew topped the oil intermittently, they did not carry out a proper repair and the steering was still sluggish, which influenced the response of the craft. Moreover, the coxswain did not take the prevailing 1.5 knot tidal current into consideration during the handling and was not able to bring the tender to the correct position under the falls. The ship's officers were supposed to supervise the recovery of the tender and give instructions as necessary, but this was not carried out properly.

Although the training manual states that the davit blocks should be raised about 3 metres during approach for recovery, they were hanging close to the water. If the blocks had been raised clear off the water, there would have been no reason for the crew member to leave his position at the aft of the tender and place himself in the dangerous area.

Communications between tender and ship (and amongst tender crew) was poor during the recovery. Ships officers or responsible crew did not notify the tender's coxswain about the tidal current. The crew member in the aft left his position without notifying the coxswain. The coxswain attempted to approach to recovery position although he saw the falls and blocks

were hanging close to the water surface without communicating with the ship to make them raise the blocks.

### **What can we learn?**

- The Safety Management System, training manuals and other safety-related instructions are made to enhance safety in various operations. All involved officers and crew should be properly familiarized and trained prior to undertaking shipboard operations. All requirements should be properly implemented and complied with.
- All maintenance and repair works should be properly reported and duly performed. Temporary repairs are not good solutions.
- If there are missing, contradicting or confusing instructions in the ship's various manuals, they should be raised in the safety management meetings or reviews for correction and clarification.
- Safety consciousness is important. Think before acting.

## **15 FATALITY DURING INSTALLATION AND RECOVERY OF GANGWAY**

### **What happened?**

Two accidents have been reported involving installation and recovery of a gangway, where in one case the seaman was killed and in the other case the seaman was seriously injured.

Accident one: Two crew members started to set up the handrails on the already lowered gangway while standing on the gangway. The boatswain standing at the top of the gangway lost his balance and fell onto the quay at a height of approximately five metres. From the quay he rolled into the water and sank. He could not be recovered alive.

Accident two: When the ship was preparing to leave port, five seamen started to manhandle the gangway on board. The cook, who came on deck to do his mooring duties, went over to assist five other crew members to tip the gangway over the main deck rails and rotate it into its stowing position. During this operation, the cook fell six metres from the rails into the empty hold. He sustained serious injuries.

### **Why did it happen?**

The immediate cause of the accidents relates to insufficient safety precautions to prevent personnel from falling. In the first case, fall-arrest equipment and floating devices were not used.

In the second case, the passage between the railings guarding the cargo hold, and those guarding the inboard side of the ladder system was only 0.7 metres because of pipes taking up most of the passage. During the work, the cook was partly standing on the pipes to assist guiding the gangway stowage.

In both cases, no risk assessment had been done to identify risks and risk-reducing measures.

Operation procedures and training of personnel were insufficient in both accidents.

The installation of handrails in the first case should have been done prior to the gangway being lowered in accordance with the manufacturer's operation instructions.

### **What can we learn?**

Manufacturer's operation manuals on equipment must be included in the ship's ISM system and training programmes.

Risk assessments should be carried out for both standard and special operations on board ships. Conclusions from the assessments should be included as a part of any training programme on board.

Proper safety equipment must be used when working at height and above/close to the sea.

## **16 SIDE SHELL FAILURE**

### **What happened?**

Following a period of adverse weather while on a voyage, the crew of this cape-size bulker discovered from manual bilge soundings that the water level in the No.1 bilge hold was increasing. Subsequent internal inspection revealed severe damage to both port and starboard shell frames and a crack in the side-shell plating. Fortunately, the vessel was able to make temporary repairs before completing the voyage. Had no port of refuge been available, the consequences may have been catastrophic.

### **Why did it happen?**

Earlier in the voyage, the water ingress alarms had been switched off because they were permanently on alarm. This was attributed by the crew to be due to the high moisture content of the loaded cargo.

### **What can we learn?**

The dismissal of water ingress alarms without further immediate investigation should be avoided. Making assumptions may prove fatal.

## **17 ENGINE-ROOM FIRE**

### **What happened?**

A fire in the diesel generator room damaged the electrical control cables and resulted in the loss of electrical power and main propulsion. The emergency generator started automatically. A watchkeeper attempted to extinguish the fire with a hand-held dry powder extinguisher, but was driven back by dense black smoke. The fire was eventually extinguished by a fire-fighting party wearing firemen's suits and breathing apparatus. When the fire had been extinguished, propulsion power was re-established from one of the vessel's four main engines which also provided electrical power from one of two shaft-driven generators. Temporary repairs to the cabling in the generator room permitted the start-up of one diesel generator.

### **Why did it happen?**

The fire was believed to have started by the escape of hot exhaust gases from an air start valve on one of the generators, since the rocker cover was found lifted off its seat and the air start valve was found to have a broken stud and the securing flange had lifted about 10mm. It was suggested that the hot gases ignited vaporized lubricating oil inside the cover sufficient to lift the cover, from where the fire spread to the deckhead located about 1.5 m above. An ignition test of the

deckhead insulation caused it to burn and emit black smoke. This could possibly have been due to the absorption of oil vapour over a period of time since the deckhead surface was irregular and may have presented cleaning difficulties.

### **What can we learn?**

1 When removing cylinder head valves for maintenance, the opportunity should be taken to examine fasteners for signs of fatigue. Fasteners should be tightened to the torque specified by the manufacturer – at the same time checking that nuts run freely on their threads.

2 Deckheads – especially those in low-headroom machinery spaces – should be examined periodically for accumulation of combustible deposits and cleaned appropriately.

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