

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

### **LESSONS LEARNED FOR PRESENTATION TO SEAFARERS**

#### **1 HAZARDOUS CARGO FIRE AND DEATH OF A SEAFARER**

##### **What happened?**

A container holding calcium hypochlorite, which was not declared by the shippers as dangerous cargo, was loaded in the bottom of a hold close to a fuel tank. Two weeks later at about 07:55 hours, whilst the vessel was at anchor, an explosion occurred and large “fire balls” were observed coming from the hold. The hold was just aft of the crew mess where most of the crew were having breakfast.

Because there was no obvious escape route, the crew’s escape from the mess-room was confused. Consequently, some of the crew escaped through mess room port holes and onto the outside deck.

During the subsequent muster, a non-swimmer member of the crew was found to be missing. He was presumed to have jumped or have been blown overboard as he tried to escape out of the accommodation using an aft facing door. When confronted by the fire, he probably jumped overboard and drowned.

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

- 1 The container filled with calcium hypochlorite, which is prone to instability, was stowed below deck.
- 2 This container should have been stowed above deck, shaded from direct sunlight and stowed away from sources of heat.
- 3 At temperatures above 35 degrees Celsius, the calcium hypochlorite may have caused the explosion and fire.

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

Accommodation and service spaces should have clearly marked escape routes. Crew should be fully aware of the means of escape from spaces on board. Also, it is advisable that all seafarers should know how to swim.

#### **2 HAZARDOUS CARGO FIRE IN CONTAINER**

##### **What happened?**

A container vessel was discharging containers when a hold smoke detector alarm sounded. White smoke was seen and there was a persistent smell of suffocating gas. Information on the contents of the containers in the hold was not available. Thermal imaging in the direction of a container suspected of containing dangerous goods indicated temperatures of 40 to 45 degrees Celsius.

Due to the presence of sulphur dioxide, all cargo work was stopped and the crew was sent ashore. The suspect container was removed ashore and five persons were hospitalized.

## **Why did it happen?**

1 The contained thiourea dioxide (UN number 3341, IMDG Class 4.2) was stowed below deck in non-compliance with the IMDG Code.

2 This substance can decompose at temperatures below 50 degrees Celsius with the consequential generation of sulphur dioxide, ammonia, carbon monoxide and carbon dioxide gases.

3 Furthermore, the suspect container was in a hold adjacent to the machinery space, thus increasing the danger to personnel.

4 The vessel had been loaded using a computer program and the master was unaware of the hold's contents until after the vessel sailed from the loading port.

## **What can we learn?**

A manual check should be made on the location of all containers containing dangerous goods. Total reliance should not be placed on computer programs. Further, masters should be provided with, and if necessary should request, full information on the contents of each hold at the time of loading.

## **3 MACHINERY SPACE FIRE AND SERIOUS BURNS TO THE MASTER**

### **What happened?**

A fire broke out in the engine-room of a fishing vessel and spread to the wheelhouse causing severe damage to the installations and serious burns to the master.

The master had noticed that a high pressure line from the lubricating oil filter to the super-charger was leaking. He had tried to tighten the screw connection when it broke off and fire broke out immediately. All the master could do was to leave the space to save himself and jump overboard to extinguish the flames on his body. The deckhand threw the master a lifebuoy and pulled him back on deck and arranged medical assistance for the 50% of body area burns.

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

1 The high pressure lubricating oil sprayed onto the nearby exhaust gas turbo charger.

2 It was evident that the oil ignited as it infiltrated beneath the insulation at the joint between the exhaust gas turbo charger and exhaust gas line which was heated up to 600 degrees Celsius.

3 The spontaneous ignition temperature of the oil was later tested and found to be 580 degrees Celsius.

4 The entrance cover between the wheelhouse and engine-room had been opened up for the inspection and the hot and partly burning gas thus spread from the machinery space to the wheelhouse and thence to the mess/galley causing major damage.

## **What can we learn?**

No attempt should be made to tighten connections when the contents of the system are under pressure. The area requiring maintenance should be isolated from other pressurized systems and thorough checks made to ensure that no pressure is present.

When using a spanner to tighten connections, both sides of the connection should be supported such that only a rotation of the spanner side of the connection is produced.

## **4 TANKER EXPLOSION DURING TANK CLEANING**

### **What happened?**

While en route to port to load cargo, two crew members began cleaning the cargo holds of an oil tanker. The tanker had just discharged its cargo of unleaded gasoline. A loud whistling noise was heard immediately before the three instantaneous explosions and fire. The deck between the aft superstructure and the midship cargo manifold was completely destroyed. The crew member who was at the tanks being cleaned was killed. The other crew member at the midship cargo manifold was unharmed.

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

- 1 The explosion was the result of ignition of the accumulated gasoline vapours in the tanks.
- 2 While it is possible that the source of ignition may have been the result of a malfunction of a cargo pump causing an increase in temperature, it is more likely that it was the result of a build-up of electrostatic charges caused by the cargo pump or washing nozzle.

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

Precautions should be taken to minimize or eliminate the generation of static electricity during cargo operations and tank washings. Further, cargo tank atmospheric testing should be carried out prior to performing tank cleaning operations and cargo tanks gas freed and monitored.

## **5 FIRE IN THE ENGINE-ROOM OF A FISHING BOAT**

### **What happened?**

A fire broke out in the engine-room of a multi-purpose trawler. There was no time to attack the fire as the wheelhouse and accommodation rapidly filled with dense smoke. Crew members abandoned the vessel. The area behind the electrical distribution panel was completely destroyed, and there was smoke damage in the engine-room, accommodation area and the wheelhouse.

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

- 1 The engine-room fire was probably caused by an electrical defect, which ignited cable insulation, the wooden after bulkhead and the main electrical distribution panel.
- 2 The fire was quickly out of control as the access to the engine-room water sprinkler system was completely blocked by the large number of creels stowed on deck in the vicinity of the wheelhouse.

3 The sprinkler system was badly maintained and inoperable.

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

Fishing equipment should be stowed so as not to restrict access to fire fighting equipment.

It is important for fishing vessel skippers to have appropriate safety training.

Smoke detection system equipment is more effective than heat detection systems for an unmanned machinery space to achieve an early detection of fire before the build up of smoke makes entry into the engine-room impossible.

### **6 OXY-ACETYLENE EXPLOSION**

#### **What happened?**

There was an explosion in the welding area of the engine-room workshop. An engine fitter who was carrying out welding work was killed by broken pieces of a gas welding equipment cabinet, which had disintegrated as a result of a gas explosion.

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

1 There had been an escape of acetylene gas from the acetylene supply line (pipe length, pressure gauges, shut off valve, pressure regulators) in the cabinet or in the pipe union fittings.

2 A spark or welding spatter ignited the explosive mixture of air and acetylene trapped in the cabinet.

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

Prior approval should be obtained from the manufacturers before modifications are made to gas welding installations. Modifications that are undertaken should be carried out by experienced workers.

In case of leaks cabinets of gas welding facilities should be ventilated sufficiently to prevent the formation of explosive gas concentrations within the cabinets. Maintenance record should be provided for gas welding installations.

### **7 FISH FACTORY VESSEL FIRE**

#### **What happened?**

The fish factory vessel caught fire in No.2 Deck (processing area) and spread quickly to the rest of upper decks, and to the accommodation. The fire was out of control and crew members abandoned the vessel. The vessel continued to burn for 5 days before being towed and berthed in port. The local fire brigade put out the fire.

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

1 Combustible packing materials were not properly stored and were ignited by careless disposal of smoking materials by stevedores or crew members.

## **What can we learn?**

It is important to ensure that all personnel onboard fish factory vessels, i.e. stevedores or crew members, are properly trained to strengthen their safety culture and to deal with emergency situations. A “no smoking policy” around processing areas or other high fire risk areas should be strictly enforced. Crew fatigue can reduce safety vigilance.

## **8 MISSING FUEL OIL VENTILATION PLUG RESULTS IN A FIRE**

### **What happened?**

Two engine-room fires happened onboard the fishing vessel in less than 3 months. The first engine-room fire was caused by leakage of fuel oil from a ventilation hole on a main fuel filter whose ventilation plug was missing. The fuel oil ignited as it came into contact with hot exhaust manifold. The skipper operated the CO<sub>2</sub> system. However, he did not know whether or not the gas had been released into the engine-room because he did not fully understand how the CO<sub>2</sub> system worked, and because the system was poorly maintained. The skipper and the engineer entered the engine-room, without considering the dangers that the presence of CO<sub>2</sub> in the space might hold. Fortunately, the fire was put out by crew members, although the engine-room was extensively smoke and heat damaged. The cause for the second engine-room fire could not be established because evidence was lost when the vessel sank.

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

1 The ventilation plug on the after duplex fuel oil filter probably became loosened by the continued impact of the brass connection of a refrigerant charging hose. The hose was suspended above the plug, and swung freely under the influence of the rough sea conditions.

2 Once the ventilation plug became loose, further impact by the charging hose combined with engine vibration, caused the plug to finally come away from the filter top.

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

Standing instructions should be provided for watch-keepers who have to visit the engine-room or to monitor the space. Fishermen should be properly trained on the maintenance of the CO<sub>2</sub> system, its operation, and personal safety issues following the use of CO<sub>2</sub>.

Also in unmanned machinery spaces, smoke detection systems can be more effective than heat detection systems for early detection of fire, and before the build up of smoke makes entry into the engine-room impossible.

## **9 MACHINERY DAMAGE ENDANGERING THE PASSENGER VESSEL**

### **What happened?**

A four-engine twin-screw passenger vessel left port with all four engines running but lost propulsion power some thirty minutes later and drifted dangerously close to land.

The engines stopped because of loss of water in the main engine cooling system and consequent over heating. There was considerable delay in restarting the main engines because of loss of air pressure from the air start system. The air compressor had to be shut down as the engineers prepared to restore propulsion power.

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

1 Two separate cooling systems serviced the four main engines, one system for the two port main engines and one for the starboard main engines. The arrangement provided some degree of redundancy, so that the two main engines would still be available should one cooling system fail. However, all four main engines stopped because a cross over valve connecting the two cooling systems had been left open, causing loss of water in both systems.

2 Delay in restarting the main engines occurred because of loss of air pressure in the air start system due air leaks in the system, and failure of the engineers to start the air compressor in good time.

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

1 A machinery pre-sailing checklist should be developed for every vessel.

2 Regular checks should be made of all running and standby plants for abnormal running conditions and failure of critical parts. Relieving engineers must be informed of the operating status of all machinery including any adjustments or alterations made during the course of the previous watch and these should be recorded.

3 Marine engineers are advised to pay particular attention to start air pressure systems with regard to efficiency of the compressors and identification of leaks. An accumulation of small leaks can rapidly deplete the charge in an air receiver.

4 Air pressure systems should be regarded as critical systems and instructions placed on board which identify the consequences of failure and the action necessary to restore the system.

5 Marine engineers should be fully aware of the operational status of all machinery under their control and not delay in bringing standby systems into operation.

6 Marine engineers should identify and highlight the minimum starting air pressure required for each of the engines under their control to avoid false or wasted starts.

7 On multi-engine installations, it is advisable to maintain the independence of each separate system as far as possible so that any defect that develops in a system will not prevent continued operation in the other system.

## **10 MANUAL MOVEMENT OF A BULKHEAD**

### **What happened?**

The chief mate and one able seaman prepared to jack up a portable cargo hold bulkhead in preparation to shift it. When the bulkhead was just clear of the bottom of the hold, it began to tilt forwards and fall over. The chief mate and the able seaman were trapped under it. Air bags were used by shore emergency services to lift the bulkhead, enabling the casualties to be removed. The able seaman was pronounced dead on arrival at the hospital. The chief officer survived the accident but suffered crush injuries to his chest.

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

1 The chief mate had never been involved in shifting the bulkhead before.

- 2 No-one checked whether or not the bulkhead's top main securing bolts were in the engaged position.
- 3 Owner's and manufacturer's bulkhead operating instructions were ambiguous and did not accurately reflect the bulkhead arrangements fitted on board.
- 4 Planning of the operation was incomplete and its management was disjointed.
- 5 The risk assessment carried out on board was unrealistic and short-sighted.

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

It has to be appreciated that moving a portable bulkhead is a dangerous operation on board and requires a thorough risk assessment. Such an operation should also be authorized following the principles of a 'permit-to-work', thus ensuring adequate planning and execution. Crew members who are not familiar with operating instructions and/or have not received the necessary training should not get involved in an operation such as this unless supervised by trained and experienced crew members.

## **11 FATAL ACCIDENT IN AN ENCLOSED SPACE**

### **What happened?**

During a loaded voyage on board a bulk carrier, the chief mate and a deck cadet went inside one of the vessel's bilge space enclosures to repair a sounding pipe. To gain access to the enclosure, the two crew members had to walk inside the duct keel and then through a steel hatch, which opened upwards inside the transverse bulkhead lower stool. Once inside the lower stool space, a manhole cover had to be removed to crawl inside the bilge space enclosure. The crew members started working on the sounding pipe but about an hour later, a second cadet found them unconscious inside the enclosure. The alarm was raised and the two crew members were pulled out to the main deck. First aid was administered, however, they were both proclaimed dead later that evening.

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

- 1 The bilge space enclosure had been closed for a considerable period and the atmosphere inside the space was non-life supporting.
- 2 Prior to entry, the atmosphere inside the bilge space enclosure inside the bilge space enclosure was not tested as required by the company's safety management system.
- 3 A Permit-to-Work was not issued before access was made inside the enclosed space, as required by the procedures laid down in the safety management system manual.
- 4 The Master was not aware of the work in progress.
- 5 The chief mate involved failed to appreciate a life-threatening situation inside the bilge space enclosure.
- 6 Evidence indicates circumventing of safety norms and procedures.
- 7 The chief mate was likely to have consumed more alcohol than the limit stipulated in the company's safety management system.

## **What can we learn?**

Crew members cannot afford a passive attitude, especially when it comes to the implementation of the safety management system. Rather, they should be fully alert and aware of the potential hazards on board their ships. A permit-to-work system should be an undisputed means of enforcing correct safety procedures.

Small quantities of alcohol can impair safe behaviour, compromising safety of the ship, crew, cargo and environment.

## **12 PIER SIDE BOLLARD FAILURE**

### **What happened?**

A small passenger vessel was in the process of berthing at a pier in a river. As the vessel came alongside the mate placed the eye of a mooring line around a bollard attached to the pier. He then secured the other end of the line to a bollard fixed to the deck. The master then applied some power ahead on the engines to bring the vessel alongside. At this point the vessel's bollard failed where it was attached to the deck and the heavy steel bollard was catapulted over a guard fence at the front of the pier. The flying bollard struck the head of a passenger standing on the pier causing fatal injuries.

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

- 1 The original mooring bollards fitted to the vessel were not placed in appropriate positions.
- 2 The bollard arrangement had failed on a number of occasions prior to the incident and had undergone several unapproved modifications.
- 3 The bollard assembly had failed about three weeks prior to the incident and was unsatisfactorily repaired using a relatively low strength weld.
- 4 The weld repair failed at the time of the incident and the bollard assembly was thrown through the air by the tension in the mooring line.

## **What can we learn?**

The condition of mooring equipment should be carefully monitored as it is often under high load during mooring operations. Repairs and modifications to mooring equipment should be carefully carried out to ensure that the strength of the equipment is maintained.

## **13 A SEAMAN KILLED BY A MOORING LINE**

### **What happened?**

A seaman was killed by a wire mooring line while a ship was in the process of berthing. The wire had been led from a mooring winch through a snatch block attached to a U-shaped rope guide on a set of mooring bitts during an unusual mooring operation. While the ship was berthing the seaman was told to go to the starboard winch to relay some instructions to the operator. As he was walking through the bight in the mooring wire, formed by the snatch block, weight came on the wire and the U-shaped rope guide failed. The seaman was caught by the flying wire and sustained fatal injuries.

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

- 1 The U-shaped rope guide should not have been used to attach the snatch block as it was not strong enough.
- 2 The mooring operation was unusual and untested and should have been approached with considerable caution.
- 3 Communication was poor between the mate supervising the operation and the seaman operating the starboard winch since they could not see each other, they did not speak the same language and they did not have radios.
- 4 The poor communication meant that the seaman, who was killed, had to move through an area of danger and the bight of the loaded wire mooring line, to pass instructions between the men.

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

Mooring operations should be carefully planned and carried out. All load-bearing mooring equipment should be fit for purpose and periodically tested. Moving through, or working within, the bight of a loaded wire or cable is very dangerous and should be avoided.

## **14 A BROKEN LEG SUSTAINED DURING A BERTHING OPERATION**

### **What happened?**

A ship was in the process of berthing in a relatively strong wind and tide. The master on the bridge was using the main engine, rudder and bow thrusters to hold the vessel alongside while the mooring lines were passed ashore by the forward and after mooring parties. The forecandle party, led by the boatswain, had run a line from each of the port and starboard mooring winches before being made fast ashore. Tension came on the forward mooring lines suddenly which caused one line to part where it was led around a roller fairlead. The section of the line between the fairlead and the winch drum snapped back and fractured the boatswain's right leg in two places.

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

- 1 The mooring rope which parted was in a poor condition.
- 2 The maintenance of the ship's mooring lines was inadequate.
- 3 The boatswain was standing in an unsafe position in the 'snap-back' zone of the mooring line.

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

Mooring operations carry risks due to the loads placed on lines and equipment. Mooring lines must be regularly inspected and carefully maintained. Working within the 'snap-back' zone of a loaded mooring line can be dangerous and should be avoided.

## **15 FAILURE OF ROLLER FAIRLEADS**

### **What happened?**

A ship was in the process of berthing at its usual berth when a set of roller fairleads on the forecastle failed. One of the rollers fell from the ship striking and killing a linesman ashore. The ship, equipped only with open roller fairleads, had been using an unusual mooring arrangement because its low freeboard meant that at times the wharf was higher than the ship's main deck. The arrangement included a mooring line led around two roller fairleads in the form of a tight 'S'. While the ship was coming alongside, weight came on the mooring line and overloaded the fairlead rollers forming the 'S', which caused the spindles on both rollers to shear.

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

- 1 The vessel's open fairlead rollers were not adequate for mooring the vessel alongside wharves where the main deck was lower than the wharf.
- 2 Running the mooring line around the fairlead rollers in a tight 'S' meant that the rollers were being regularly overloaded.
- 3 A fairlead roller had failed in similar circumstances on another vessel in the fleet in the past which should have led to a change in the fairleads and mooring practices used on all the vessels in the fleet.
- 4 The maintenance system was deficient with respect to the roller fairleads.

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

All vessels should be fitted with mooring equipment suitable for the vessel's intended service. All load-bearing mooring equipment should be fit for purpose and carefully maintained.

## **16 KILLED BY A MOORING WINCH OPERATION**

### **What happened?**

A ship was in the process of berthing with the second mate, an able seaman and an ordinary seaman, working at the after mooring station. The men were busy running a stern line which was led from the underside of the port winch drum. When the ordinary seaman standing at the stern saw that the mooring line had been made fast ashore, he signalled to the second mate to start heaving up on the line. The able seaman was seen to be standing clear of the mooring line in front of the mooring winch. The second mate started heaving and when the ordinary seaman looked over towards the mooring winch a short time later, he saw that the able seaman had been dragged under the rope drum of the winch. The winch was stopped immediately but the able seaman was found to be deceased.

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

- 1 The able seaman probably caught a piece of clothing on the mooring line as he was feeding it onto the winch drum.
- 2 The mooring line had to be led from the underside of the winch drum due to the low height of the roller fairleads on the deck.

3 The mooring winch was not fitted with any form of protection or guarding to stop a person being dragged underneath it.

4 There were only two seamen assisting the second mate at the after mooring station.

5 The able seaman may have been tired as he was at the end of a long period of duty.

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

Mooring operations are risky and so an adequate number of properly skilled and alert crew must be allocated to the task. Mooring lines should not generally be run from the underside of the rope drum. Aside from the potential risk for crew feeding line onto the drum, this practice reduces the efficiency of the winch brake if it is the standard band type. Mooring arrangements should be carefully designed to ensure their safety and utility in service.

## **17 KILLED CLEARING A JAMMED BACK SPRING LINE**

### **What happened?**

A ship was in the process of berthing in a lock with a tug made fast fore and aft. The mooring crew on the forecastle were busy running a back spring line. When it had been made fast on a bollard on the lock wall, the crew continued to let out line as the ship moved forward. At this point the mooring line became jammed between the winch drum and the winch bearing pedestal. One of the seamen was attempting to clear the jammed line when tension came on it and it suddenly came free. The seaman was thrown by the freed section of mooring line, his helmet falling free, and he sustained a fatal head injury.

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

1 There was too much line on the mooring winch's working drum which caused it to slip over the side plate and become jammed between the side plate and the bearing pedestal.

2 There were no rope deflectors in place on the bearing pedestal to prevent the mooring line from becoming jammed.

3 The movement of the vessel ahead should have been arrested until the mooring line jam was cleared. The mate supervising the crew on the forecastle should have ensured that the seaman was in a position of safety when tension came on the mooring line.

4 The seaman's helmet was not fitted with a chin strap.

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

Plan mooring operations in advance to ensure that there is not too much line loaded onto the working drums of split drum mooring winches. Clearing of jammed mooring lines should only be attempted when there is no tension on the line. Points of possible line jamming should be fitted with rope guards/deflectors. Crew working in helmets should use chin straps at all times to prevent the helmet from becoming dislodged.

## **18 CONTACT WITH A BRIDGE BUTTRESS**

### **What happened?**

A sailing vessel was on a passage that involved passing through a bridge on a strong flood tide. Forty-eight persons were on board including 17 physically disabled persons. The passage depended upon the bridge roadway being lifted. The sailing vessel was navigating under power using its starboard engine. The use of the port main engine was restricted. The pilot assumed that arrangements had been made to lift the bridge and after a number of attempts to contact the bridge. He responded to a weak VHF call believing it to be the bridge. It was not. A subsequent mobile phone message confirmed that no bridge lift had been ordered. Between about 400 m and 500 m from the bridge the decision was made to abort passage and turn the sailing vessel. The operation was hampered by adjacent mooring buoys, a passing tug and tow and a flood tide of 2.5 knots. The pilot did not use the anchor to snub the ship round and delayed starting the port engine.

The sailing ship was carried broadside and contacted the southern buttress of the bridge.

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

- 1 A lack of understanding by the operators meant that a lift of the bridge roadway had not been ordered as required by the port procedures.
- 2 The master/pilot briefing was inadequate and no check was made to ensure that the port procedures had been followed.
- 3 No contingency planning had been undertaken by either the master or pilot to plan for an aborted passage.
- 4 The true nature of the restriction on the port engine was not understood, its use was delayed and then only used at half power.
- 5 Decisions were delayed beyond the 'no-go' point so that the anchor was not used and the outcome was inevitable.

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

Passage planning, contingency planning and realistic risk assessments are essential in ensuring a safe passage.

## **19 POOR LOOK OUT**

### **What happened?**

A large fishing vessel with 24 crew members ran aground just outside a compulsory pilotage area with the fishing master and mate on the bridge. The fishing master was acting as master, but was not qualified to do so. The vessel was on auto-helm steering with a known five degree gyro error, the engine was on full ahead. The fishing master and mate were discussing ship business and did not notice the vessel deviate from its course.

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

- 1 Failure to keep a proper lookout.

- 2 Allowing those on the bridge to be distracted from the primary task.
- 3 There was no proper use of the human resources on the bridge.

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

There is absolutely no substitute for keeping a proper navigational watch and focusing on the primary task of safe navigation. Bridge resource management reduces risk.

## **20 DRAGGING OF ANCHOR**

### **What happened?**

A large, sophisticated yacht was at anchor close to the shore in a position convenient for boat transfer to a local port. The yacht was at anchor for a number of days in good weather and light winds. No anchor watch was kept. The wind subsequently increased in strength and the yacht was at anchor on a lee shore with a short scope of chain deployed. The period of yaw decreased with the increasing force of the wind and the design of the yacht. The master decided to get underway but before the engine could be brought into effect the anchor broke out of its holding ground. The yacht dragged anchor rapidly over 300 m and grounded.

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

- 1 Decision to get underway was delayed.
- 2 Lack of contingency planning.
- 3 Anchorage chosen and maintained for 'convenience' rather than safety.

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

Risks should be recognized and contingencies planned for and understood by crew. Decisions to minimize risks should be made in good time without regard to less important considerations.

## **21 CONTACT WITH A JETTY**

### **What happened?**

An inbound liquefied petroleum gas (LPG) tanker was under pilotage to berth starboard side to a jetty on the south side of a narrow channel. The vessel was approaching the jetty from the east in reduced visibility (2 miles) and keeping to the starboard (north) side of the channel. The tanker was making eleven knots with a flood tide. At about this time a petroleum tanker sailed from the jetty. Another LPG tanker transiting the area had been notified that a petroleum tanker was leaving the jetty. The two LPG tankers saw each other and agreed to pass green to green to avoid collision. The transiting LPG tanker thought that the ship it was avoiding was the product tanker leaving the jetty. The passing manoeuvre forced the inbound LPG tanker to the south. In attempting to turn to go alongside the berth the tanker ran out of room and contacted the jetty.

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

- 1 Transiting LPG tanker on wrong side of narrow channel.

- 2 Insufficient sea room to undertake a 'running' turn.
- 3 Excessive speed and possibly a miscalculation of effect of following tide.
- 4 Loss of visual perspective in restricted visibility.
- 5 Possibly there was no plan or if there was one, the plan was not flexible.
- 6 There was no evidence that anyone, other than the pilot, was involved in manoeuvring the ship.
- 7 This was a routine manoeuvre that had been modified by external influences.

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

Proper planning and bridge resource management can reduce the risk of accidents.

## **22 COLLISION IN FOG**

### **What happened?**

A roll-on, roll-off (ro-ro) ship leaving port with a local pilot entered a narrow channel at about 6 knots and collided with a dredger in fog (visibility about 200 m). The pilot had boarded the ro-ro ship ten minutes before sailing and had been engaged because of the reduced visibility. The dredger had just deposited its spoil and was on passage to an adjacent harbour making about 5 knots. At the same time a small pleasure craft was known to be on passage through the area and in a VHF contact confirmed it would stay out of the channel. Both the ro-ro ship and the dredger were operating radar on 0.75 mile range. Port Control had radar coverage of the area and gave the ro-ro ship clearance to leave. VHF conversation between the pilot of the ro-ro ship and dredger agreed that the dredger would keep to the extreme edge of the channel. The conversation was conducted in Danish, a language which the ro-ro master did not understand. The dredger was set by the tide into the channel and although the master realized this he delayed correcting the course. As the ro-ro ship left the berth, a vessel was detected by the ship's radar and the pilot initially assumed it was the pleasure craft. When the ro-ro ship had cleared the harbour entrance and was turning to starboard a vessel was seen close ahead. The closing speed was about 5.7 m/s. Both vessels went full astern, but collided.

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

- 1 The ro-ro ship was given permission to sail when there was a potential risk of collision with the dredger. A delay of a few minutes in leaving the berth would have removed the risk.
- 2 The radars of both vessels were on an inappropriate range and longer distance scanning was not used.
- 3 At a range of 0.75 miles the approaching vessels would have been in radar contact for only four minutes.
- 4 In fog, perspective is changed, and unless planned and blind pilotage techniques are used, course alterations can be delayed.
- 5 The use of the local language to communicate between the three vessels meant that the master and other ro-ro ship's bridge personnel were unaware of critical information.

## **What can we learn?**

Planning is vital in reducing risk. Blind pilotage techniques and bridge resource management reduce the risk of accidents.

## **23 COLLISION**

### **What happened?**

While proceeding in the traffic separation scheme, under conditions of restricted visibility, the master of a container ship altered course to starboard to pass ahead of a crossing ship and collided with an overtaking vessel to starboard. The speed of the container ship was 16 knots.

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

1. The bridge watch arrangement, consisting of the master and a wheelsman, was not adequate for the prevailing conditions.
2. The conditions of restricted visibility aggravated an already stressful situation for the bridge team.
3. The master was not fully aware of the situation and did not communicate with the other vessels to determine their intentions. There was no consideration to reduce the speed of the ship.

## **What can we learn?**

An effective lookout that ensures that the bridge team is always aware of shipping movements round his vessel is an essential feature of good resource management and safe navigation. Masters need to assess carefully all the developing hazards and risks that could affect the safety of navigation and set a safe speed accordingly.

## **24 FAILURE OF HATCH COVERS CAUSES LOSS OF A SHIP**

### **What happened?**

A bulk carrier fully loaded with coal encountered bad weather. Seas constantly washed over the deck and the hatch covers and the tarpaulin hatch covers were destroyed. The holds were flooded and the ship sank. The crew of 20 abandoned the ship into the lifeboat. During the abandonment one crew member fell into the water and disappeared.

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

1. The master misjudged the weather forecast received before the departure, and the gale warning and the forecast of a severe tropical depression received shortly after departure.
2. At the time when the vessel encountered the strong winds and high seas the vessel's course and speed were not adjusted to minimize the effect of the weather.

## **What can we learn?**

The voyage planning should contain careful consideration of weather forecasts, especially in waters with high risks of typhoons. In rough weather course and speed should be adjusted to reduce the effect on the ship's hull and deck.

## **25 BRIDGE OPERATIONS**

### **What happened?**

A vessel sailing westward collided in the Kiel Canal with another vessel. Both vessels were manned with canal pilots. The westbound vessel suddenly turned to port and hit the second vessel amidships. Substantial damage was sustained by both vessels.

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

1. The bridge of the westbound vessel was not properly operated in accordance with STCW section A-VIII/2, Part 3-1.
  1. The vessels were using automatic steering systems in a busy shipping area.
  2. The co-operation between the mate and the pilot, particularly regarding the use of the automatic steering systems, was unsatisfactory.

## **What can we learn?**

Masters need to ensure that the bridge is safely manned. Officers on watch are responsible for safe command of the vessel and have to ensure that the intended course is maintained. Pilots must work closely with the master or the officer on watch. The pilot must be notified of the manoeuvrability characteristics of the vessel. He should be made aware of any special instructions and procedure particular to the vessel.

## **26 PASSAGE PLANNING**

### **What happened?**

A ro-ro passenger ferry made contact with a breakwater while entering the terminal in severely restricted visibility. Consequently, the forward azimuth thruster blades of the propellers were distorted, the hull indented but not breached. There were no injuries or pollution.

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

1. The bridge team was not sufficiently familiar with the operation of the navigational equipment on board.
2. The master and mate did not make full use of the integrated bridge system, because they were unfamiliar with the system's features.
3. The master and mate were not working together effectively in accordance with the principles of bridge team management, an essential function in restricted visibility.
4. The radar and electronic chart display and information system (ECDIS) could have been used and a passage plan could have been incorporated into the ECDIS.

5. The vessel did not have specific passage and blind passage plans.

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

It is necessary that vessels have an adequate blind pilotage plan, and that blind pilotage drills are carried out at regular intervals, as required by a safety management system (SMS).

## **27 COMMUNICATION DIFFICULTIES DURING MANOEUVRING**

### **What happened?**

On entering port during dense fog, a refrigerated vessel collided with a dolphin of a pier. During the subsequent attempts to manoeuvre the vessel back in to the right position in the river, the vessel rammed a quay wall with her stern. The ship sustained deformations in the stern area.

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

1. The possible confusion of the bow tug with a supposed small craft or work vessel in a crossing situation.
2. The excessively hasty manoeuvres initiated by the bridge of the vessel, during which the manoeuvring capabilities of the vessel and in particular the effect of the flood stream were not sufficiently taken into account.
3. The communication in different languages between the master and the manoeuvre station, and between the pilot, the tug masters and the land station.

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

Using different language reduces the performance of the bridge team, thus increasing the risk of collision. Under such conditions, a risk of accident is enhanced further with the tug and refrigerated vessel operating close quarters manoeuvres in an area of restricted visibility.

## **28 AN ACCIDENT IN RESTRICTED VISIBILITY**

### **What happened?**

The general cargo vessel made contact with a buoy in a channel in restricted visibility. The ship's propeller blades were distorted. The buoy was subsequently found to have been severed from its moorings.

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

1. Visibility reduced to about 100 m in snow, and two buoys were no longer visible on the radar displays.
2. The chief officer did not move the main engine pitch control sufficiently to cause a significant reduction of speed.
3. When applying port helm to avoid a buoy, the chief officer did not monitor the rudder angle or the movement of the ship's head. Too much port helm was initially applied, and

opposite helm was applied too little and/or too late to prevent the vessel's stern from swinging into the buoy.

4. The chief officer would have been better placed to cope with the sudden worsening of the visibility had he not been alone on the bridge. Had the master been on the bridge as the ship passed the Lighthouse, his knowledge of the ship's handling characteristics, and the area, would have been beneficial as the visibility decreased.
5. The vessel had only two watch keepers, and the duty able seaman lookout was not used.

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

The master must at all times make sure that the bridge manning is in accordance with the regulations and rules. It is ultimately the master's responsibility that the bridge is manned safely at all time.

## **29 LACK OF A PROPER LOOK OUT**

### **What happened?**

One vessel did not give way to another in accordance with the collision regulations. Both ships were damaged. The port side ballast tanks on one vessel were damaged, and the consequent loss of ballast caused it to list to about 10 degrees starboard.

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

1. The two vessels were under way and the weather conditions were good. However the bridge of one vessel was unmanned, while the OOW on board the other was alone on the bridge.
2. The OOW was concentrating his attention on some ships on his starboard side. In so doing he was unaware of the movement of a vessel and a developing close quarters situation until it was too late to take evasive action to prevent a collision.

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

It is important to adhere strictly to Collision Regulations and keep a look-out in a professional way. The OOW should always be guaranteed an increase in bridge manning should the need arise. The need for efficient operation on board ship should not be at the expense of safe navigation.

This need should not influence the availability of the look out when required: any other duties assigned to the look-out should not be given priority over his look-out duties.

## **30 SAFE SPEED IN FOG**

### **What happened?**

A container vessel and sailing yacht collided while under way in heavy fog. The master had been on the bridge since sailing (a period of 15 hours).

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

1. The container ship was proceeding at 25 knots in heavy fog conditions.

2. Her master was over confident in the accuracy of the ARPA and willingly accepted a too small passing distance.
3. The skipper of the sailing yacht was unable to use the radar effectively.
4. Both vessels did not keep an effective radar look out.

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

When navigating in restricted visibility, it is important to assume a safe speed and to maintain a proper radar and visual look-out. Judgement can be affected by prolonged hours on duty.

## **31 SEAMAN INJURED AS A RESULT OF A LIFEBOAT EXERCISE**

### **What happened?**

Two people were injured during the launching of a lifeboat and the operating the on-load release gear as the lifeboat was suspended one metre above the water.

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

1. Ship's crew had never been involved in such an exercise.
2. No one was in position to accurately assess the height of the lifeboat above the water.
3. The signage within the lifeboat did not adequately warn of the dangers of operating the on-load release gear when suspended above the water.
4. No risk assessment was carried out for a routine on-load release gear test.
5. It was not clear who was in control of the exercise.
6. Action of the surveyor assessing the exercise was affected by a heavy workload.

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

There is an obvious need for the crew to be well prepared for an exercise of this kind. To avoid confusion during the exercise the seamen's roles and the person in charge need to be clearly identified.

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