6

Grounding

6.1 Grounding in unsurveyed waters

A 50,000 GT RoRo vessel had been loading in a European port. The navigation officer had prepared the passage plan for the voyage to the next port of call which was in central America. Prior to departure the Master received weather routeing for the passage, which suggested a route over the Silver Bank and via the Windward Passage.

The navigation officer planned the route in the ECDIS and on paper charts and discovered that the minimum depth the vessel would encounter was at the Silver Bank where the water depth was 16 metres according to British Admiralty chart 3908.

The vessel's draft was 7.5 metres, so a 16-metre water depth was considered acceptable as per the company's ISM under keel clearance procedure. The procedure stated that there had to be a minimum of 20% under keel clearance of the maximum draught.

'Inadequately surveyed' warning

On the British Admiralty chart the Silver Bank is marked 'Inadequately surveyed' in three places. On the route planned by the navigation officer there was no specific mention of inadequately surveyed waters. The navigation officer did not consult the Admiralty Sailing Directions when preparing the passage plan.

After checking the entire route on the ECDIS and on the paper charts, the Master decided to follow the route suggested by the weather routeing company. The passage was uneventful over the Atlantic from Europe and the vessel maintained a speed of 13.5 knots. Shortly after entering the Silver Bank the vessel's bow suddenly swung to starboard, which caused a list for about 3 to 5 seconds, with excessive vibration. The OOW changed to hand steering. A couple of minutes later the vessel's bow swung to starboard, but this time with less vibration. The vessel's bow swung a third time to starboard and listed for about 3 seconds, with vibrations. After carrying out a damage assessment it was found that the forepeak tank and a water ballast tank had water ingress. All the fuel tanks were intact.

Vessel repaired in dry dock

The vessel arrived at the destination port, discharged the cargo and carried out an in-water survey. It was found that the tanks had been punctured as the vessel had touched bottom. The vessel had to be repaired in dry-dock.

What can we learn?

- The vessel had on board the Admiralty Sailing Directions NP 70, West Indies Pilot, where it is stated that Silver Bank has been inadequately surveyed and it is not advisable to attempt to cross it. The sailing directions had not been reviewed before or after preparing the passage plan. It is important to ensure that all reference literature is used when making a passage plan.

- It is important to perform a two-person check for critical operations such as a passage plan. It is more likely that another person will find a mistake rather than just carrying out your own double checking.

- The ECDIS chart information is based on data from the paper charts. If the quality of the data in the paper charts is poor, then so will the data in the ECDIS charts cell be. Each chart cell contains a CATZOC code (Category Zone of Confidence), which indicates the accuracy of the data in the cell. As part of the passage plan appraisal the navigation officer should check the quality of the data. The sailing directions will give good information about routeing and will also mention recommended routes. There are many areas in the world where the chart data is uncertain so even if the chart is vectorised as per IHO standards, it is necessary to check the quality of the data used.

6.2 Grounding as channel buoys were in the wrong position

A 20,000 DWT dry cargo vessel had picked up the pilot and was approaching the fairway to the port. It was morning with clear skies and light winds.

On the bridge were the Master, the pilot the OOW and the helmsman. The Third Officer was the OOW and had completed the pre-arrival checklist. The vessel was in hand steering mode and the pilot had the conn. The Master had given the pilot a pilot card, but they had not carried out a pilot briefing. The pilot asked for 7 knots in the fairway and lined up the vessel between the buoys.

Everything seemed in order

The OOW was monitoring the vessel's position on the radar and the ECDIS and was also filling out the logbook. The vessel passed the first buoys, and everything seemed in order to the Master when he looked outside.

Suddenly the vessel vibrated heavily and the speed fell rapidly until the vessel completely stopped. The Master realised that the vessel had run aground. He told the pilot that the vessel was aground, but the pilot did not believe him as the vessel was in the middle of the fairway.

When the pilot also realised that the vessel had run aground he started to talk on the VHF in the local language.

Vessel ran aground outside the fairway

The vessel had run aground on a bank which was outside the fairway. The vessel was clearly visible outside of the channel on the ECDIS and radar. This was also confirmed when the position was plotted.

The Master began to deballast the vessel and carried out engine manoeuvres in an attempt to get the vessel off the bank. Subsequently the Chief Engineer called the Master and told him that the steering gear was not responding.

The Master immediately stopped the engines and asked the Chief Officer to sound all tanks and also take soundings around the vessel.

Tugs called to assist

The pilot told him that two tugs were coming from the port to assist the vessel.

The Master had not signed any salvage contract, but the two tugs began to attempt to refloat the vessel with the assistance of the pilot and authorities. The tugs managed to remove the vessel from the bank the following day.

What can we learn?

- The bridge team did not check the position of the vessel on the chart, radar, or by any other means than visually.
- The passage plan should be berth to berth, so there should have been a planned route into the port which would have highlighted the discrepancy in the vessel's position on the ECDIS.
- The vessel had an ECDIS, but it appears no one was monitoring the display during the approach.
- There was a leading line for the approach, but for some reason it was disregarded. The bridge team did not monitor the vessel's progress with all the available navigational equipment.
- It is important that the shipowner has a navigation policy that details which navigation equipment should be used and how the bridge should be manned efficiently at different stages of the voyage. Leading lines should always be used, and the vessel's position should be confirmed by radar, GPS and visually. This was not done.
- In addition, the passage plan should be berth to berth and it should detail how to conduct a pilot briefing. It is obvious that the pilot should have known that the buoys were out of position. It is important that the bridge team follows the passage plan and monitor the actions of the pilot.

6.3 Grounding as the OOW missed waypoint

It was night and a 700 TEU container vessel was sailing near the coast towards the next port. It was raining, so visibility was reduced.

On the bridge was the Second Officer who was OOW. The passage plan had been approved by the Master and the bridge team and entered into the GPS and radar.

Vessel began vibrating heavily

Suddenly the vessel vibrated heavily and veered strongly to port. The OOW was confused about what had happened. Soon afterwards the bow thruster room high level alarm sounded. The Master came to the bridge and when he asked what had happened the OOW was still confused.

The Master called the Chief Officer and asked him to check the forepeak and bow thruster room. A couple of minutes later the Chief Officer informed him that there was water ingress in both locations.

The Master stopped the engines and the vessel drifted until the situation could be assessed. The Master realised that the vessel had hit the bottom and contacted the nearest JRCC and informed them that the vessel had grounded and was taking on water. The Master asked for assistance as he was unsure what had happened.

Fortunately there was no pollution and no injuries, and the steering gear, engines and bow thruster were all operational. A rescue vessel from the nearest port came out to the vessel but no assistance was needed, and the vessel sailed to the nearest port and berthed without incident to assess the damage.

Waypoint not entered on GPS

The vessel frequently traded in the area, so the voyage was not unusual. It was found that the navigation officer had forgotten to insert a waypoint in the GPS. This meant that the course took the vessel straight over a shallow area where it ran aground.

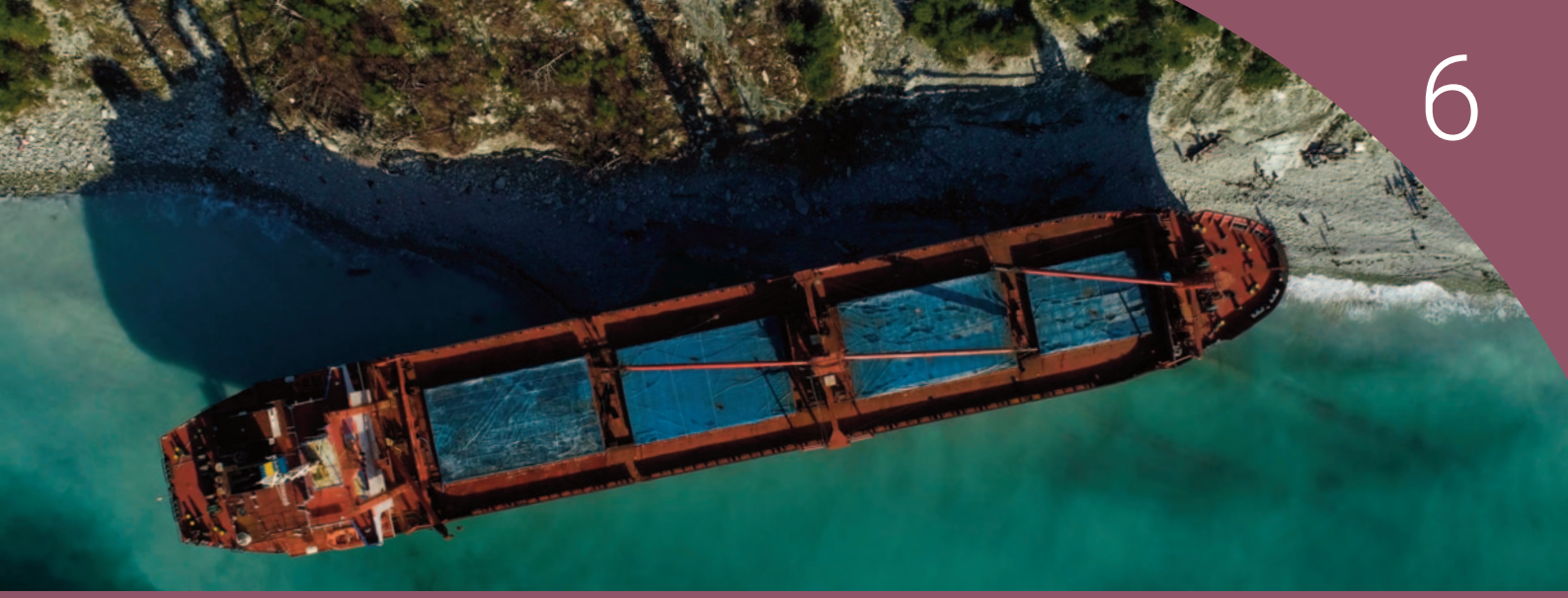
What can we learn?

- When preparing a passage plan it is suggested that the plan is double-checked by another officer to ensure all waypoints have been entered into the navigation equipment. It is prudent to perform a two-person check of the passage plan and all critical navigational equipment, such as the GPS, before departure. The passage plan needs to be signed by all bridge officers and the Master.

- It is also suggested that every officer taking over the watch ensures that the passage plan is correct and that all the correct parameters are included in the GPS, radar and ECDIS. Any deviation from the passage plan during the watch needs to be reported when handing over to the next watch officer.

- If the passage plan is entered in the ECDIS and the correct safety depth is entered in the system, the software can check that the passage plan is not crossing any area with less depth than the safety depth. If any shallow areas or any other dangers are detected a warning will be triggered, which the navigation officer must check and rectify. In this case the passage plan was not entered into the ECDIS and was only entered into the GPS and radar.

- Once again, we highlight that all navigation equipment should be used and checked during the voyage.



6.4 Grounding in heavy weather

It was an autumn night, and strong winds of Beaufort scale 10 hit a handysize bulk carrier. The vessel was in ballast condition and sailing through an archipelago.

Difficulty in maintaining course

The Third Officer, acting as OOW, and a helmsman were on the bridge. The vessel was in hand steering mode and was only making 2 knots over the ground. It was difficult to maintain course and the wind was blowing in on the port bow. The helmsman had put the rudder hard to port but the vessel began to alter to starboard. The OOW called the Master and informed him that it was difficult to maintain course. The vessel was between two islands, which made the winds even stronger as the islands were creating a wind tunnel.

The Master came up on the bridge and ordered the OOW to go to the emergency steering room. The vessel was classed to have the engine control room constantly manned. The Master called the duty engineer and asked for the engine controls to be transferred to the bridge. When transferring the engine controls the engine had to be put on standby.

Engine controls transferred to the bridge

The Master made an announcement on the PA system and asked all crew to come to the bridge. The Chief Officer was told to prepare the anchors.

The OOW was now in the steering gear room and confirmed that the rudder was hard to port.

Impossible to enter main deck

The Chief Officer informed the Master that it was impossible to enter the main deck as large waves were washing over the deck.

The duty engineer called the Master and informed him that the bridge now had the engine controls. However, the vessel had drifted very close to an island during the engine transfer. Before the Master managed to increase the engine speed the vessel hit rocks.

What can we learn?

- In heavy weather it is important to reduce speed, but this can only be done if the steering can be maintained. To put the engines on standby to transfer the control to the bridge was a poor decision, as the vessel was then drifting between the islands in heavy weather. If the Master wanted the bridge to have the engine controls, it would have been safer to shift the controls when the vessel was in open water and not battling heavy weather.

- The vessel was in ballast condition and if heavy weather is anticipated the vessel should be ballasted in such a way to increase the draft and reduce the wind area.

- The bridge team was not prepared for the heavy weather and did not amend the route. It would have been possible to remain in open waters and not pass between the islands.

- Why the Master sent the OOW to the steering gear room is unclear. It seems that the Master did not trust the rudder indicator and wanted to confirm the angle.

6.5 Grounding at high speed

A suezmax oil tanker loaded with crude oil was transiting the Suez Canal from North Africa to India. On the bridge were the pilot, Master, helmsman and Chief Officer. It was morning and a second set of pilots had just boarded the vessel. The pilots carried out a handover on the bridge – this was carried out in Arabic. After the handover the new pilot ordered the vessel to increase to full speed ahead. The Master asked the pilot if full speed was really necessary as the vessel was fully loaded and had a draught of 14.5 metres. The pilot replied that there were strong currents ahead and that full speed was required. The vessel managed to achieve a speed of 9 knots over the ground.

Vessel listed heavily

About one hour later the vessel had to alter course to port from 171 degrees to 154 degrees. The pilot ordered 'port 20' to the helmsman, and the vessel began to alter at a rate of turn of 15 degrees per minute. It was rapidly closing the distance to the eastern canal bank at full speed. To counteract this the pilot ordered hard to starboard. This caused the vessel to swing to starboard at a 25-degree rate of turn, and the vessel listed heavily.

Master relieved the pilot

The Master asked the pilot if the western branch of the channel was safe. The pilot stated that it was not. At this point the Master took over and relieved the pilot as he determined that the pilot had lost control of the vessel.

The Master ordered hard to port and the vessel just missed the buoys by the centre embankment. The vessel was again heading for the west bank and the Master initially reduced the engine speed to slow ahead, but realised that he needed to turn more quickly, so he ordered full speed ahead to increase the rate of turn.

Vessel made contact with bank

Unfortunately, the Master could not avoid the bank and made contact a couple of times before ending up in the middle of the canal where the vessel finally stopped.

About an hour later the vessel anchored in the Bitter Lakes and informed the Suez Canal Authorities about the incident. There was no pollution and divers inspected the vessel and found several dents in the hull.

The vessel had to dry dock to repair the damage to the hull at a substantial cost. The vessel was out of service for over a month.

What can we learn?

- This was a fully laden tanker, and increasing the speed to full ahead in the Suez Canal caused the stern of the vessel to swing towards the near bank (the Bank effect). Neither the pilot or the bridge team discussed this possibility as the pilot increased the speed. It is obvious that the Master was uncomfortable with the pilot's decision, but he still accepted it.

- The reality was that there were no strong currents at the time. If the bridge team had checked the current this could have been brought to the pilot's attention.

- The pilot's action was not up to the expected standard and to relieve a pilot is an unpleasant and stressful experience. It is essential that managers train their Masters to challenge a pilot who does not comply with the vessel's SMS and company's ISM regulations. However, there should have been a proper pilot briefing where the pilot and the rest of the bridge team discussed the upcoming pilotage and what to expect. This should have included expected environmental conditions, what speed and what rate of turn would be suitable, how the vessel performed when it was fully laden and any upcoming traffic. If these issues are discussed it is likely that all involved parties can give their input on why a suggested action is advisable or not.

6.6 Grounding because of poor cooperation

A 1,000 TEU container vessel departed its berth after loading. During the loading there had been some delay and the gantry cranes had stopped operating because of strong winds, so the Master was eager to depart. The navigation officer had prepared the bridge before departure.

Pilot plan was not discussed

On the bridge were the Master, pilot, lookout and Chief Officer. A tug assisted the vessel during departure. The Master gave the pilot the pilot card and offered him some coffee. After this the Master gave the pilot the conn. The pilot was steering from the port side bridge wing. The berth had a heading of 317 degrees and there were still WSW winds at Beaufort scale 9. The vessel was moored at the end of the berth. The fairway leaving the port had a heading of 230 degrees. The pilot's plan was for the vessel to go astern and swing to port and clear the end of the berth and then follow the fairway. However, he did not explain the plan to the Master and the Master didn't ask the pilot about any plan.

The Master ordered all lines let go. The bow started to fall off quicker than the stern as the wind pushed on the vessel's port side, off the berth. The pilot ordered half astern and the plan was to use the bow thruster to let the vessel's bow swing past the end of the berth and to position the vessel to sail out in the fairway. At this time the vessel had a course of 310 degrees.

Drifting towards buoy

The tug assisted with pushing the vessel on the starboard side. The vessel was now moving astern at 2 knots and towards the opposite side of the fairway, the south side. There were several buoys marking the fairway. The closest buoy was on the starboard quarter about 50 metres away.

The wind continued to push the vessel from the portside causing the vessel to drift SE in the fairway towards the south side of the fairway. The vessel had a stern thruster and it was set full to starboard to assist the vessel in turning to port. The vessel started to slowly come around and had a heading of 291 degrees but was still drifting SE towards the buoy.

Multiple warnings ignored

The Second Officer was on the stern and warned the Chief Officer over the UHF that a buoy was only 30 metres away on the starboard quarter. The vessel now had a heading of 320 degrees which was a 90-degree angle towards the fairway. The Chief Officer informed the pilot and Master but neither of them acknowledged or took any action. The Second Officer now informed the Chief Officer that the buoy was only 10 metres away. The pilot ordered half ahead on the engines. For some reason the stern thruster was stopped. At the same time the pilot received a job-related mobile phone call which he answered. The vessel continued its movement astern and hit the buoy on the starboard quarter. The entire buoy was dragged underneath the vessel and damaged the propeller, rudder and rudder stock. The damage caused the vessel to lose its steering and because of the damage the Master stopped the main engine. This caused the vessel to start drifting even quicker SE towards shallow waters.

The pilot suggested that the anchor should be dropped, and so the Master ordered the port anchor to be dropped. This was delayed as the Second Officer had to cross from the stern to the bow. When he reached the bow and the bosun tried to drop the anchor it became entangled and it took a minute before it was released. At the same time the vessel ran aground.

What can we learn?

- Underestimating natural forces such as strong winds is the third most common reason for vessels running aground.
- A big concern in many navigational claims is that the bridge team does not work efficiently as the different members don't discuss the plan - or sometimes don't even have a plan as in this case.
- It is important for the Master to be polite but assertive when he feels that the vessel's safety might be at risk. To avoid such a situation occurring, the Master's expectations need to be discussed during the pilot briefing. In this case there had not been a pilot briefing. The Master should inform the pilot of any parameters e.g. the rate of turn and speed he is comfortable with, and the pilot should explain to the Master what the plan is to ensure the operation is safe. This is what we would consider as having good situational awareness. This is especially important as there were strong winds.
- During the pilot briefing the Master should ask the pilot about local regulations, concerned traffic, expected currents and winds, passing requirements and how the pilot plans to approach the departure. If the local language is spoken the pilot should be asked to explain the conversation, in English, to the bridge team. If a plan is discussed and agreed, it is easier to amend the plan if there are complications.
- The pilot must be included in the bridge team and anything unclear about the vessel's progress or deviation from the plan needs to be voiced within the bridge team at once. To have efficient communication is one of the most important factors for a functional bridge team. In this case there had not been a pilot briefing.

Glossary of common industry abbreviations

Term	Meaning
AB	Able seaman
AIS	Automatic identification system
ARPA	Automatic radar plotting aid
COLREGS	International Regulations for Preventing Collisions at Sea
COSWP	Code of Safe Working Practices for Merchant Seafarers
CPA	Closest point of approach
CSM	Cargo securing manual
ECDIS	Electronic chart display information system
ETA	Estimated time of arrival
GM	Metacentric height
GPS	Global positioning system
IHO	International Hydrographic Organization
IMDG Code	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
IMSBC Code	International Maritime Solid Bulk Cargoes Code
ISM	International Safety Management Code
JRCC	Joint rescue coordination centre
MOU	Memorandum of understanding
NM	Nautical miles
OOW	Officer on watch
PA	Public address system
PMS	Planned maintenance system
SMS	Safety management system
SSAS	Ship security alert system
SSP	Ship security plan
STS	Ship-to-ship (transfer)
TML	Transportable moisture limit
UHF	Ultra high frequency (radio)
VDR	Voyage data recorder
VHF	Very high frequency (radio)
VTS	Vessel traffic serice

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