

Collision/Contact





4.1

Collision as vessel was overtaken

Vessel A was a small general cargo vessel sailing at night in a busy area in the Baltic Sea. Visibility was good, and winds were westerly at Beaufort scale 3. The vessel was maintaining a speed of about 10 knots.

Bridge equipment

The S-band ARPA radar was set up in off centre, range 12 NM, north up, in relative motion mode, while the X-band radar was on standby. Both radars had similar blind zones as the masts were positioned close to each other on the ship's upper bridge. The bridge equipment included an ECDIS, which the Master who was on the 8-12 watch was monitoring. A lookout was also on the bridge.

Handover

There were a number of vessels astern of vessel A. Five minutes before midnight the Second Officer came to the bridge for his night watch. During the handover, the Master informed him about the vessels which were astern and advised that they were being overtaken by a number of them. After the handover the Master left the bridge.

The Second Officer was aware of a vessel overtaking them on the portside but was not aware of vessel B also overtaking them, but on the starboard side. He switched the radar between centred display to off-centre several times. The lookout was on the port bridge wing.

One minute from collision

The Second Officer was monitoring the ARPA S-band radar when he noticed a target astern on the starboard quarter - it was very close. This was vessel B and it was one minute from collision and only a few cables away. The officer turned around and looked out through the aft starboard bridge windows. Vessel B was almost on top of them. He tried to call the Master but could not reach him. He then switched to manual steering and altered hard to starboard which was towards the overtaking vessel, and the vessels collided.

Collision

Soon after the collision the Master came onto the bridge. He noticed that the engines were still full ahead and the rudder was hard to starboard, but the vessel was not turning. He reduced the engines to 60%. Vessel A was not moving. Vessel B had struck vessel A on the starboard side in way of cargo hold 2. After a while vessel B moved astern, and the vessels disengaged. The Master contacted vessel B but the OOW on vessel B responded that they had only been involved in a near miss. After a while they admitted that they had been involved in a collision.

Recording

The Master saved the VDR. However, only the X-band radar was interfaced with the VDR and as that radar was in standby mode, radar screenshots of the developing close quarter situation had not been recorded by the VDR.

COLREGs

Rule 5 - Look out:

Every vessel shall at all times maintain a proper look-out by sight and hearing, as well as by all available means appropriate in the prevailing circumstances and conditions, so as to make a full appraisal of the situation and of the risk of collision.

It is essential that the OOW ensures that a proper lookout is maintained all-round the vessel in cooperation with the AB on watch. This is the responsibility of the OOW. It is unclear why the lookout did not actively inform the OOW about the vessel overtaking on the starboard side.

Rule 7 - Risk of collision:

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt [then] such risk shall be deemed to exist.

This may include running both radars. The ARPA radars should always be used for plotting all critical traffic. The X-band radar was the only radar recorded by the VDR, which means that the X-band radar should always be running when the vessel is on passage. It is also imperative that the OOW is aware of the bridge equipment's limitations and is not over-reliant on any specific equipment.

Rule 13 – Overtaking:

*(a) Notwithstanding anything contained in the Rules of Part B, Sections I and II, any vessel overtaking any other shall keep out of the way of the vessel being overtaken:
(b) A vessel shall be deemed to be overtaking when coming up with another vessel from a direction more than 22.5° abaft her beam.*

In this collision vessel B was overtaking vessel A and should have kept out of the way of vessel A.

Rule 17 - Action by stand-on vessel:

*(a) (i) Where one of the two vessels is to keep out of the way the other shall keep her course and speed.
(ii) The latter vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these rules.*

(b) When, from any cause, the vessel required to keep her course and speed finds herself so close that the collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

Vessel A was the stand-on vessel. The OOW on vessel A noticed vessel B only one minute prior to the collision. The OOW took the action that he thought would be effective. However, it was too late to be able to avoid the collision.

What can we learn?

- In this accident vessel B did not alter course or adjust its speed at any point. Vessel A was the stand-on vessel and vessel B was the give-way vessel as it was overtaking vessel A on the starboard quarter. Vessel B would have been able to see the stern light of vessel A but not its sidelights.
- Rule 5 stipulates that every vessel shall maintain a proper look-out by all available means. The proximate cause of this collision was poor lookout by those on the bridge of vessel B. Vessel A was the stand-on vessel as it was being overtaken. However, it is essential that the bridge team (the OOW and the dedicated lookout) maintain a proper 360° lookout, track all traffic around the vessel and use all navigation equipment available on the bridge.
- It is imperative that the OOW and lookout discuss all traffic concerned and that the lookout updates the OOW with any change in the movement of the targets. It is the responsibility of the OOW to ensure that the lookout is actively reporting targets observed.
- The X-band radar can, depending on the sea conditions, be better at detecting smaller targets compared to the S-band radar. However, it was on standby. Preferably both radars should be running all the time, as with today's modern ARPA radars there is no reason not to do this. Furthermore, there is an IMO requirement on VDRs installed after 1 July 2014 that both ARPA radars should be recorded to the VDR which was not the case when the VDR was installed on vessel A.

4.2

Collision in restricted visibility when approaching port

Vessel A, a 1000 TEU container vessel, was approaching the pilot station at 17 knots. The vessel was in manual-steering mode and was on a course of 280°. That afternoon visibility was restricted to approximately 0.1 NM due to fog. The Bosun was on deck preparing the pilot ladder after which he would go to the forecastle to act as a lookout.

The bridge

The Master, the Second Officer and the AB were on the bridge. The Master had the conn, the Second Officer was monitoring, and the AB was on the wheel. Two ARPA radars were used alternatively on ranges between 6 NM, 3 NM and 1.5 NM. Both the Master and OOW were monitoring the vessel's progress on the radars.

Monitoring

The Master saw a target on the radar and acquired it on the ARPA as vessel B. The target was 10° on the port bow, 4 NM away with a CPA of 0.2 NM. Vessel A was overtaking vessel B. It could be seen that if vessel A maintained this course, it could hit vessel B on the starboard side. Vessel B was also on a course of about 280° and making a speed of 6 knots. The Master started the fog signal.

C -15 minutes: Vessel B was on course of 293° and the CPA was 0.14 NM. Vessel A was maintaining its course and speed.

C -10 minutes: Vessel B's course was 285°, CPA 0.04 NM and distant 1.4 NM.

C -5 minutes: Vessel B's course was 289°, CPA 0.03 NM and distant 0.65 NM.

C -2 minutes: Vessel B's course was 304° and CPA 0.01 NM and distant 0.3 NM. Vessel B was still on the port bow of vessel A. At this point the Master on vessel A realised that vessel B was very close and ordered hard to starboard and stop engines.

Collision: It was too late to avoid the collision and vessel A struck vessel B on its starboard side about midships. The Master saw that vessel B was a small tanker. Shortly afterwards vessel B began to list heavily to starboard and the crew were forced to deploy the life rafts and abandon ship. They were all rescued by vessel A.

COLREGs

Rule 5 - Look out:

Every vessel shall at all times maintain a proper look-out by sight and hearing, as well as by all available means appropriate in the prevailing circumstances and conditions, so as to make a full appraisal of the situation and of the risk of collision.

In this collision neither vessel seems to have maintained proper look-out.

Rule 6 - Safe speed:

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. In determining a safe speed, the following factors shall be among those taken into account:

- (a) By all vessels:
(i) the state of visibility

The OOW must have time to take proper and effective action to avoid collision as required under Rule 6 to be considered to have proceeded at safe speed. Vessel A was making a speed of 17 knots in restricted visibility while approaching a congested area and a pilot station and this would probably be considered not to be a safe speed in the prevailing circumstances. This is also emphasised in Rule 19.

Rule 7 - Risk of collision:

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt [then] such risk shall be deemed to exist.

(b) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

Vessel B was plotted on the ARPA on board vessel A and showed a small CPA. Despite the small CPA, no action was taken by the bridge team on vessel A. At about C-15, the CPA to vessel B was 0.14 NM, which indicated that a risk of collision existed between the vessels. Visibility was restricted and so it was even more important to ensure that the CPA was large enough to account for any margin of error in the equipment. As per ARPA performance standards regulation the CPA should be calculated by the ARPA within three minutes with an accuracy of within 0.5 NM. This means that if the ARPA reports a CPA of 0.5 NM the actual CPA could be 0.0 miles or 0.5 miles. The bridge team must factor in this margin of error of the CPA when planning any collision avoidance manoeuvres and the passing distances to other vessels.

Rule 8 - Action to avoid collision:

(e) Any action taken to avoid collision shall be taken in accordance with the Rules of this Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

(f) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar: a succession of small alterations of course and/or speed should be avoided.

It is prudent and good seamanship to take action at an early stage by altering course and/or reducing speed to open up the CPA. In this case neither vessel took any action to avoid collision.

Rule 13 – Overtaking:

(a) Notwithstanding anything contained in the Rules of Part B, Sections I and II, any vessel overtaking any other shall keep out of the way of the vessel being overtaken:

Vessel A was overtaking vessel B.

Rule 19 - Restricted visibility:

(a) This Rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.

(b) Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate manoeuvre.

(d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters' situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:

- (i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;
(ii) an alteration of course towards a vessel abeam or abaft the beam.

In restricted visibility both vessels have a requirement to stay clear of each other. It is likely that vessel B was altering course as per its passage plan. It is still the responsibility of vessel A to ensure they stay clear of vessel B as per Rule 19.

What can we learn?

- The bridge team on vessel A acquired vessel B on the ARPA at about C -15 minutes. The CPA was 0.14 NM. With such a small CPA this should be considered a close quarter situation. At this point the bridge team had time to make an alteration to ensure the collision was avoided but no action was taken on vessel A.
- When sailing in restricted visibility all vessels have a responsibility to stay clear of each other. All vessels also have a responsibility to proceed at a safe speed which ensures that they can stop quickly. Maintaining full speed in restricted visibility under these navigational circumstances could be considered proceeding at an unsafe speed. Vessel A was approaching a pilot station in restricted visibility which meant there was also an increased risk of encountering a greater concentration of different types of vessels.
- In restricted visibility both vessels have an obligation to stay clear of each other. However, we do not know why vessel B altered to starboard. It is possible vessel B altered course in accordance with their passage plan. Vessel A was overtaking vessel B which required vessel A to stay well clear of vessel B.
- It is important that the officers understand the rules and increased risks when sailing in restricted visibility. It is also important to understand the limitations of the navigation equipment. It appears that the bridge team on vessel A considered a CPA of 0.14 NM to be an acceptable margin. To ensure situational awareness is maintained, the bridge team should discuss all plotted targets, what risks they pose and take appropriate action.



4.3

Collision in river

It was the middle of the night and vessel A, a 6,500 TEU container vessel, was sailing out from a port in a busy river with a pilot conning the vessel. The weather was fine with clear skies and winds at around Beaufort scale 6. All navigation equipment on vessel A was in good working order except for the AIS transceiver, which was not working.

Vessel A was on an easterly course in the outbound deep-water channel of the river fairway. Vessel B was proceeding on a reciprocal course in the inbound fairway of the river. The vessels were in sight of each other. The Master, Chief Officer, lookout, helmsman and the pilot were on the bridge of vessel A.

Underestimated weather conditions

Vessel B, a handymax bulk carrier, then reduced speed in order to time arrival for its berth. However, the bridge team on vessel B underestimated the impact of the wind and current, and the vessel was set towards the outbound fairway and its heading altered to port and towards vessel A. This caused vessel B to enter the outbound fairway.

No room for manoeuvre

Vessel A was sailing in the fairway of the extended deep-water channel but towards the centreline between the inbound and outbound fairway. The bridge team saw that vessel B had slowed down and that its heading was changing towards them.

There was some room for vessel A to turn to starboard and still remain in the fairway, but it was limited. The vessels were approaching each other, and vessel A was not able to turn to starboard and clear vessel B and still remain in the fairway.

An attempt to communicate

The pilot on vessel A flashed the signal lamp and called vessel B on the VHF but vessel B did not respond. The pilot ordered full astern and tried to alter course to starboard with the bow thruster. This did not prevent the collision. The Master on vessel A saved the VDR data after the accident. There were no injuries or pollution.

COLREGs

Rule 5 - Look out:

Every vessel shall at all times maintain a proper look-out by sight and hearing, as well as by all available means appropriate in the prevailing circumstances and conditions, so as to make a full appraisal of the situation and of the risk of collision.

In this case vessel B failed to keep a proper look-out.

Rule 7 - Risk of collision:

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt [then] such risk shall be deemed to exist.

When vessel B drifted towards the outbound side of the channel it should have been clear to both vessels that a risk of collision was developing. Vessel B did nothing, and vessel A tried to contact vessel B instead of taking evasive action. The COLREGs do not mention the use of VHF. The rules are clear and should not require any discussion between the vessels.

Rule 9 - Narrow channels:

(a) A vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable.

Neither of the vessels navigated near the outer limits of the fairway.

What can we learn?

- If we look at this case from vessel A's point of view, there are several problems in this collision which could have been resolved if the pilot had clarified the intentions of vessel B.
- The major fault in this collision lies with vessel B as it drifted into the opposite fairway when it slowed down. What happened on vessel B's bridge and why it did not respond to vessel A or take any action when it started to drift is unknown.
- It is important to continually evaluate all traffic, especially if the vessel is in a congested area such as approaching or departing a port. In the port state investigation, vessel A was found to be positioned close to its starboard side of the fairway, and this was identified as a fault. However, vessel B was found to be preponderantly to blame. The bridge team was not maintaining a proper look-out, they did not respond on the VHF and vessel B failed to stay clear of vessel A as it drifted into the opposite side of the fairway. The investigation also raised the issue of vessel A not having a working AIS.
- It is important that the bridge team has a departure briefing, where different scenarios are discussed, and the potential risks identified. When the pilot boards, the Master should discuss the plan for the pilotage. It is also important that the Master asks about local regulations, concerned traffic, expected currents and winds, and knows what the passing requirements are and how the pilot plans to approach the departure. If the local language is spoken the pilot must share the conversation, in English, with the bridge team.
- If the Master for some reason is not confident in the pilot's orders, he needs to voice this concern immediately. If he believes the vessel's safety is at risk, he must relieve the pilot. It is not uncommon for The Swedish Club to find that following navigational claims the Master has afterwards stated that he was concerned with the pilot and how they navigated the vessel. However, he did not relieve the pilot and take over.
- It is important that Masters are confident enough and are trained on how to challenge correctly. As in any line of work there is a vast difference in competence between different pilots and officers around the world. The safety of the crew and vessel should always be the Master's priority.

4.4

Collision in busy anchorage after grounding

In an evening with good visibility, vessel A, a 2,470 TEU container vessel, was approaching port. The Master had received orders to arrive at the pilot station at 20:40, which was one hour earlier than previously planned. To make the new ETA the speed had to be increased from 10 knots to 14 knots. Instead of following the passage plan, the Master decided to take a shortcut through an anchorage.

On the bridge was the Third Officer, who was the OOW, the Master who had the conn and the Chief Officer who was monitoring traffic both on the radar and visually. He was also talking on the VHF. An AB was manually steering whilst the Third Officer was filling out the logbook. The two ARPA radars were in north up, relative motion and the radars were switched between 3 NM and 6 NM range. The CPA alarm was set to 0.3 NM.

Passage plan not updated

The Second Officer who was the navigation officer, had already entered the waypoints for the original passage plan into both ARPA radars and the ECDIS, and a cross-track error alarm of 1 cable had been set up. During the approach he was not on the bridge and the passage plan was not updated for the shortcut as the Master did not consider it was necessary.

C -15 minutes: During the approach to the pilot station there were two smaller vessels ahead of vessel A that would be overtaken on their starboard side. Shortly after the vessels had been overtaken the Master ordered an alteration to port which meant that vessel A crossed in front of the bow of the two vessels.

C -12 minutes: The Master was also aware of two outbound vessels from the port, vessels B and C. These vessels were not acquired on the radar. Vessel B called up vessel A and asked what their intentions were. The Master responded that he would like to have a port-to-port passing. Vessel B replied that it was turning hard to starboard to make the passing. The Master altered course to starboard. At this time vessel B was about 1 NM away on the port bow.

C -9 minutes: The Master became aware of vessel C on the port bow. He could see the green, red and forward top lights on vessel C but did not take any action. Vessel A was maintaining a speed of 10 knots.

C -7 minutes: The Master decided to open up/increase the CPA by altering 5 degrees to starboard for vessel C. A minute later the Master realised that vessel C was very close, and he ordered full ahead and hard to starboard. The vessels just passed each other clear by 10 metres. When vessel C was abeam the Master became aware of an island just ahead and he ordered hard to port. When vessel C passed clear the Master ordered midships and then 20 degrees to port.

C -4 minutes: A minute later the pilot called the vessel on the VHF and asked why the vessel was heading dangerously close to the island. The vessel was now very close to it. The Master once again ordered midships and believed they would stay clear of the island.

C -3 minutes: Suddenly the vessel started to vibrate heavily and there was a loud noise. The vessel's speed was reduced to 5 knots. The Master was initially confused about what had happened but then understood that the vessel had hit the bottom but was still making way.

C -2 minutes: The Master identified that vessel D was at anchor only 0.15 NM ahead of them, at which point the AB informed him that the rudder was not responding. The Master ordered starboard 20 and then hard to starboard, but the AB repeated that the rudder was not responding. The vessel was now sailing at about 7 knots. The Chief Officer suggested dropping the anchor, but the Master declined.

Collision: The Master ordered full astern but shortly afterwards vessel A's bow hit the side of vessel D. The Master reported the grounding to the VTS but did not consider it was necessary to report the collision. Shortly afterwards the vessel managed to disengage from vessel D by engine manoeuvres and later dropped anchor.

COLREGs

Rule 5 - Look out:

Every vessel shall at all times maintain a proper look-out by sight and hearing, as well as by all available means appropriate in the prevailing circumstances and conditions, so as to make a full appraisal of the situation and of the risk of collision.

The bridge was manned properly in terms of the number of individuals present and number of functions represented. However, the different members of the bridge team had not been assigned properly defined roles and duties. The Master was in charge, but he did not use the members of the bridge team to provide him with the information he needed to make decisions about the safe navigation of the vessel.

A bridge team will be more efficient if roles and responsibilities are defined as outlined in The Swedish Club **Bridge Instructions** booklet.

Rule 6 - Safe speed:

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. In determining a safe speed, the following factors shall be among those taken into account:

(a) By all vessels:

(ii) the traffic density including concentrations of fishing vessels or any other vessels:

(iv) at night the presence of background light such as from shore lights or from back scatter of her own lights.

Proceeding at a speed of 14 knots through a busy anchorage can probably be considered to be unsafe. We know that the Master stated at the hearing following the incident that the vessel was not proceeding at a safe speed but that he was determined to make the ETA.

Rule 7 - Risk of collision:

(a) *Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt [then] such risk shall be deemed to exist.*

(b) *Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.*

All available equipment on the bridge should be used to determine if a risk of collision exists. In this case not all the vessels were plotted on the ARPA, not even vessels which were in close quarter situations. It is imperative to plot all vessels to determine if risk of collision exists. The bridge was manned with three officers including the Master. However, the Master had not delegated the task of monitoring surrounding traffic and reporting close-quarters situations before they became dangerous.

Rule 8 - Action to avoid collision:

(a) *Any action to avoid collision shall be taken in accordance with the Rules of this Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.*

(b) *Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar: a succession of small alterations of course and/or speed should be avoided.*

The Master appears not to have communicated his intentions to the bridge team. The Master did not make a proper appraisal of the possibility of arriving at the pilot station at the time requested by the pilots.

What can we learn?

- There are several reasons why this vessel went aground and also suffered a collision. These were set in motion by a change to the passage plan caused by the order to arrive earlier at the pilot station. This is a common root cause of groundings and other accidents.
- In his desire to arrive at the pilot station on time the Master lost focus on safe navigation.
 1. He improvised the passage plan, which meant that no evaluation of the safety of the route was made.
 2. He demonstrated a complete loss of situational awareness.
 3. He failed to communicate his intentions to the bridge team and did not delegate tasks to the officers on the bridge.

A proper evaluation of the options would probably have resulted in the Master calling the pilots to say that they could not make the desired ETA but would arrive 20 minutes later.

- It is not good seamanship to cross in front of vessels that have just been overtaken. Once again it highlights the risks the Master was willing to take to make the ETA.
- Any deviation from the passage plan other than for collision avoidance should be documented and subject to a proper appraisal. The passage plan should be berth to berth and not only pilot station to pilot station. The new passage plan needs to be entered in the ECDIS. All bridge team members need to sign the updated passage plan. If paper charts are used, the charts must be updated and the route plotted on the charts.



4.5

Collision due to miscommunication when approaching port

Vessel A, a capesize bulk carrier, was approaching port while fully loaded with iron ore. It had an overall length of 325 metres, a breadth of 52.5 metres and drafts of 17.8 metres. The water depth in the fairway of the port was more than 18 metres. However, the water depth to the north and south of the fairway was less than 17 metres. Vessel A was constrained by her draught and had the correct lights displayed. The fairway was about 420 metres in breadth.

Pilot briefing carried out

The pilot had embarked, and three tugs were lining up to connect to the vessel. The Master and pilot on vessel A had carried out a pilot briefing and the pilot had received a copy of the pilot card. It was evening with clear skies and light winds. Vessel A had a speed of 7 knots and a course of 310 degrees and both steering pumps were switched on. All navigation equipment was working. The vessel was in manual steering mode. Both X-band and S-band ARPA radars were set to north up and true motion. The range was switched between 3 NM and 6 NM.

On the bridge of vessel A were the Master, the Third Officer who was OOW, the pilot and the helmsman. According to the wheelhouse poster the minimum manoeuvring speed for vessel A was 5 knots. In ballast condition, it would take it about 12 minutes to stop if the engines were put from full ahead to full astern. If vessel A was sailing at 15 knots in deep water, it would take about 153 seconds to alter course by 90 degrees at hard-over angle.

C -30 minutes: Vessel B outbound from the port was acquired on the ARPA. It was a panamax bulk carrier with a length overall of 225 metres, breadth of 32.3 metres and was about 10 degrees on the starboard bow, 6 NM away. The ship was on a course of 125 degrees making about 10 knots, giving it a course almost reciprocal to the course of vessel A. Vessel B had a CPA of 0.5 NM and was shaping up to pass down the starboard side of vessel A. Those in vessel A observed the starboard green sidelight and masthead lights on vessel B. The vessel had a pilot on board.

C -14 minutes: Vessel B was about 3 NM distant. Behind vessel B there was a third outbound vessel. Vessel B was still slightly on the starboard bow of vessel A. Vessel B was outbound and navigating in the waters outside and to the north of the fairway.

C -12 minutes: The pilot on vessel A talked to the pilot of vessel B in the local language, and was advised that vessel B's pilot had just disembarked, before which he had told the Master of vessel B that he should pass vessel A green to green. Vessel A's pilot ordered the tugs to standby as they were approaching the buoyed fairway.

C -11 minutes: The pilot on vessel A called vessel B on the VHF and asked to pass green to green, which an officer on vessel B agreed upon. Vessel A was now on a course of 300 degrees and making about 8 knots. At about the same time, the VTS called vessel B and informed it that vessel A was inbound. Vessel B's officer acknowledged that they were aware of vessel A and that they would pass green to green.

C -9 minutes: The pilot ordered the first tug to make fast on the stern, the second on the starboard side and the third to follow the vessel on the port side. Vessel B was at a distance of 2.3 NM.

C -2 minutes: When vessel B was about 0.5 NM off the starboard bow it started to alter to starboard and towards vessel A and the red side light on B could be seen. The pilot on vessel A was alarmed by vessel B and called on the VHF and yelled 'green to green vessel B' and at the same time ordered hard to port and stop engine. An officer on vessel B replied, 'too close have to pass port to port' and continued to alter to starboard.

Collision: The pilot on vessel A ordered hard to starboard and full astern but it was too late, and the vessels collided. Vessel B's port side shell plating was torn open from cargo hold 2 to cargo hold 6.

COLREGs

Rule 3 - General definitions:

(h) The term 'vessel constrained by her draught' means a power-driven vessel which, because of her draught in relation to the available depth and width of navigable water, is severely restricted in her ability to deviate from the course she is following.

Vessel B should have stayed clear of vessel A as she was constrained by her draught.

Rule 8 - Action to avoid collision:

(a) Any action to avoid collision shall be taken in accordance with the Rules of this Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

(b) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar, a succession of small alterations of course and/or speed should be avoided.

(c) If there is sufficient sea-room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.

Reviewing the radar screenshots recorded by the VDR on vessel A shows that the vessels were positioned to make a safe 'starboard to starboard' passing had they kept their courses. At this point there was no risk of collision. However, just before the vessels began to pass each other, vessel B called 'port to port' on the VHF and altered starboard to cross ahead of vessel A. The distance between the two vessels was about 0.5 NM when vessel B called port to port. The sudden starboard alteration by vessel B changed a safe starboard-to-starboard passing into a risk of collision. Vessel B caused a risk of collision to arise.

Rule 9 - Narrow channels:

(a) A vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable.

(d) A vessel shall not cross a narrow channel or fairway if such crossing impedes the passage of a vessel which can safely navigate only within such channel or fairway. The latter vessel may use the sound signal prescribed in Rule 34(d) if in doubt as to the intention of the crossing vessel.

Vessel A was sailing on the starboard side in the fairway/narrow channel with constrained draught.

Vessel B was outside of the fairway and then suddenly altered to starboard at a distance of 0.5 NM and tried to cross ahead of vessel A, which is in violation with (d).

Rule 18 - Responsibilities between vessels:

(a) A power-driven vessel underway shall keep out of the way of:

(ii) a vessel restricted in her ability to manoeuvre;

(d)

(i) Any vessel other than a vessel not under command or a vessel restricted in her ability to manoeuvre shall, if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by her draught, exhibiting the signals in Rule 28.

Vessel B should stay clear of vessel A.

What can we learn?

- Vessel A was a huge vessel, constrained by her draught and was assisted by tugboats which made it difficult for her to manoeuvre. To enter the fairway, vessel A needed to be lined up at an early stage. The agreement between the two vessels was to pass 'starboard to starboard'. This meant that vessel B would keep sailing outside and to the north of the fairway (B was already sailing outside the fairway) whilst A would proceed in the fairway. If vessel B had not altered to starboard there would not have been a collision.
- The pilots on vessels A and B made a verbal agreement to pass 'starboard to starboard'. This was also confirmed later between the pilot on vessel A and an officer on vessel B. The VTS was also in contact with vessel B and informed them that vessel A was an incoming vessel. They also did not raise any concerns about the 'starboard to starboard' passing.
- Collisions between vessels in a narrow channel are one of the few scenarios in collisions between two vessels underway where one vessel can be held solely at fault for not maintaining position on its starboard side of the fairway. These are issues that Masters need to be aware of.

4.6

Collision in restricted visibility

Vessel A was a 2,692 TEU container vessel underway. Shortly after commencing the sea passage, visibility worsened. The vessel was sailing through dense fog with SW winds at Beaufort scale 6. On the bridge were the Master, OOW and a lookout. The Master had the conn. At 20:00 the Second Officer took over the watch from the Third Officer. The visibility was only 0.1 NM and the fog was persistent into the evening. The Master stayed on the bridge the entire time.

Speed of 17 knots

Vessel A was maintaining a speed of 17 knots on a course of 240 degrees, the vessel was sounding fog signals. Both the ARPA X-band and S-band radar were used and the ranges were changed between 3 NM and 6 NM.

C -12 minutes: Vessel B was on the port bow about 3 NM from vessel A, making a speed of 6 knots on a 010 degree course according to the ARPA. Vessel B was about 11 o'clock from vessel A and crossing from port to starboard. The CPA was 0.0 NM and so a risk of collision existed.

C -10 minutes: The Master saw the name of vessel B on the AIS and called it on VHF channel 16, but had no response. He also used the searchlight to flash at the direction of vessel B as a warning signal. It is unlikely that vessel B would have seen this.

C -5 minutes: The Master ordered hand steering and an alteration to port to 210 degrees, in order to let vessel B pass ahead of vessel A. Shortly afterwards vessel B started to alter to starboard, resulting in a distance of 0.5 NM between them. The Master on vessel A ordered hard to port.

Collision: The vessels collided, and vessel B struck the starboard side of vessel A. The Master on vessel A now saw that vessel B was a fishing vessel.

Continued at same speed and course

However, the Master of vessel A continued the voyage at the same speed and course. After a while the VTS called vessel A and told them to stop and await the coast guard. At the time of the collision the fishing vessel was fishing by casting fishing pots overboard.

COLREGs

Rule 5 - Look out:

Every vessel shall at all times maintain a proper look-out by sight and hearing, as well as by all available means appropriate in the prevailing circumstances and conditions, so as to make a full appraisal of the situation and of the risk of collision.

The bridge was manned sufficiently and the bridge team on vessel A plotted vessel B at an early stage. However, the bridge team did not act on their observations.

Rule 6 - Safe speed:

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. In determining a safe speed, the following factors shall be among those taken into account. [(a) By all vessels:]

(i) the state of visibility:

(ii) the traffic density including concentrations of fishing vessels or any other vessels:

A speed of 17 knots in restricted visibility in an area with fishing boats can be considered unsafe.

Rule 7 - Risk of collision:

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt [then] such risk shall be deemed to exist.

The CPA was 0 when vessel A plotted vessel B at C -12 minutes. It should have been apparent to those on the bridge of vessel A that there was a risk of collision.

Rule 19 - Conduct of vessels in restricted visibility:

(a) This Rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.

(b) Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate manoeuvre.

(d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:

(i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken:

(ii) an alteration of course towards a vessel abeam or abaft the beam.

Vessel A altered to port, which is in contravention of rule 19 as vessel B was on the port bow of vessel A. At no time did the Master on vessel A reduce speed.

What can we learn?

- The Master and OOWs must always consider the safe speed of the vessel. The crew may be under the impression that they have to maintain a high speed to meet a schedule and this can create conflicts of interest between meeting a schedule and sailing at a safe speed. This is something that the Master and the owners must deal with in their safety management procedures to ensure that the vessel is navigated safely.
- In addition, the greater risk of sailing at a high speed must always be evaluated by the Master and instructions conveyed to the bridge officers. Rule 6 advises that a vessel needs to be able to avoid a collision as per the prevailing situation. Proceeding at higher speeds will also attract a higher degree of blame when the courts apportion liability between the vessels involved in collision.
- The bridge team on vessel A was aware of vessel B for about 12 minutes before the collision. Despite the clear indication that the vessels were on collision courses, the Master of vessel A altered to port, towards vessel B and in contravention of rule 19. Under no circumstances should a vessel alter to port towards a vessel on its port bow in restricted visibility as vessel A did in this collision. The Master on vessel A stated that this manoeuvre was because he believed that vessel B was the give-way vessel and that vessel B would pass forward of vessel A. Under Rule 19, both vessels have an equal obligation to avoid a collision.
- It is not acceptable to continue a voyage after a collision and this was a very bad decision by the Master. He should have ensured that all crew on vessel B were safe before continuing the voyage, which he did not do.
- The Master had been on the bridge for five hours when the collision occurred. It is unknown how long he had been awake prior to this. However, according to the flag state investigation it is unlikely that the Master suffered from fatigue.
- In this case vessel B was plotted but the bridge team on vessel A did not act on the information and assumed that vessel B would alter course. It is important to ensure that bridge officers are well trained so that they can take critical decisions quickly and correctly. They must understand the consequences of their actions, appreciate when no action needs to be taken, and know how to prevent a close-quarters situation.
- Some safety management systems stipulate minimum CPA limits and manning levels in the navigation policy, depending on visibility and during critical operations such as approaching or leaving a port. However, generic requirements in the navigation policy may not illustrate to officers what are acceptable limits and what are unacceptable limits. Many of these issues are covered in the Club's *Bridge Instructions* booklet.



4.7

Contact while berthing in river

It was early morning and a 150 metre long, 14,900 DWT general cargo vessel, vessel A, was sailing up a South American river with a pilot on board. The Master and pilot had carried out a pilot briefing where the pilot presented the plan for berthing. The vessel would be berthed portside alongside, between two vessels which were already berthed. The Master asked the pilot if any tugboats would be necessary, but the pilot did not believe so as there would be a 200 metre gap between the berthed vessels, giving vessel A about 50 metres clearance from the berthed vessels.

Strong current and brisk winds

During the berthing the Chief Officer was by the radar and the ECDIS on the bridge, monitoring progress. The vessel had a speed of about 2 knots over the ground in the river and was on a NNW course. There was a strong SSE current at around 2-3 knots and a NE wind at Beaufort scale 3. During the final berthing manoeuvre the vessel passed one of the berthed vessels with only 20 metres clearance on the portside. The wind set the vessel towards the berthed vessel.

The Master had the conn and was positioned on the port wing. As he was manoeuvring the vessel, the pilot gave him advice and instructions. When the Master noticed that his vessel was very close to the berthed vessel he ordered full power to starboard on the bow thruster.

Master lost control

Despite the Master's efforts to turn the bow to starboard the vessel continued turning to port and the bow collided with the berthed vessel. The vessel's superstructure was forward, so the bridge wing also caused damage to the berthed vessel.

The Master finally managed to gain control of the vessel and berth it. Upon berthing the vessel, the Master noted that the distance between the two other vessels was 10 metres forward and 20 metres aft.

What can we learn?

- When the Master approached the berth, he should have evaluated if the available tugs should be used or not. If he was unsure about the clearance, he should have asked the pilot for tug assistance before berthing.
- It is important that the Master and pilot discuss what is anticipated and how to carry this out in the safest way. When the vessel was sailing up the river there were strong currents and some wind. During the manoeuvre the Master had the conn but needed constant updates from the pilot and Chief Officer about how strong the current was. These discussions should also have taken place during the pilot briefing. Having an NNW course and NE winds on the starboard bow will push the bow to port, especially when the vessel is lining up for the final approach and altering slowly to port and slowing down. The current will also make the approach more difficult as more power must be used during the final manoeuvre as the current would push the bow to starboard.
- The entire bridge team should be involved in berthing. In this instance the Chief Officer was by the radar and ECDIS and was the person who could have informed the Master about changing current or wind. The current also took the pilot by surprise. An efficient bridge team are assigned roles where they all know what they are expected to do and what the other persons are supposed to do. If someone makes a mistake this should be identified by a member of the bridge team. The Chief Officer was on the bridge and he should have supported the Master with information. This is further explained in the Club's **Bridge Instruction** booklet.



4.8

Excessive speed when approaching berth

It was morning with clear skies and NW winds at Beaufort scale 7. A 200 metre RoRo vessel had picked up the pilot. There had been a short pilot briefing where the bridge team were advised that that the vessel would berth starboard side at berth A which had a course of 285 degrees. The approach in the fairway was 090 degrees. This meant that the vessel had to make a large port alteration of 165 degrees to line up with the berth. The port had no breakwater and was open to the sea.

Two tugs standing by

The pilot had the conn and the vessel was sailing down the fairway on a 90 degree course and a speed of 9 knots over the ground. Two tugs were standing by but were not connected. At the position where the pilot decided to begin the alteration there were less than 500 metres of space between the quays in the port basin.

Wind pushed vessel away from berth

The pilot ordered the vessel to come around to port and stop the engines. The vessel was still making 9 knots. The vessel was sensitive to the wind because of the large hull and superstructure. This caused the NW wind to push the vessel away from the berth.

The vessel started to alter to port and was facing the berth at a 90 degree angle when it was only 50 metres away. The pilot realised the danger and ordered slow astern and hard to port, followed instantly with full to port on the bow thruster. As the speed was excessive for the bow thruster nothing happened.

Bow hit quay at speed

At the same time the Master realised that the vessel was not slowing down so he ordered the port anchor to be dropped and full astern on the engines. It was too late, and the bulbous bow hit the quay at a 90 degree angle.

After the contact the tugs were connected and berthed the vessel.

The vessel had to dry dock and repair the bulbous bow. The berth also needed extensive repairs.

What can we learn?

- The vessel was approaching at excessive speed. Maintaining a speed of 9 knots when starting to swing around and as close as 50 metres highlights that the berthing plan was not safe and that the bridge team had not planned it accordingly regarding wind and speed.
- The Master did not challenge the pilot until it was obvious that the vessel would make heavy contact with the quay. It is imperative during the pilot briefing that the approach is discussed in detail with the entire bridge team, so orders can be challenged if there is concern.
- Two tugs were standing by but were not connected. Once again, if the vessel had slowed down and had the tugs connected the berthing manoeuvre would have been controlled. If tugs have been ordered why not use them?

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 service



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