A small coastal container ship was en route at night in good visibility with an OOW and lookout on the bridge. The vessel was on autopilot at a speed of approximately 15.5 kts when the OOW observed another ship ahead on the radar. The target was plotted, showing that it would cross from the starboard side to the port side.

About 2 hours and 25 minutes later the relief OOW came to the bridge. He was given information about the approaching vessel before taking over the watch. At the radar, he extended the true speed vectors, which were set to a three-minute display, and found that the tip of the target’s vector reached a point behind the tip of his vessel’s vector. He therefore assumed that the target vessel would pass astern of his ship. Meanwhile, as was the practice, the relieved OOW was at the chart table completing the logbook entries with the curtain open and chart table light on.

A few minutes later the lookout reported sighting the target vessel. He also asked permission to leave the bridge to attend the head, which was granted. The OOW looked at the target vessel’s true vector on the radar screen. It appeared to him that the direction and length of the vector had not changed. He then glanced out of the window and saw the vessel’s lights at close range to starboard and realised there was a danger of collision. Using the daylight signalling lamp on the starboard side of the bridge, the OOW flashed the vessel about ten times. With no observable response, he then went to the helm and switched to hand steering, setting the rudder hard to port.

The OOW did not feel any impact, and assumed that a collision had been avoided. From the bridge wing he was unable to observe the other ship’s lights astern. He then set the autopilot to the previous course and, when the lookout returned to the bridge, asked him if he had felt an impact. The lookout had not. The OOW telephoned the engine room and, when the lookout returned to the bridge, asked him if he had felt something like being hit by a wave.

Unsure of what to do, the OOW again went out onto the wing and searched astern together with the lookout. Nothing was sighted so, about 30 minutes later, he informed the Master. The Master decided to investigate further, and went to the bow to see if there were signs of a collision. He did not see any, so was inclined to believe that no collision had occurred.

At the next port the crew again searched for signs of a collision from the winch and the connection with the tail was approximately 68 metres long. The section of line in use between the winch and the connection with the tail was 22 metre polyester/polyethylene tail. The section of line fitted with a ultra-high-modulus polyethylene (HMPE) line. The line was fitted with a shoulder roller fairlead while under tension. The section of the line between the break and the port shoulder roller fairlead struck the deck officer on the head as it whipped back before going overboard through the fairlead. The deck officer was found lying unconscious forward of the roller fairlead. He had sustained multiple skull fractures.

The mooring line that failed was a 44 millimetre diameter sheathed ultra-high-modulus polyethylene (HMPE) line. The line was fitted with a 22 metre polyester/polyethylene tail. The section of line in use between the winch and the connection with the tail was approximately 68 metres long. The MAIB report found, among other things, that:

- The residual strength of the mooring line was substantially reduced from original specifications. The tensile load on the mooring line when it parted was less than a quarter of its specified minimum breaking load and below its accepted working load limit.
The predominant factor for the loss of residual strength was axial compression fatigue. However, axial compression fatigue had not previously been considered as a likely failure mode or significant cause of strength loss in HMPE rope by the manufacturer.

The decision to attempt to reposition the vessel using the spring lines rather than recalling the tugs placed the mooring parties in an unnecessarily hazardous position, particularly given the strength and direction of the winds.

Lessons learned

- Mooring line maintenance management and condition monitoring regimes must include clear and practical criteria for discarding compromised ropes.
- The condition of the load bearing core of jacketed ropes cannot be adequately assessed on board ship. Several of the rope discard criteria listed in the company’s safety management manual, such as broken strands, abraded yarns and fused fibres, cannot be identified without destroying sections of the rope.
- The tensile strength of high modulus rope will diminish steadily over time regardless of how well it is maintained. For this reason, appropriate safety factors and anticipated life expectancies need to be applied, and parameters such as time, tension and temperature need to be closely monitored. Without these, the ropes will likely fail before being discarded.

MARS 201844

Unlisted bulk cargo exploded
As edited from official MAIB report 26/2017

The Master of a small coastal trader received instructions from the charterers to load a full cargo of unprocessed incinerator bottom ash (U-IBA). The instructions specified that the cargo was not dangerous, and stated ‘...cargo also includes some foreign materials which is no problem. Cargo can be loaded/discharged in rain.’

The Master and Chief Officer referred to the International Maritime Solid Bulk Cargoes Code (IMSBC Code), but did not find an entry for U-IBA. The Master decided to load as instructed, and did not receive any further information about the cargo.

Loading into the single hold took about eight hours, with heavy and persistent rain throughout. When loading was completed, the vessel departed, but anchored 30 minutes later to await better weather conditions for the voyage. The next day, while still at anchor, the chief engineer went to the forecastle store to investigate a problem with the emergency fire pump. He started the pump and from the sound of its operation suspected that it was running dry. After confirming this was the case, he pushed the stop button on the main panel. At the very same moment there were two loud explosions in quick succession and the chief engineer was thrown violently to the deck.

The victim was quickly evacuated by helicopter to a shore hospital. He had suffered first degree burns to his face and second degree burns to his body, hands and lower extremities. The vessel had suffered some minor damage. Five of the nine hatch covers had to be replaced, along with all of the hatch cleats and the cargo hold coaming bar among others.

There had been 34 shipments of U-IBA from the same port on 26 vessels without incident. However, U-IBA was not listed in the IMSBC Code and no steps had been taken to seek approval from the competent authorities for its carriage, as required by the Code. The charterparty stated that U-IBA was non-dangerous and non-IMO classed (implying that it was not a recognised dangerous cargo under the IMDG Code). Therefore, it is not surprising that the Master, along with the Masters of the vessels carrying the previous 34 shipments, followed the loading instructions from the charterer.
The investigation found, among other things, that U-IBA, when exposed to water, generates a low rate of H₂, with a risk of explosive atmosphere formation. In this case, H₂ gas had probably migrated from the vessel’s hold to the forecastle store and into the pump’s start/stop panel, initiating the first explosion.

Lessons learned
- If the bulk cargo is not listed in the IMSBC Code, do not load until approval for carriage is received from the competent authorities.
- Had the IMSBC Code requirements been followed it is likely this accident would not have happened, as the dangers would probably have been identified and procedures for safe carriage developed and implemented prior to loading.
- For purposes of transportation in bulk by sea, the release of any quantity of flammable gas should be considered dangerous.

**Lessons learned**
- Use all available means at your disposal to navigate the vessel. In this case the electronic chart would have clearly shown the vessel was in danger of grounding.
- The bulk carrier’s OOW must have felt some pressure to complete the overtaking manoeuvre as previously agreed, and therefore did not moderate the vessel’s speed; a sharp port course alteration was coming up very near to where the overtaking would have been completed. Don’t be afraid to change your plans, and when in doubt, slow down.

**MARS 201846**

*Lifeboat self-launches*

The port lifeboat was to be lowered to deck level as a test, with the vessel underway at about five knots. As soon as the lashings were removed, the lifeboat started to lower itself to the sea of its own accord. Crew attempted to stop the descent by pulling down the brake arm to stop the lifeboat, but without effect. The lifeboat continued its course downward to the sea.

The bridge was informed and the vessel was stopped and turned to make a lee on the port side to protect the lifeboat. The company investigation found that the lowering arm, which had been dismantled for maintenance and then reassembled, had been improperly installed.

Lessons learned
- Lifeboat launching apparatus is essential equipment. Maintenance should be undertaken or supervised only by competent personnel.
- Always slow the vessel to a near stop or wait until at anchor to test lifeboat lowering. If berthed, test the outboard lifeboat only.
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