KOMITE NASIONAL KESELAMATAN TRANSPORTASI

REPUBLIC OF INDONESIA

FINAL

KNKT.19.01.03.03

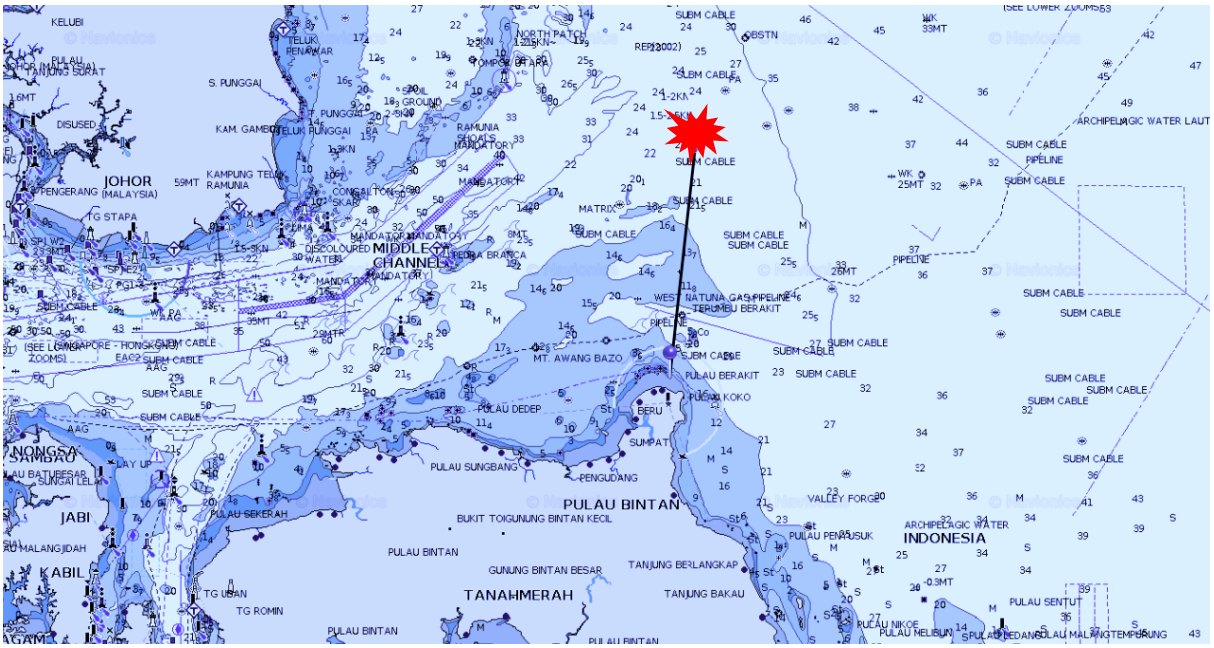
Marine Safety Investigation Report

Collision between *ANTEA* and *STAR CENTURION*

Approximately 10 nm north of Tanjung Berakit, Pulau Bintan, Kepulauan Riau

Republic of Indonesia

13 January 2019



2020

The report is based upon the investigation carried out by the KNKT in accordance with IMO Resolution MSC. 255 (84) and Indonesian Shipping Act (UU No.17/2008).

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The report was issued based on:

1. Indonesia Shipping Act no 17 year 2008, chapter 256 and 257 along with it explanatory
2. Government regulation No 62 year 2013 on Transport Accident Investigation
3. President Regulation No 02 Year 2012 on the Komite Nasional Keselamatan Transportasi
4. IMO Resolution MSC.255 (84) on Casualty Investigation Code

The report is issued by the **Komite Nasional Keselamatan Transportasi (KNKT)**, Gedung Perhubungan Lantai 3, Kementerian Perhubungan, Jln. Medan Merdeka Timur No. 5, Jakarta 10110, Indonesia, in 2020.

FOREWORD

Praise to be given to the Almighty God with the completion of the preparation of the Final Report on the Investigation of the collision between Antea and Star Centurion approximately 10 nm of Tanjung Berakit, Pulau Bintan, Kepulauan Riau on 13 January 2019.

The completion of this Final Report of Marine Accident Investigation was mandated by Indonesian Shipping Act No. 17 Year of 2008 Articles 256 and 257 as well as Government Regulation of Transport Accident Investigations No. 62 Year of 2013 Article 39 paragraph 2 Letter c which states that "The report of transport accident as referred to the verse (1) consists of the final report".

The report is the final output of the entire investigation process which covers fact information, analysis of causal factors that most likely contributed the accidents, recommendations for prevention and improvement, and appendix of other supporting documents. The report discussed the marine accidents issues about what, how and why the accident occurred and findings about the cause of the accident along with the recommendations of shipping safety to the parties to minimise or prevent recurrence by the same factors in the future. The final report is issued or publicly published after requesting responses and/or feedback from regulators, operators, manufacturers of transportation facilities and other related parties.

The last, but not the least, the Final Report of Marine Accident Investigation was made so that the interested parties could learn and take lessons from the accident.

Jakarta, September 2020

KOMITE NASIONAL KESELAMATAN TRANSPORTASI

CHAIRMAN

Dr. Ir. SOERJANTO TJAHJONO

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SUMMARY

On 13 January 2019 at 0616[1] hours local time, the Hong Kong flagged oil tanker *Antea* and the Vanuatu flagged pipe layer *Star Centurion* collided at Bintan waters, approximately 10 nautical miles north of Tanjung Berakit, Pulau Bintan, Kepulauan Riau, Indonesia. *Antea* was on passage from Singapore to Wayame in Indonesia with a cargo of 25377 metric tonnes of Jet A-1. The vessel was eastward after leaving eastern sector of the Singapore Strait Traffic Separation Scheme (TSS), with the deck officer on watch and able seaman manning the bridge. *Star Centurion* was at anchor on outer port limit to standing by waiting for further instructions from the ship manager.

Antea had the forecastle and bow damaged in the collision. The vessel was able to proceed to Port of Sungai Linggi, Malaysia to discharge all cargo before went for permanent repairs in Singapore.

Star Centurion had severe damaged in the hull on the port side. The vessel watertight integrity compromised and it commenced taking on water then capsized due to a loss of stability and eventually it sank in the collision location.

The accident did not result in any injuries or pollution.

[1] Unless stated otherwise, all times shown in this report are local (UTC + 8 hours)

I. FACTUAL INFORMATION

I.1. Notification of the accident

On 13 January 2019, at 0616 hours local time, the Hong Kong registered vessel *Antea* and the Port Villa registered vessel *Star Centurion* collided in the Bintan waters, at about 10 nm north of Tanjung Berakit, Pulau Bintan, Indonesia. Following the accident, *Antea* broadcasted message by VHF ch. 16 to alert the ships in vicinity. The Singapore Port Operations Control Centre (POCC) notified the National Search and Rescue Agency (BNPP) Tanjung Pinang.

Indonesia as coastal state notified Hong Kong and Vanuatu as flag states of the accident. The National Transport Safety Committee (KNKT) carried out investigation pursuant to chapter 8 of the Indonesia Shipping Act no.17 of 2008 and the International Maritime Organization's guidelines for conducting marine accident investigations.

On 16 January KNKT started investigation to the accident site where the *Star Centurion* capsized and eventually sank. On 25 January 2019, the *Antea* owner and operators were informed, and representatives of KNKT went on board *Antea* at Keppel Tuas Shipyard in Singapore.

I.2. Photo of *ANTEA* and ship particulars

Figure I-1: ANTEA (source: MarineTraffic)

Name of ship:	*ANTEA*
Type of ship:	Oil Tanker/Chemical Tanker
Flag state:	Hong Kong
Port of registry:	Hong Kong
IMO number:	92550153
Call sign:	VRMW6
Year built:	2002

Place built:	Ulsan, South Korea
Classification society:	American Bureau of Shipping
Length overall:	175.86 m
Breadth:	31.00 m
Depth:	17.00 m
Maximum height:	49.88 m
Gross tonnage:	32,545
Hull material:	Steel
Main engine:	2 Stroke B&W 6S50MC
M.C.R:	11640 BHP at 127 RPM
Propeller:	Single screw, right, 4 blades
Rudder:	Semi balanced
Bow thruster:	1341 BHP

I.3. Voyage particulars for *Antea*

Port of departure:	Singapore
Port of call:	Wayame, Indonesia
Type of voyage:	International
Cargo information:	25377 metric tonnes of Jet A-1
Manning:	23 of Filipino, Indonesian, Turkish, Indian and Myanmar nationalities
Pilot on board:	No

I.4. Photo of *STAR CENTURION* and ship particulars

Figure I-2: STAR CENTURION (source: SE Subsea)

Name of ship: *STAR CENTURION*

Type of ship:	Pipe Laying
Flag state:	Vanuatu
Port of registry:	Port Vila
IMO number:	9241712
Call sign:	YJUU8
Year built:	2002
Place built:	Ulsan, South Korea
Classification society:	Lloyd's Register of Shipping
Length overall:	146.5 m
Breadth:	30.0 m
Depth:	17.1 m
Gross tonnage:	27,082
Hull material:	Steel
Main engine:	4 x MAN 8L32/40, 3,840 kW
Aux engine:	2 x CAT 3512C, 1,785 kW
Propulsion:	Main propulsion, 2 x Azimuth thrusters Bow thrusters, 1 x tunnel thruster, 2 x retractable azimuth thrusters Mid ship thrusters, 2 x swing down azimuth thrusters Stern thrusters, 2 x swing down azimuth thrusters

I.5. Voyage particulars for *Star Centurion*

Port of departure:	Johor Bahru, Malaysia
Port of call:	Singapore
Type of voyage:	International
Cargo information:	In ballast
Manning:	22 of Dutch, Ukranian, Iranian, Indian, Mexican, Polish, Indonesian, Malaysian and Myanmar nationalities.
Pilot on board:	No
No. of passengers:	0

I.6. Marine Casualty Information

ANTEA

Date and time:	13 January 2019 at 0616 hours local time
Type of marine casualty/accident:	Collision
Location:	Pulau Bintan waters
Position:	01° 24.8' N - 104° 35.5' E
Ship operation:	On passage

Place on board: Forecastle area; Bow above and under waterline

Consequences: Breach of bow and substantial damage to anchor and forecastle area

Injuries/fatalities: None

STAR CENTURION

Date and time: 13 January 2019 at 0616 hours local time

Type of marine casualty/accident: Collision

Location: Pulau Bintan waters

Position: 01° 24.8’ N - 104° 35.5’ E

Ship operation: At anchor

Place on board: Almost amidships on the port side to the full depth of the vessel

Consequences: Capsized and sank

Injuries/fatalities: None

I.7. Weather Data

Wind direction and speed: NE / force 4 (11-16 knots)

Sea: Slight (0.5-1.25 metres)

Visibility: 8-10 nm

Light/dark: Dark

Current: Southerly at about 1.5 knots

I.8. Site Of The Accident

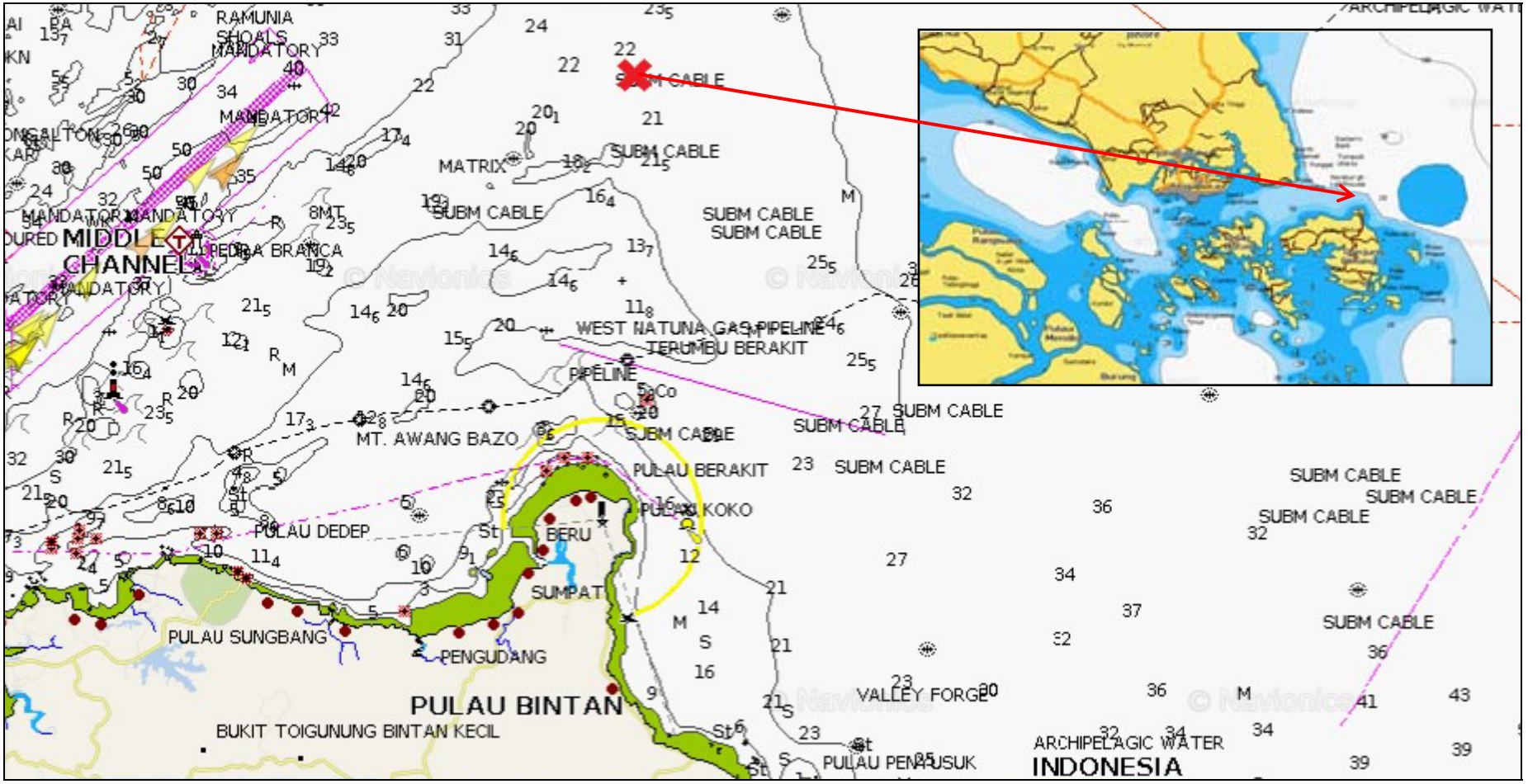


Figure I-3: Map of the accident site, approx. 10 nm north of Tanjung Berakit, Pulau Bintan, Indonesia

I.9. THE ACCIDENT

I.9.1. Events on *Antea*

After completed loading at Shell Bukom Terminal, Singapore the oil tanker *Antea* shifted to Western Petroleum 'B' Anchorage (AWPB) for taking bunker. On 12 January 2019 at 2000 hours, the vessel has completed bunkering. At 2300 hours, one-hour notice to engine room. The third officer as the officer on watch conducted preparation for departure. The main engine has tested and put on standby at 2350 hours.

At 2355 hours, the second officer arrived on the bridge.

On 13 January 2019 at 0005 hours, the second officer called the Master because Pilot was enroute to the ship. At 0010 hours, the Master on the bridge. At 0018 hours, Pilot on board.

At 0024 hours, commence heave up anchor after completed Master/Pilot information exchange. The anchor was aweigh at 0036 hours.

At 0106 hours, the Pilot disembarked.

Antea proceeded accordance with navigation plan through the fairway, crossing the traffic at precautionary area and subsequently joined the eastbound lane in Traffic Separation Scheme (TSS) of Singapore strait. The vessel displaying standard navigation lights for a vessel of her size, that including two masthead lights, side lights and a stern light.

At 0142 hours, full away, the *Antea* begin her sea passage bound for Wayame, Indonesia. The Master increased engine revs to full sea speed (96 Rpm), and the ship was making good a speed of 10 knots.

At 0400 hours, having assessed the vessels traffic situation which were not concerns and the *Antea* about to exit the TSS, the Master changed the steering to auto and handed over the con to the second officer who was the officer on watch. After that the Master leaving the bridge for rest. At that time, the weather remained overcast with good visibility to a range of 8-10 nm, sea state was slight and wind NE force about 4. The vessel was on a course of 050°(T) with engine at full ahead in the eastbound lane in the TSS of Singapore Strait. There was an able bodied seaman (AB) on the bridge as a look out.

At 0500 hours, the ship maintained on a course of 050° (T). The vessel arrived at the termination of eastern section of the Singapore Strait TSS at approx. 0535 hours.

At about 0537 hours, the second officer started to change course to a new course in accordance with passage plan utilising the auto pilot.

At about 0544 hours, the second officer has completed the course alteration to 085° (T). The second officer observed several vessels anchored on the port bow. There was a vessel visually fine on the starboard bow. The vessel on the starboard bow was marked as 4 on the ECDIS display with distant about 5.8 nm ahead of the vessel. The vessel was identified later as *Star Centurion*. The second officer used the S-band radar and acquired *Star Centurion*. The S-band radar computed value of distance of the closest point of approach (CPA) of around 0.2-0.3 nm on *Antea* starboard side and the time to the closest point of approach (TCPA) was indicated as 30 minutes.

At 0545 hours, the second officer declared the vessel 'at sea' to the engine room.

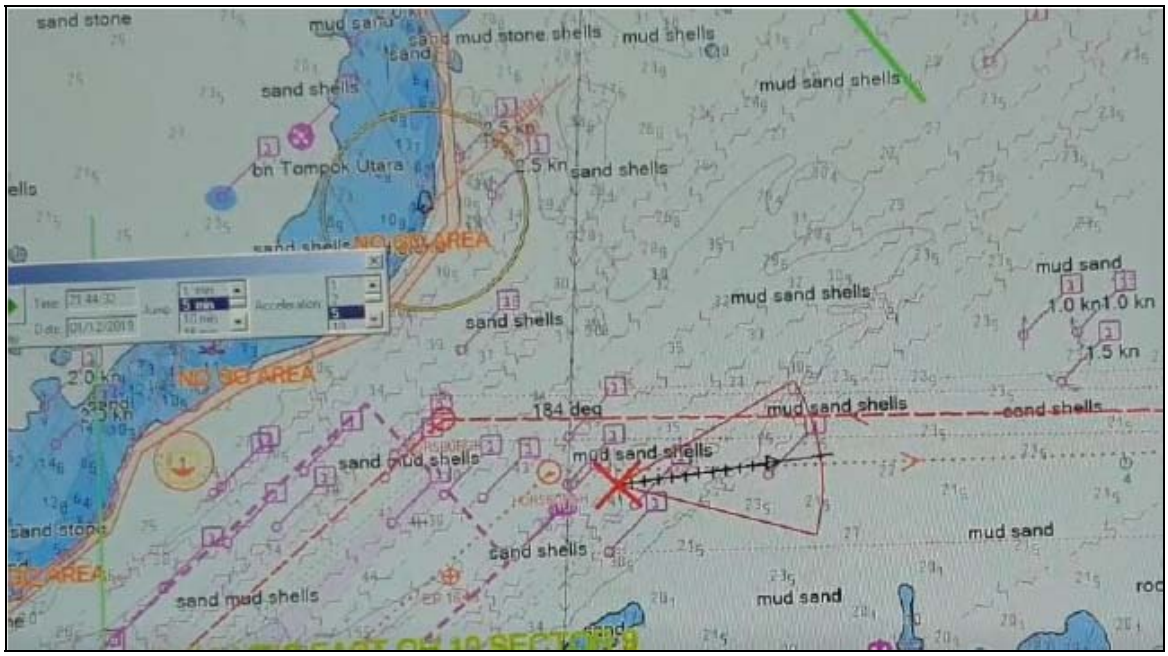


Figure I-4: ECDIS playback at 0544 hours. Antea on a new course of 085°

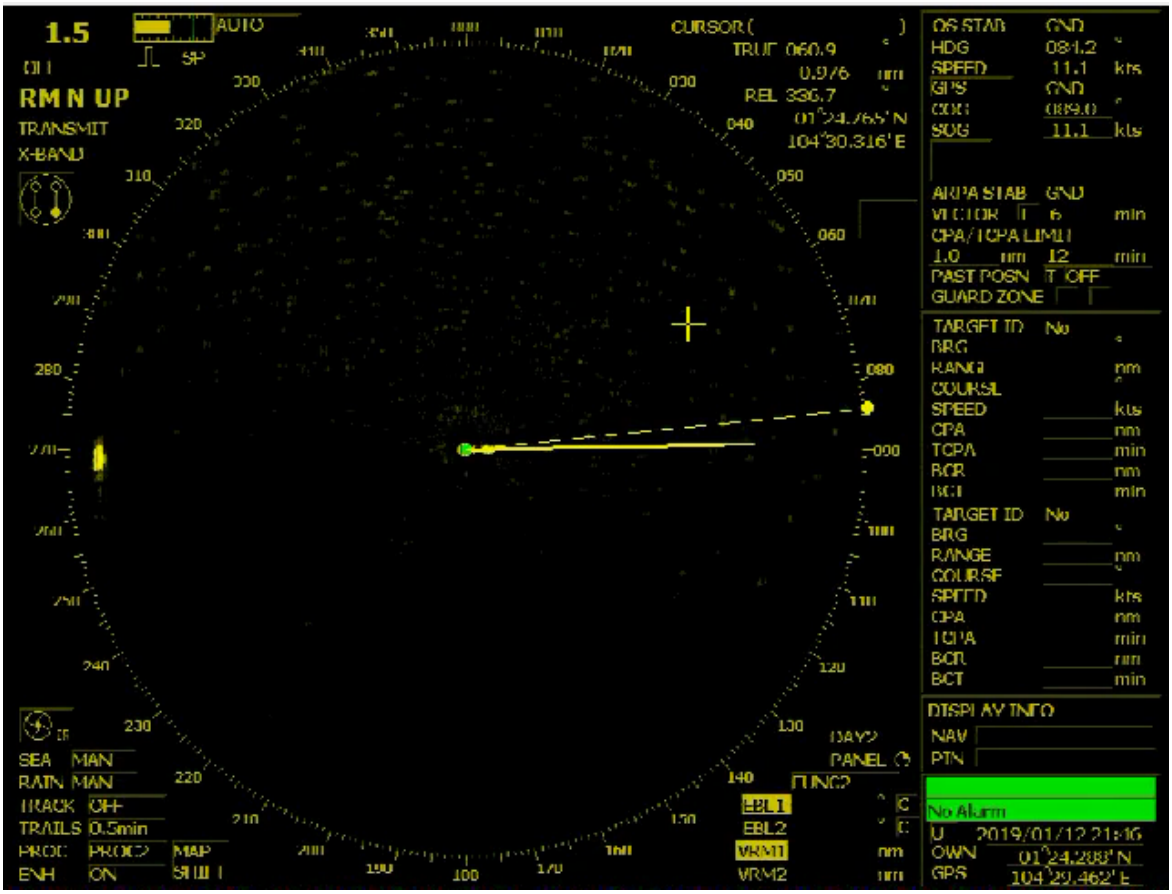


Figure I-5: Extract from X-band radar on Antea at 05:45:48 hours

At 0545 hours, the X-band radar setting was 1.5 nm of range, configured to north up, in relative motion, sweep origin on centre, vector 6 minutes and trails 0.5 minutes. The ARPA plot functions were not used.

The third officer arrived on the bridge at 0600 hours to take over navigational watch from the second officer. The second officer and third officer then carry out handing over watch procedures. In process of handover the watch, the second officer explained regarding current traffic situation to the third officer. The second officer stated that all the ships ahead of *Antea* were at anchor with the exception of *Lauren*, which sailed in the same direction and already ahead of *Antea*.

At 0603 hours, the X-band radar range scale setting changed to 3 nm. The radar trails extended to 6 minutes subsequently, and the centre changed to offset to increase the forward range. On this setting, the *Star Centurion* became visible on the X-band radar monitor at a distance of approximately 2.5 nm. Thereafter and until the collision, *Star Centurion* remained visible on the X-band radar monitor at a range scale setting of 3 nm.

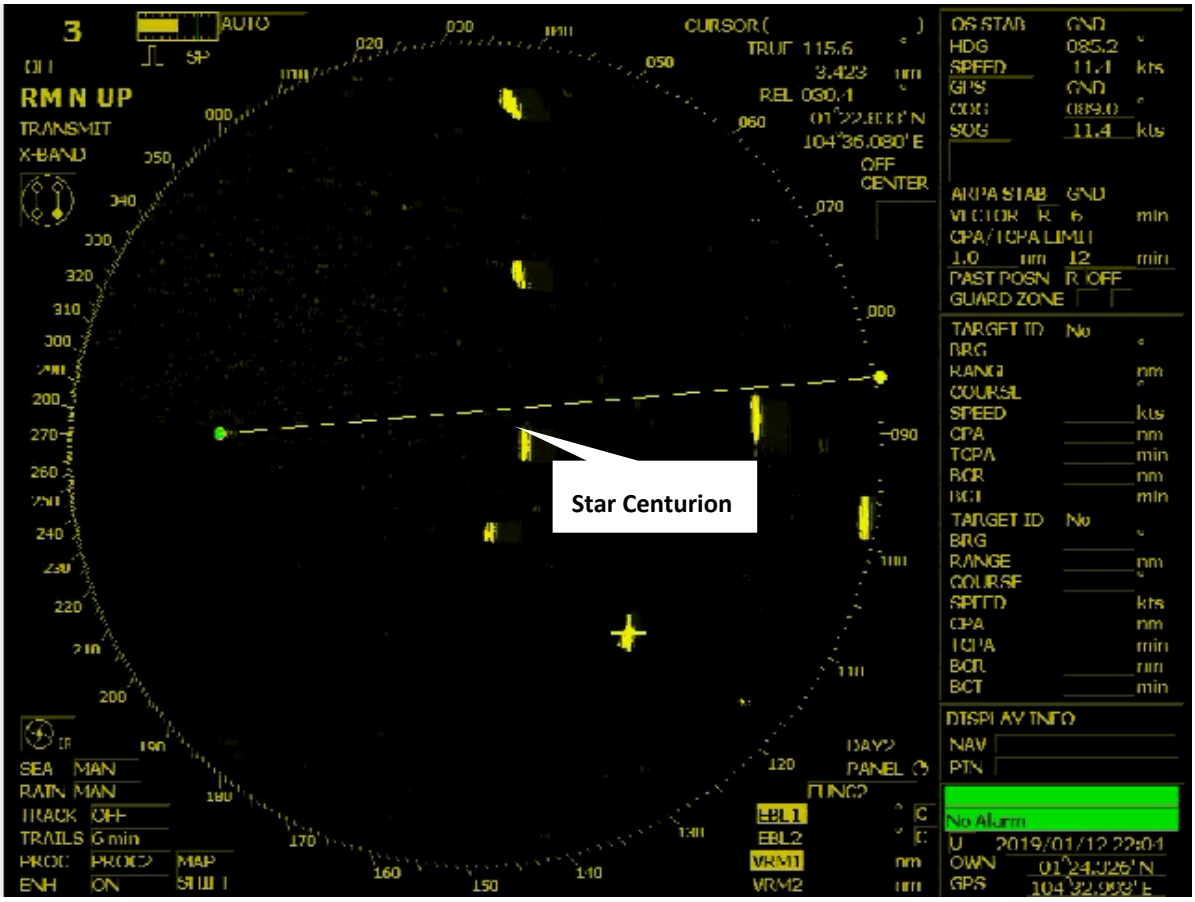


Figure I-6: Extract from X-band radar on Antea at 06:04:51 hours

At 0605 hours, one target plotted on the X-band radar. Later a target appeared on the radar screen as no.1. The second officer give suggestion to the third officer to alter course early.

The second Officer informed the third Officer that the vessel had been declared to be at sea to engine room.

At about 0607 hours, the third officer taking over the watch. He could see the accommodation and deck lights of a vessel fine on starboard, which he later found out it was *Star Centurion*. In the meantime, *Antea* maintained its course of 085° (T) and speed made good over ground of 11.1 knots. Following the handover, the second officer left the bridge for take a rest.

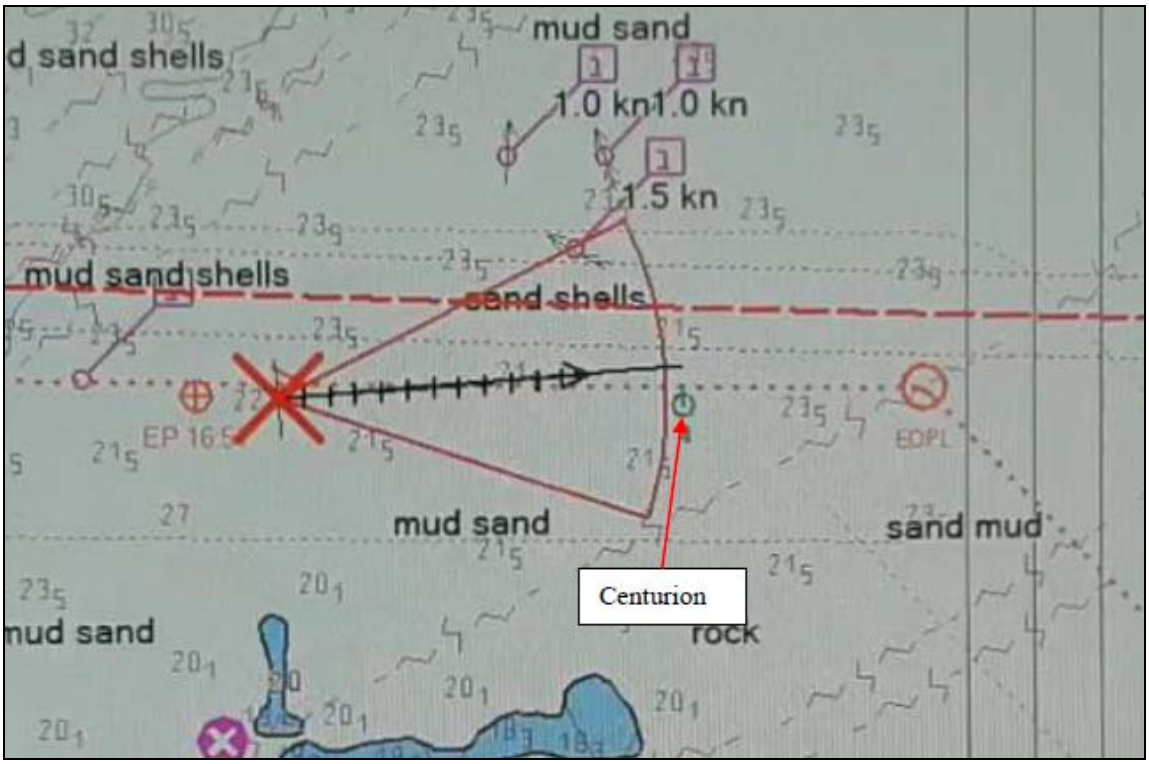


Figure I-7: ECDIS playback at 0605 hours. Star Centurion about 2 nm from Antea

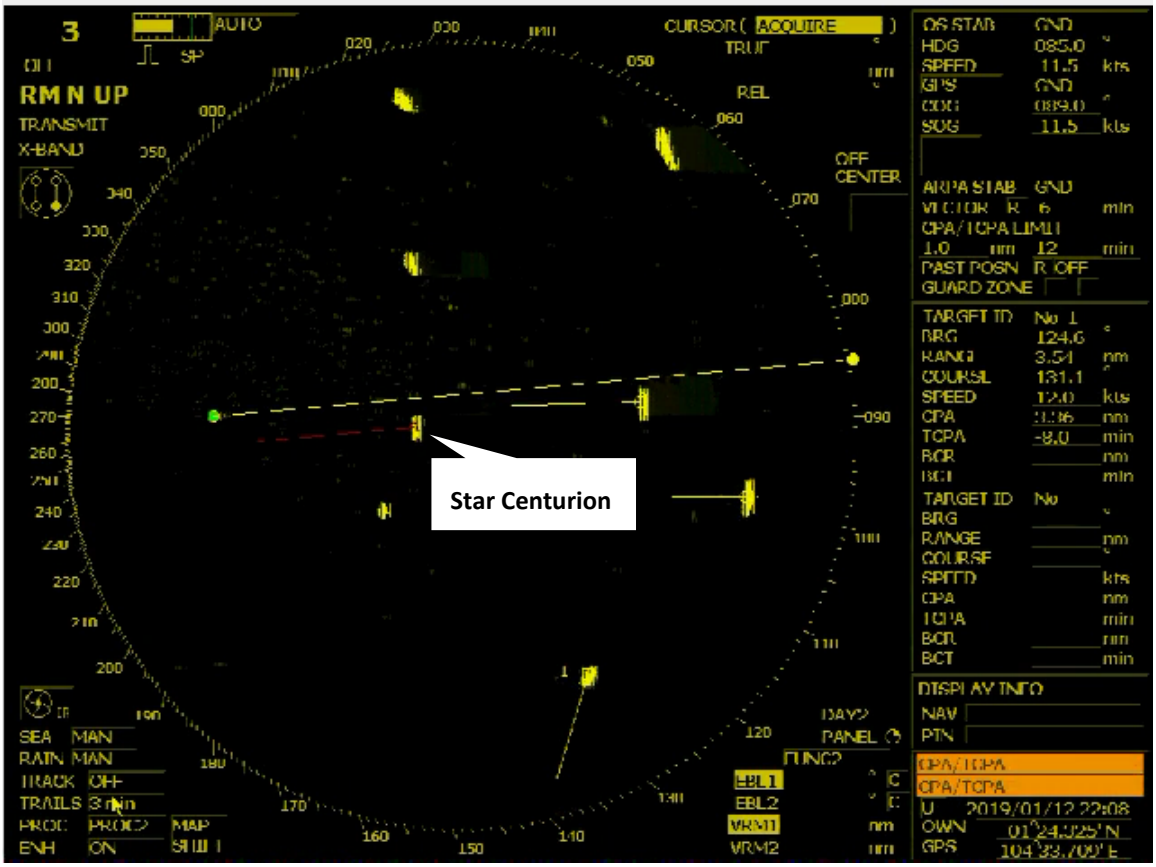


Figure I-8: Extract from X-band radar on Antea at 06:08:36 hours. CPA/TCPA alarmed to Star Centurion

At 0608:36 hours, a CPA/TCPA alarm on the X-band radar sounded in relation to *Star Centurion*. The officer on watch acknowledged the alarm. He examined the target by the X-band radar and changed the radar trails to 3 minutes. He moved to ECDIS[2] unit to see where *Star Centurion* in relation to *Antea* navigation course tracks.

At 0612 hours, the officer on watch switched on the second steering gear motor, and changed the steering mode from auto to manual. He instructed the AB on watch to take the helms whilst he was observing the ECDIS screen. He wanted *Star Centurion* to be on the vessel's port side then he ordered the helmsman to steer to starboard without give wheel order.

Shortly after, the helmsman applied the steering wheel to starboard 15 to 20 degrees. The officer on watch intention was to pass through in between the two anchored vessels, and leave *Star Centurion* on the port side.

The helmsman noticed that the ship's heading had go to starboard about five degrees over the next minute, however the heading change was smaller and slower response compared to previous occasions when he assigned for steering the vessel.

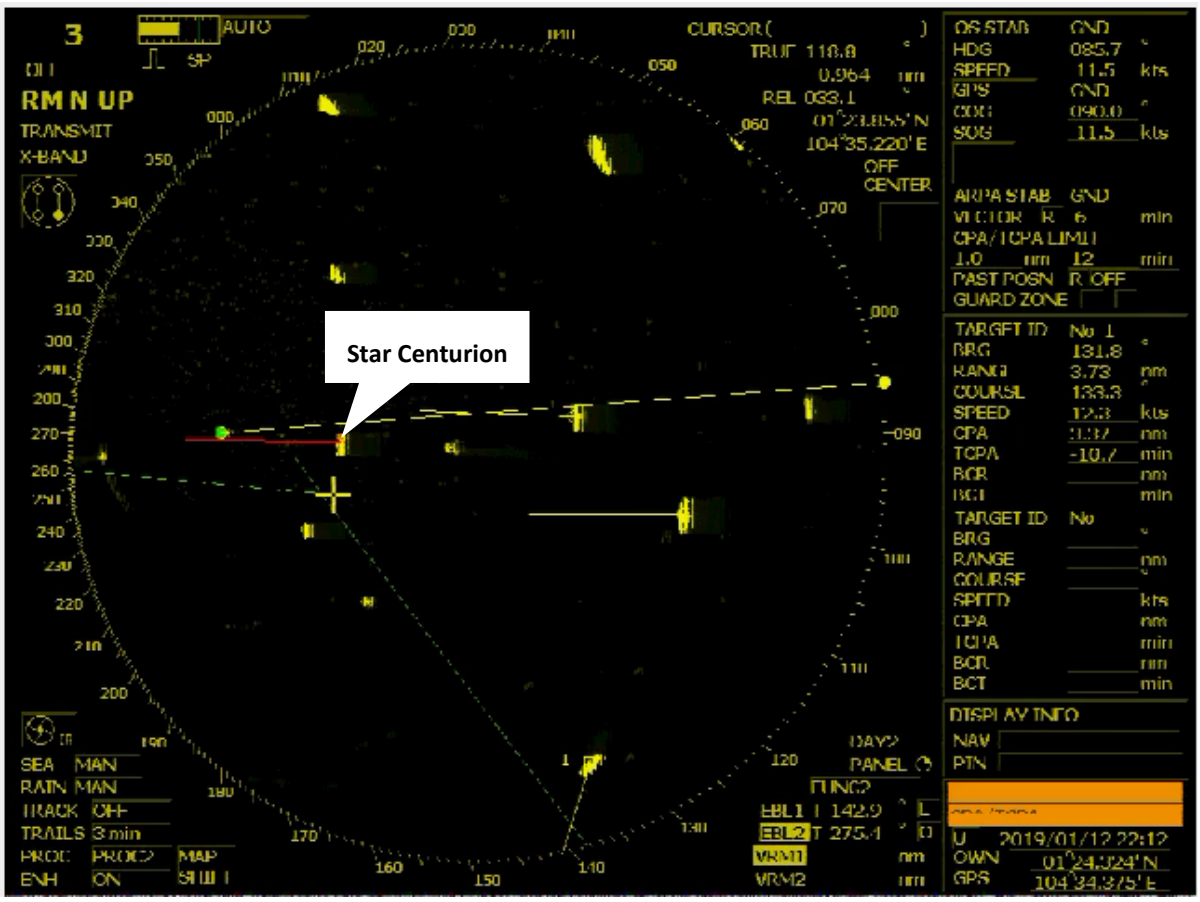


Figure I-9: Extract from X-band radar on Antea at 06:12:10 hours. Instruction to manual steering

[2] ECDIS - Electronic Chart Display and Information System

At 0613:37 hours, the helmsman informed the officer on watch that there was no change of heading after he turns the steering wheel. The officer on watch give an instruction to put helm hard a starboard which the helmsman acknowledged the order.

At 0613:46 hours, the helmsman informed the officer on watch again that there was no steerage after the steering wheel applied to hard starboard. The officer on watch immediately took over the wheel and put helm to hard starboard again, however the ship's heading did not pay off to starboard.

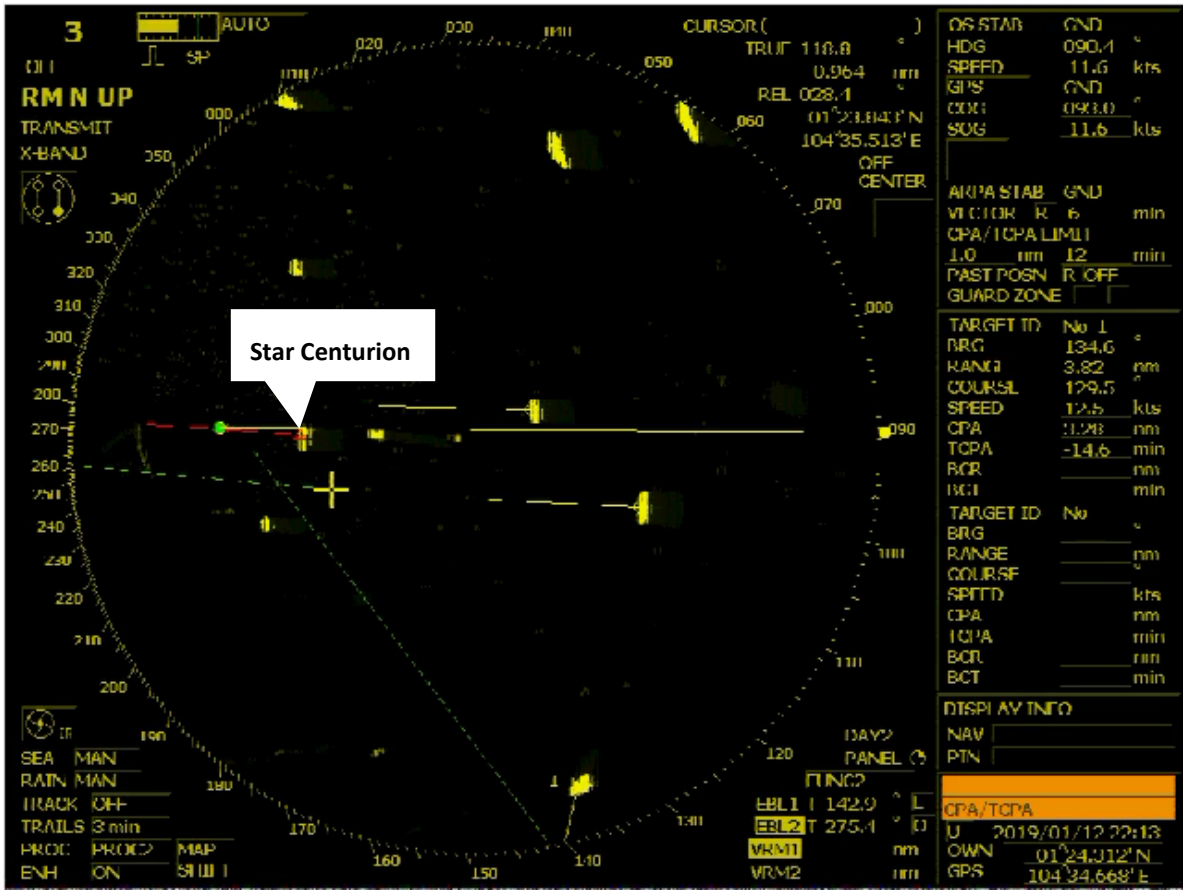


Figure I-10: Extract from X-band radar on Antea at 06:13:46 hours. Again, the AB inform to the OOW that there was no steerage after he applied to hard starboard

At 0614:36 hours, the officer on watch made an announcement over the public address to engine crew: *'attention engine (3x) … there is no steering (2x) … engine'.* At the same time, he brought the engine telegraph to Stop then to Full Astern. At 0614:44 hours, alarm sounded (the engine telegraph at bridge console).

Following the first announcement at 0614:59 hours, the officer on watch call the Master over the public address: *'Captain … Captain … please proceed to Bridge'*. Upon hearing the announcement, the Master rushed to the bridge.

At 0615:19 hours, Master entered the bridge. He saw bright white lights that he considered were the accommodation and the floodlights of the other vessel, and it was very close. The lights covered almost the whole of the bridge windows. The Master immediately take over the steering wheel from the helmsman. At that time, the wheel was lied to hard starboard but the heading was not paying off to starboard. The Master brought the wheel to amidships before moving the wheel back to hard starboard and realised there was no response.

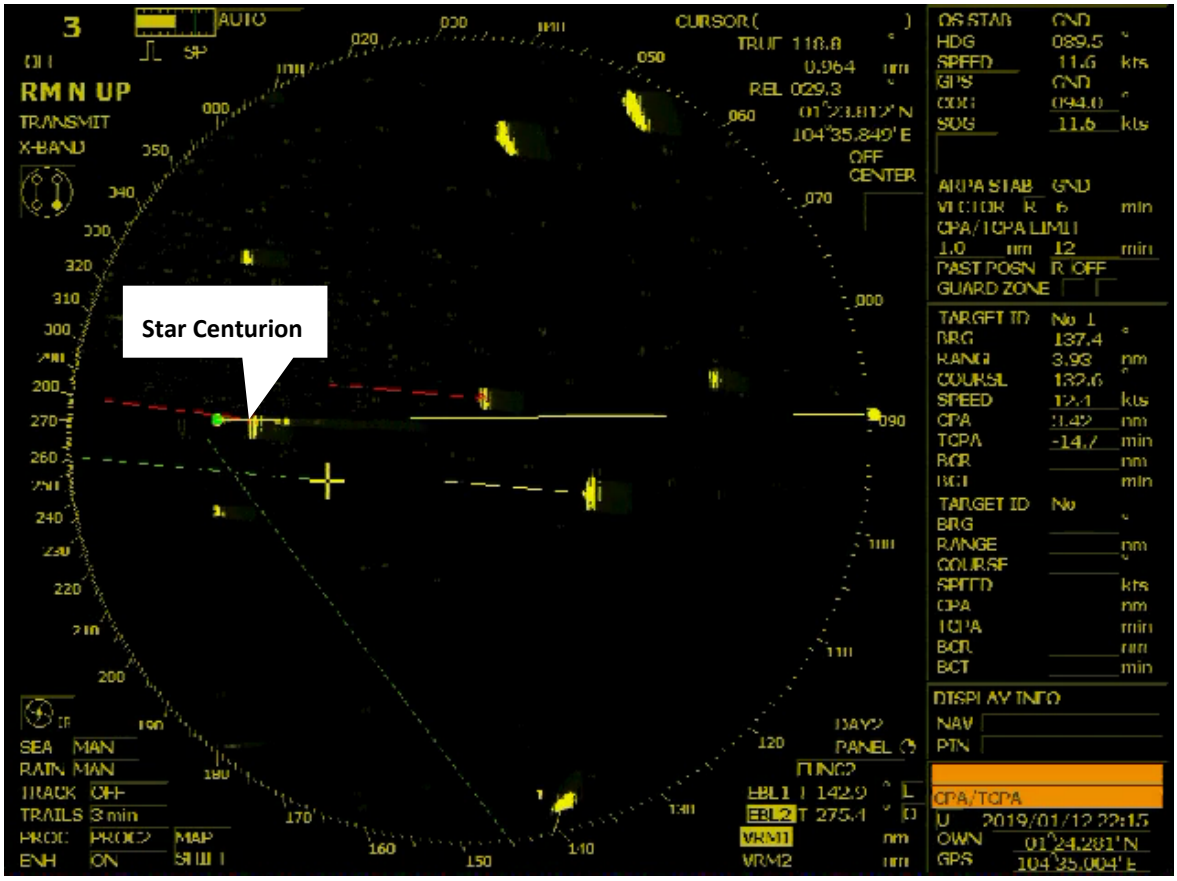


Figure I-11: Extract from X-band radar on Antea at 06:15:19 hours. The Master entered the bridge

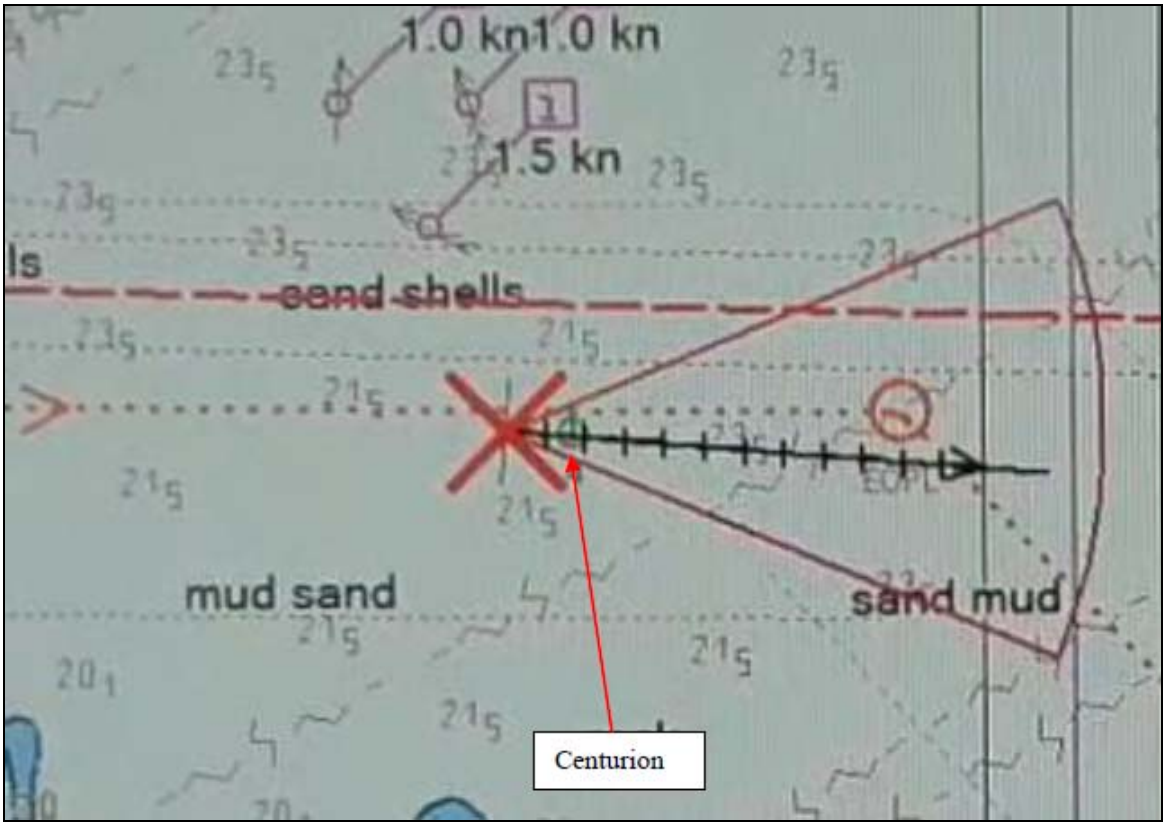


Figure I-12: ECDIS playback at 0615 hours, 1 minute before impact

At 0615:35, the officer on watch shout over the public address: *'attention engine…there is no steering…there is no steering'.* The engine telegraph unit at bridge console alarm still sounding, that indicate the engine control room (ECR) had not acknowledge the bridge telegraph order.

At 0616:10 hours, the bow of *Antea's* at a speed of 11.5 knots make contact with *Star Centurion's* almost amidships on the latter's port side.

Shortly after the collision, *Antea's* general emergency alarm activated and announcement was made to all crew to proceed to the bridge.

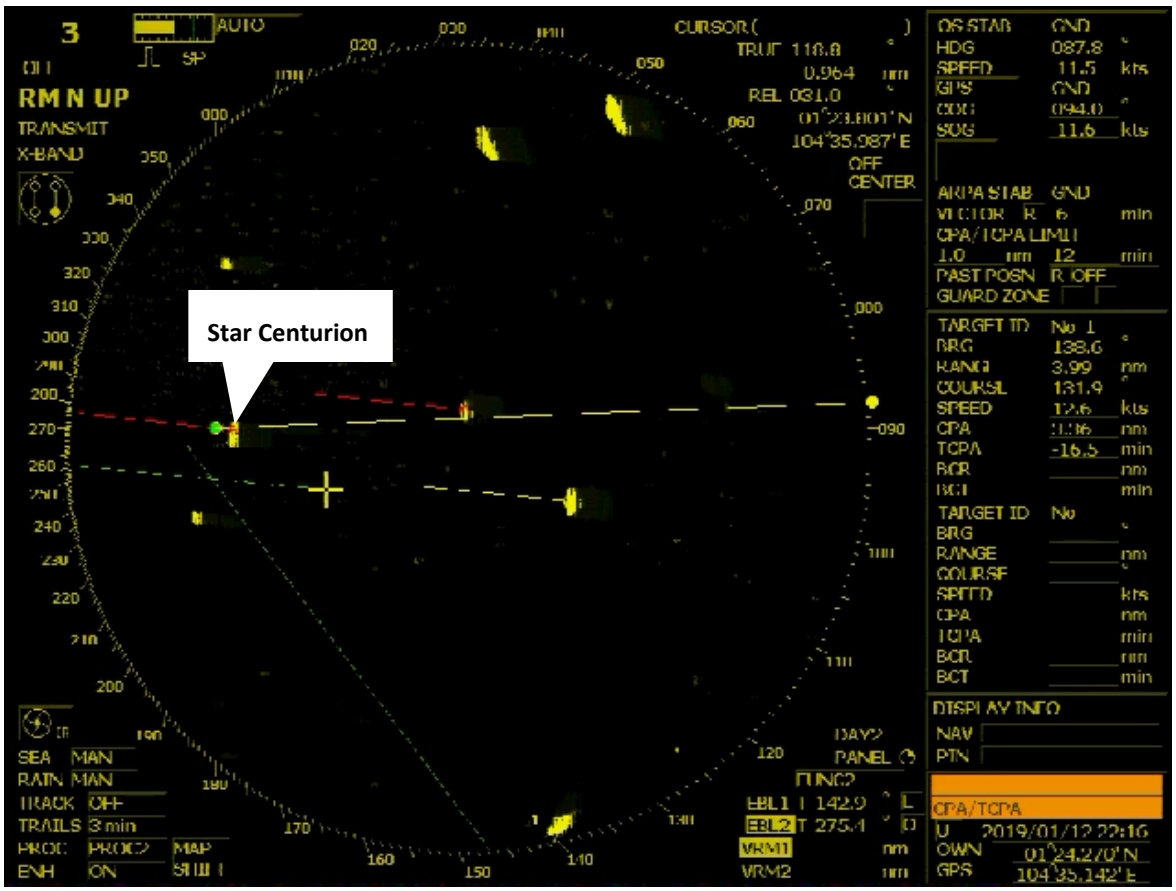


Figure I-13: Extract from X-band radar on Antea at 06:16:10 hours. Impact (noise heard on recorder)

At 0621 hours, Master of *Antea* informed company designated person ashore (DPA) advising of collision.

At 0622 hours, the officer on watch broadcast an urgency call to all ships which explains that *Antea* have a collision in position 1° 24' N - 104° 35' E.

At 0628 hours, Singapore Port Operations called *Antea* on VHF channel 16 and they want to talk with Master. However, the Master still engaged managing the situation and he will call back when it settled.

At 0632 hours, Master called Singapore Port Operations, gave confirmation regarding *Antea* collided with *Star Centurion* and reported that no injuries on crewmembers of *Antea*.

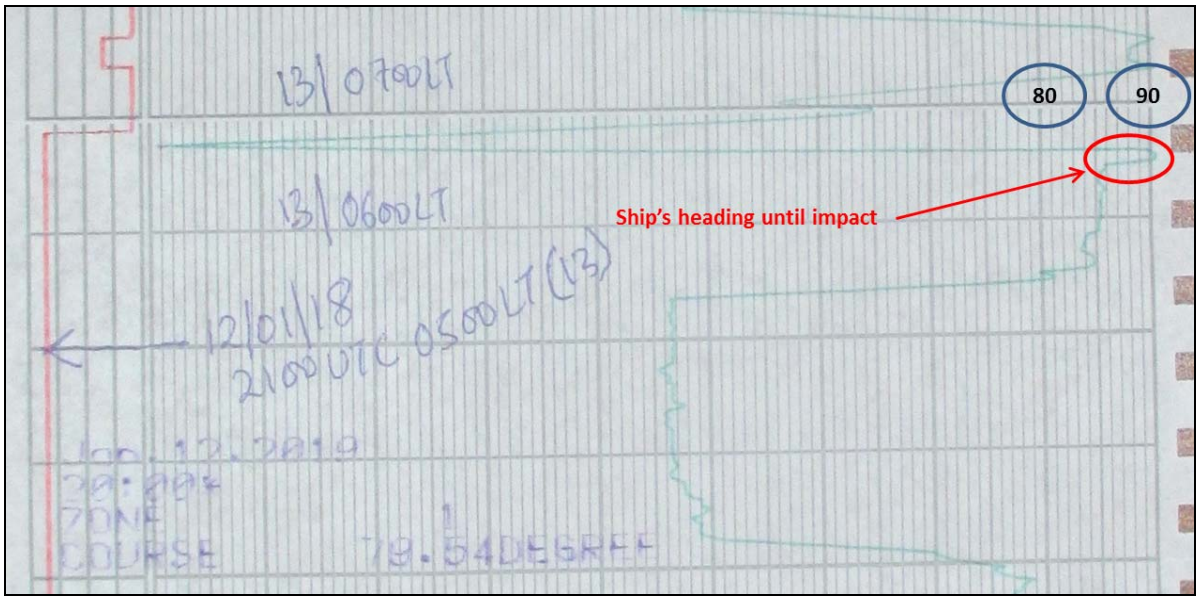
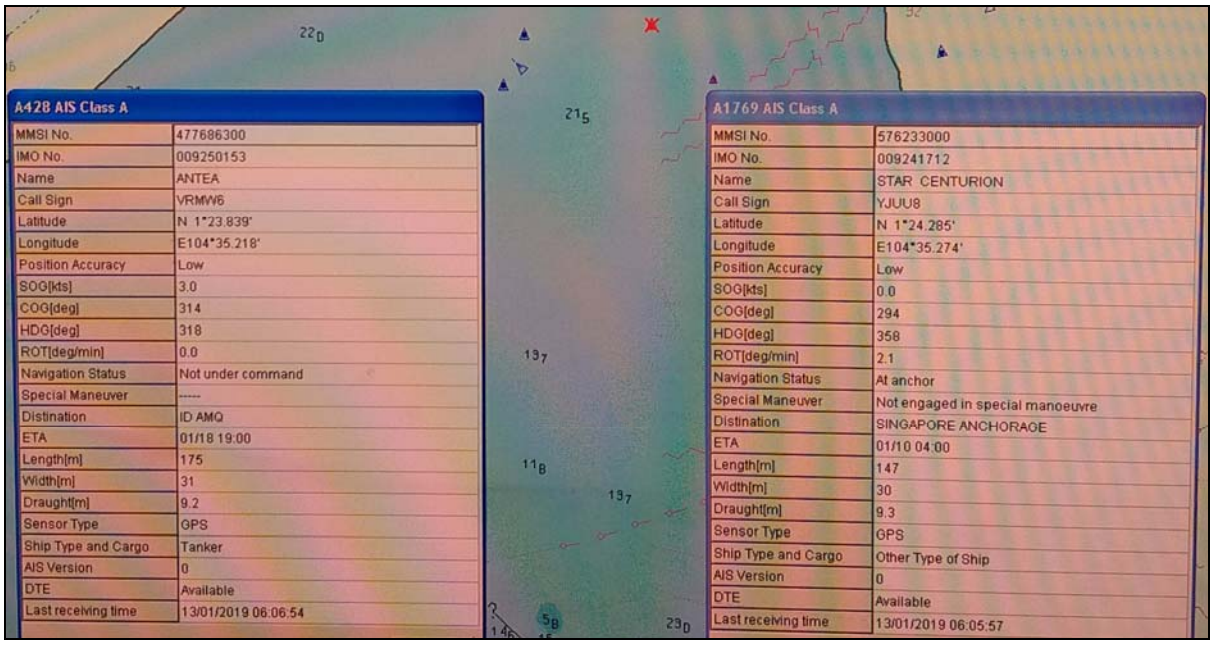


Figure I-14: Antea's heading changes to impact based on information from course recorder

After both vessels clear from each other, *Antea* remained standby on location and make contact to *Star Centurion* by radio VHF to offer assistance.

The second officer of *Antea* change the AIS[3] navigational status from 'under way using engine' to 'not under command'.



A428 AIS Class A	
MMSI No.	477686300
IMO No.	009250153
Name	ANTEA
Call Sign	VRMW6
Latitude	N 1°23.839'
Longitude	E104°35.218'
Position Accuracy	Low
SOG[kts]	3.0
COG[deg]	314
HDG[deg]	318
ROT[deg/min]	0.0
Navigation Status	Not under command
Special Maneuver	-----
Distination	ID AMQ
ETA	01/18 19:00
Length[m]	175
Width[m]	31
Draught[m]	9.2
Sensor Type	GPS
Ship Type and Cargo	Tanker
AIS Version	0
DTE	Available
Last receiving time	13/01/2019 06:06:54

A1769 AIS Class A	
MMSI No.	576233000
IMO No.	009241712
Name	STAR CENTURION
Call Sign	YJUU8
Latitude	N 1°24.285'
Longitude	E104°35.274'
Position Accuracy	Low
SOG[kts]	0.0
COG[deg]	294
HDG[deg]	358
ROT[deg/min]	2.1
Navigation Status	At anchor
Special Maneuver	Not engaged in special manoeuvre
Distination	SINGAPORE ANCHORAGE
ETA	01/10 04:00
Length[m]	147
Width[m]	30
Draught[m]	9.3
Sensor Type	GPS
Ship Type and Cargo	Other Type of Ship
AIS Version	0
DTE	Available
Last receiving time	13/01/2019 06:05:57

Figure I-15: Navigational status of both vessel after collision (source: Batam VTS)

At about 0643 hours, *Star Centurion* call *Antea* on radio VHF channel 16, and then there was a conversation on VHF channel 67 with regard to the situation that occurred on the ship.

[3] Automatic Identification System

At 0645 hours, *Antea* convey *Star Centurion* message to Singapore Port Operations that on the *Star Centurion* pipe cargo hold have been flooded and the crews of *Star Centurion* planning to abandon the ship.

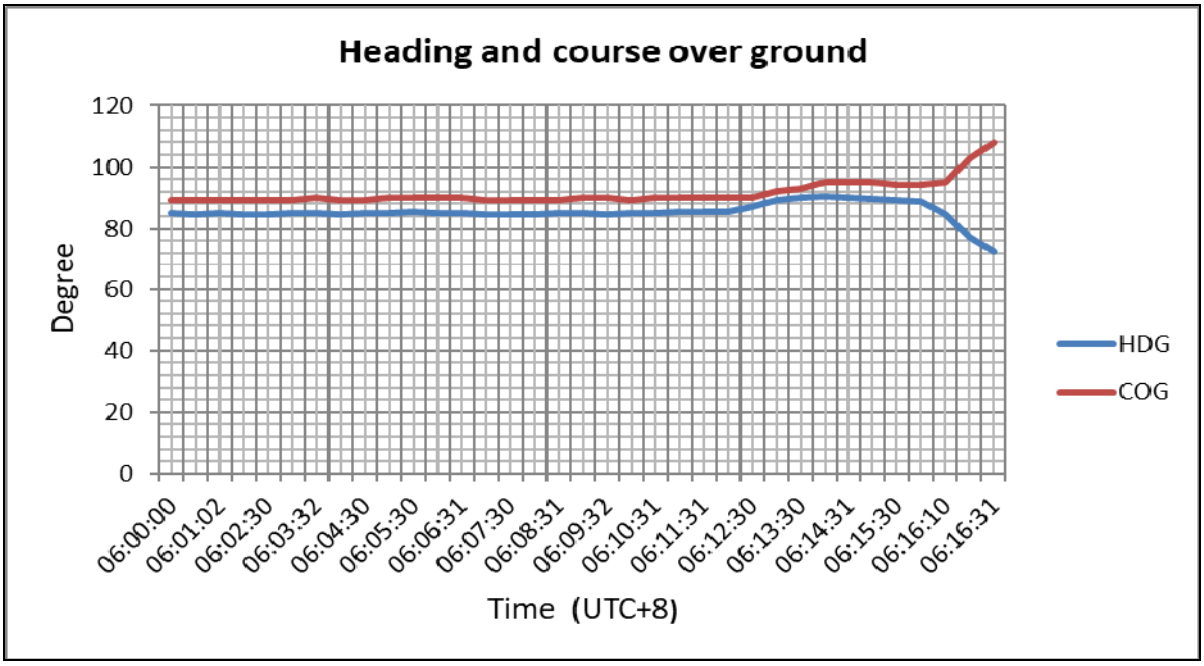


Figure I-16: Diagram showing Antea's heading and course over ground in the last few minutes until impact. The diagram based on information from VDR.

At approx. 0824 hours, *Antea* lowering the designated lifeboat as rescue boat to assist *Star Centurion* crew abandonment.

At approx. 0911 hours, total 22 crewmembers of *Star Centurion* succeed abandon the ship and they subsequently managed to board the *Antea.* There was no crew were injured due to impact of the ships collision, however *Star Centurion* sustained severe damage below the waterline.

At 1320 hours, Technical and marine superintendents boarded on *Antea* with an electrical technician.

At 1700 hours, *Antea* dropped the anchor for temporary in position 01° 26.24' N - 104° 44.74' E.

At 2018 hours, *Antea's* anchor aweigh and the vessel start to steaming around on the collision site location.

At 2100 hours, 11 crewmembers of *Star Centurion* disembarked from *Antea* (first batch) tug *Sea Eagle 1.*

On 14 January 2019, at 0206 hours, the rest of *Star Centurion* crewmembers disembarked from *Antea* (second batch) to tug *Sea Eagle 1*. All crewmembers of *Star Centurion* were taken to Singapore.

From 0800 hours until 1300 hours, diving inspection and hull damage assessment was carried out on *Antea* in the presence of class surveyor.

After the situation had stabilized, *Antea* instructed to proceed to port of Sungai Linggi to discharge all the cargo by ship-to-ship operation. Following completion of cargo discharge operation, *Antea* proceeded to Keppel Shipyard in Singapore for permanent repairs.

I.9.2. Events on *Star Centurion*

The Port Villa registered pipe laying vessel *Star Centurion* came off charter and demobilized following completion of charterparty services in Johor Bahru at 1000 hours on 7 January 2019. After finished with charter bussiness matters, the vessel was instructed to proceed to anchor off Singapore to await orders.

On the same day, *Star Centurion* departed Johor Bahru bound for Singapore. Due to no space to drop anchor on the anchorage within Singapore Port Limit, the vessel instructed by the ship's manager to proceed towards Horsburgh Lightshouse to anchor. Once cleared from the Singapore TSS eastbound lane, then the vessel altered course to east towards group of vessels at anchor. The Master pick a location to drop anchor with no other vessel closer than one mile from *Star Centurion*.

On 8 January 2019, at 0430 hours, *Star Centurion* anchored in position apporximately 01° 24.4' N - 104° 34.1' E with 7 shackles of anchor cable in the water on starboard anchor. The anchor position about more than 6.5 nm to the east of the termination of the eastern sector of the Singapore Strait TSS. The Master reported the anchor location to VTIS and VTIS acknowledge it. The vessel remained on safely anchored with maintained anchor watch and the engine room manned at all times. Throughout the period the vessel displayed anchor light and a daylight shape anchor signal as required. Deck working lights including white lights on stinger and red lights on the top of the A-frame and cranes illuminated during hours of dark. All machinery, electronic navigation equipment and communication equipment was in good working order.

On 12 January 2019, at night time the Master came up to bridge to make orders to the officer of the watch as usual. At that time the visibility was good.

At the time of collision on 13 January 2019, the master was in cabin and about going to the bridge for routine round in the morning prior to breakfast. When the collision occurs, the Master and the second officer proceeded to the forward bridge. All bridge instruments alarm sounded. The Master ran out to the forward port bridge wing and noted the vessel name *Antea* was on the port side. The *Antea* angle appeared at about 90° relative to the *Star Centurion*. The Master then went to the aft port bridge wing and he saw that the bow of *Antea* was inside on the *Star Centurion* port side. After realised the situation, the Master immediately return inside the bridge. The general emergency alarm was activated and all crew called to the muster station on B-deck. All crew were accounted for.

When the impact occurs the chief engineer was in his cabin. He felt the ship heeled over violently and heard a big noise like an explosion. After that he went to the aft bridge and saw a tanker stuck on the port side at roughly 90° of angle. The first engineer who was on the winch deck reported to chief engineer that there was water coming in from the deck above near to the fire pump compartment on the port side and also into the fire compartment itself. The chief engineer proceeded to the winch deck to meet the first engineer to inspect the situation. He noticed that doors of the offices on the winch deck had been detached because of impact and the bulkheads were buckled. The second engineer reported to chief engineer that there was no water in the engine room. At that time, generator number 2 was

in operational which was sufficient to supply power for the needs of the ship during at anchor. The chief engineer went to check the pipe hold from the hatch on the starboard side because it had not inspected yet. The pipe hold is a very long and deep space that extends from the inner bottom deck all the way up to the winch deck. The chief engineer looked into the pipe hold through the hatch and found that the space was flooded. The chief engineer realised how serious the damage. He went down to the engine room to called up the second engineer then proceeded to the bridge and reported the findings to the Master.

At the time when *Antea* clear away from *Star Centurion* port side, the vessel had taken a significant list to port which was increasing. The Master ordered to all crew should abandon ship. The list make crew evacuation process difficult. However, all crewmembers have succeed boarded to one of the lifeboat without getting injured. There was still electrical power on the vessel because the generator was left running. *Star Centurion* draft while at anchor before collision at about 9 m. The lifeboat manoeuvered away of *Star Centurion* and then it was assissted by a fishing vessel towards *Antea*. All crewmembers were taken on board *Antea* before being taken ashore to Singapore.

I.10. DAMAGE TO VESSELS

I.10.1. *Antea*

Figure I-17: Bow damage. Antea afloat following the collision

Reportedly on *Antea* that no crewmembers were injured as a result of the collision and there was no pollution of the environment. The consequences for *Antea* was lost time with the vessel out of service to carry through and complete repairs.

Figure I-18: Bow damage. Antea in Keppel dry dock

Antea is constructed with bulbous bow and protruding anchor hawse pipe. *Antea's* bulbous bow protrudes 4.5 metres forward from the intersection of the stem and design waterline. Considering the bulbous bow construction and the extent of scratching to the forecastle topside area, it is estimated the *Antea* bow penetrated the *Star Centurion* to a maximum distance of 9 metres.

Figure I-19: Forecastle damage. Antea in Keppel dry dock

Following the collision and later in dry dock, the damage to hull of *Antea* was found at:

- Multiple locations at bulbous bow on both sides
- Internal structural members of forepeak tank
- Forecastle (Bosun) store – forward ship side plating and frames
- Bosun store davit detached from forecastle deck
- Forecastle deck bulwark at multiple locations
- Foremast half detached from deck towards forward
- Ship side plating dent at no.3 starboard water ballast tank
- Port side anchor bell mouth casing cracked

- Both anchors deformed. Port side anchor beyond repairs
- Hand rails and fitting on the compass deck at the starboard side forward corner and deck buckled down
- Damage to bow thruster anodes

I.10.2. *Star Centurion*

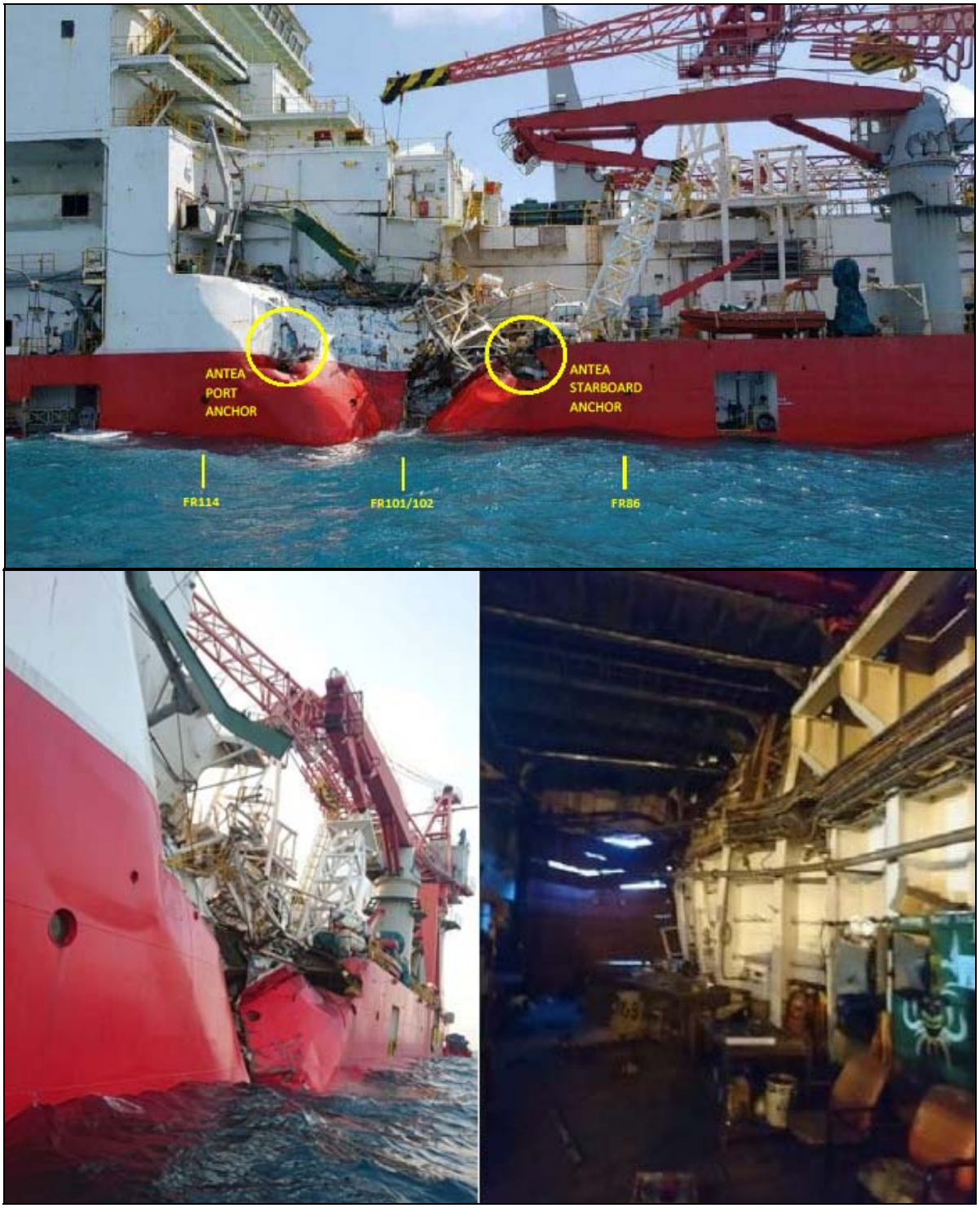


Figure I-20: External damage on port side (above and left) and internal damage seen from construction shop (right)

An estimation from reported observation shortly after the collision that the impact of *Antea* on the port side of *Star Centurion* was located across frame 86 to frame 114 with a length of about 21 metres. A wide tear damage on port side shell as the primary impact point was located approximately at frame 101/102.

The two secondary impact points at one either side of the primary point, just below the production deck. These are come from the anchors of the *Antea* which secured in their stowed position, giving an initial indication of the bow penetration into the *Star Centurion*.

Figure I-21: Capsizing and sinking Star Centurion

The London Offshore Consultants (LOC) was appointed by the shipowner as a party to carried out damage summary, they identify the likely extend of damage from photos of the *Star Centurion* between the collision and capsize, photos of the *Antea* in dry dock and first-hand accounts from the divers and salvage team during the initial oil removal phase.

Vertical extent of damage

Antea on departure had an observed fore draft of 8.40 metres. Prior to collision *Antea* was making speed of 11.5 knots which created a squat in open waters about 1 metre based on ship's squat calculation, and therefore fore draft at the time of impact about 9.40 metres. This is similar draft to *Star Centurion* when at anchor about 9 metres. It is fair to assume that the vertical extent of damage to the *Star Centurion* is the full depth of the vessel from the production deck down.

Transverse extent of damage

Having observed *Antea* bow damage to an estimated 9 metres of penetration this can be seen in the transverse section and deck plan view, it shown with respect to vessel structure and internal subdivisions. The key subdivision to identify here is that between the wing tanks, within the sponson, and the pipe cargo hold, where this longitudinal bulkhead is 4.5 metres inboard of the side shell. It is therefore evident that the transverse extent of damage has resulted in the loss of the pipe cargo holds watertight integrity.

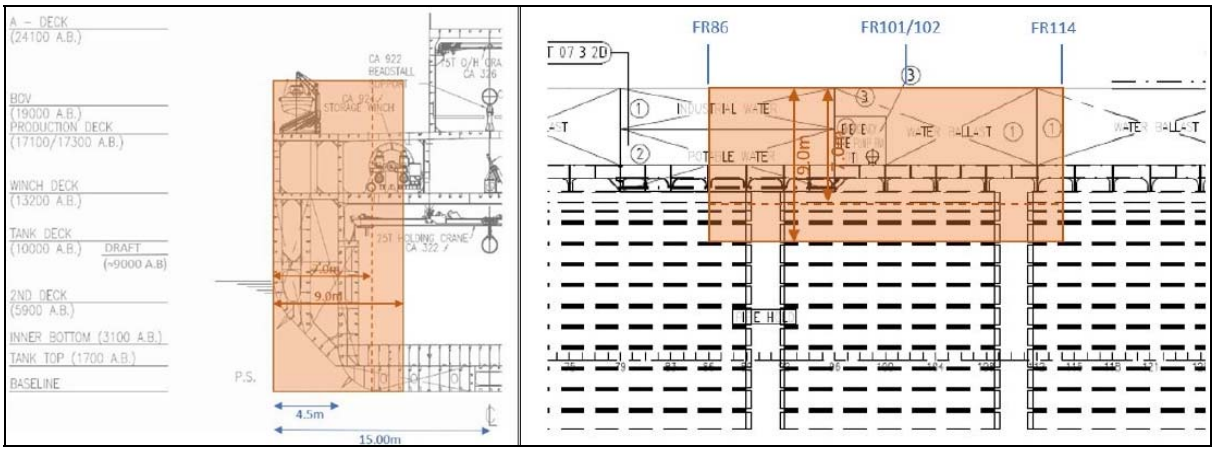


Figure I-22: Transverse section (left) and 2nd deck plan view (right) showing estimated damage penetration (height and length)

The full extent of the collision damage openings in the port side cannot be assessed as the vessel is now lying on its port side, it submerged to a reported depth of 6 metres to 8 metres into the seabed.

I.11. *ANTEA* (Shipowner, Operator, Vessel and Crew)

I.11.1. Shipowner

Antea is owned by PT Pertamina (Persero), Indonesia. The shipowner delegated the operation, manning and the International Safety Management (ISM) responsibility for the vessel to an operator company.

I.11.2. Operator

The vessel was operated by Bernhard Schulte Shipmanagement (BSM). The vessel has been under full technical management with BSM Singapore from December 2013. BSM had established safety management system in accordance with the IMO's ISM Code[4].

On the BSM website stated that over 190 chemical, product and oil tankers of all sizes are currently managed by BSM across their 10 regionally based Ship Management Centres.

[4] International Safety Management Code (IMO Res. A 741 (18))

I.11.3. The vessel

Antea was built in 2002 by Hyundai Mipo Dockyard in Ulsan, South Korea. The vessel delivered on 18 December 2002. It has an overall length of 175.86 m, a beam of 31.0 m and a depth of 17.030 m. The distance between the bridge front and bow is 144.4 m and distance between the bridge front and stern is 31.46 m.

The vessel is equipped with a MAN B&W 6S50MC main engine connected to a right-handed four blades fixed pitch propeller. The vessel is also equipped with a semi-balanced rudder[5] and a bow thruster.

The vessel is a double hull oil and chemical tanker. The vessel has 12 cargo tanks, 2 slop tanks and 1 residual tank with total cargo capacity (98%) of 44589.2 cubic meter. The vessel has a deadweight tonnage of 37,113 tonnes at a summer draft of 10.516 metres.

The vessel was carrying 25377 metric tonnes of Jet A1. This cargo from Singapore would be discharge partly at Wayame and with the remainder discharged at Surabaya. On departure Singapore, the vessel had fore draft 8.40 metres, mean draft 8.80 metres, and an aft draft of 9.20 metres.

Figure I-23: Bridge layout on Antea

Antea is equipped with navigational equipment consistent with SOLAS[6] requirements. The vessel has a traditional bridge layout with a centrally located steering stand. A manoeuvre console is located on the port side that covers steering pumps, bow thruster and engine controls, internal and external communications system. On the starboard side of the steering stand are two units of radar system (S-band and X-band) with ARPA[7] capabilities

[5] A rudder with part of the blade positioned forward off the turning axis.

[6] The International Convention for the Safety of Life at Sea, 1974, as amended

[7] ARPA – Automatic Radar Plotting Aid

and two units of Simrad ECDIS (monitoring and planning) respectively. Navigation equipment in the chart room are GPS, AIS, course recorder and GMDSS equipment.

All the statutory and classification certificates were valid at the time of the accident.

Inspection of the steering after the accident

In the evening on 14 January 2019, the service engineer from Rolls-Royce (the manufacturer of the steering gear) came on board the *Antea* upon request by the ship operator. The service engineer carried out manoeuvring test at bridge control (FU and NFU) and the test result was no sign of abnormalities.

Manoeuvring test also carried out at local control with time checks using one steering pump operation, all timing having average of 24.6 seconds. Moreover, for using two steering pump operation, all timing having average of 12 seconds. There was no sign of abnormalities as a result from those tests.

Steering gear, Autopilot and wheel control

Antea is equipped with Rolls Royce/Frydenbo RV 850-3 for steering gear. The autopilot and wheel control by Yokogawa. All feedback control units are also from Yokogawa.

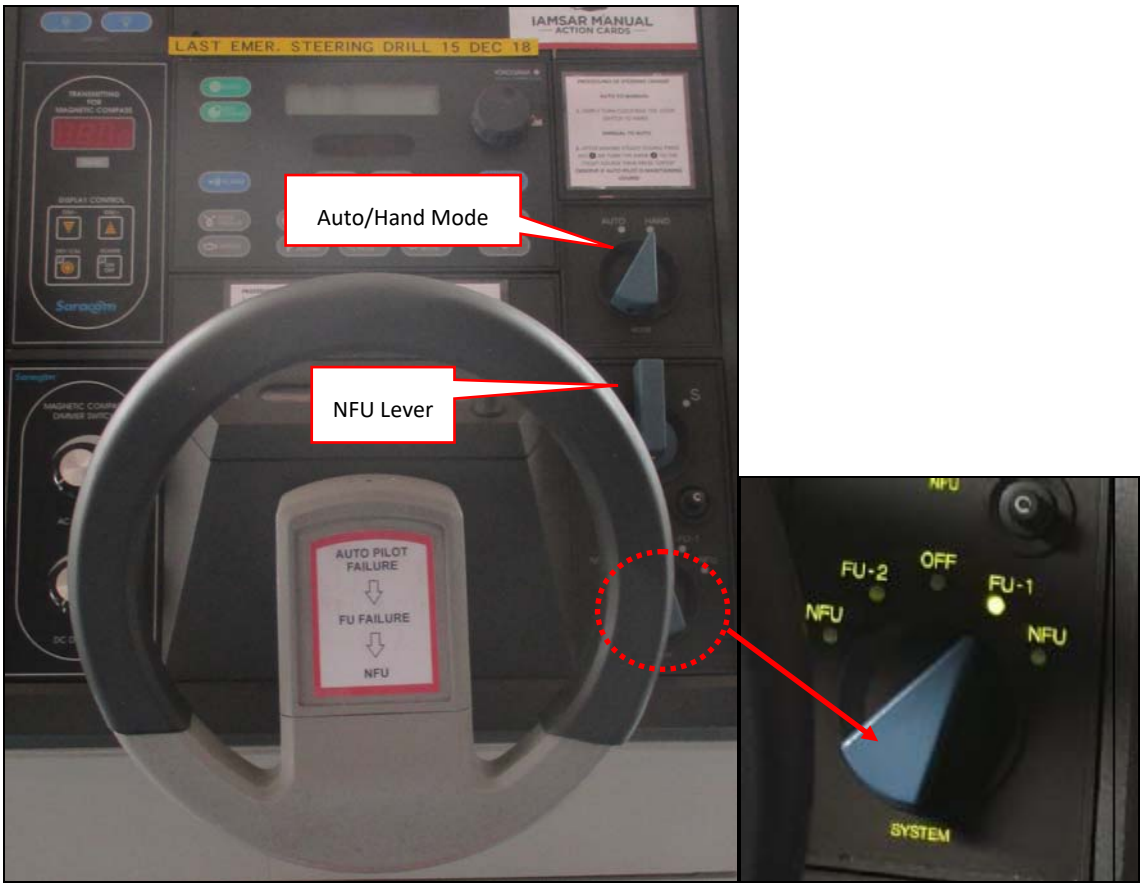


Figure I-24: Autopilot and wheel control on Antea

The vessel steering console on the bridge had three mode of operation:

a) Manual using the steering wheel

b) Manual using the lever

c) Autopilot

To use the steering wheel, the system must be selected to 'follow up' (FU) and the mode switch to 'Hand'. The steering wheel will not function if the system is at 'non-follow up' (NFU) even if the mode switch is put to 'Hand'.

To use the lever, the system must be selected to 'non follow up' (NFU) and the mode switch to 'Hand'. The lever will not function if the system is at 'follow up' (FU) even if the mode switch is put to 'Hand'.

The procedures of steering change over from auto to manual and vice versa have been made and placed on the upper steering console where all bridge team personnel can read and follow.

Main engine control

The propulsion-machinery space of *Antea* can be control and monitor from the navigation bridge. The vessel was equipped with Hyundai Norcontrol ETU (engine telegraph unit with handle) which provided direct control of the main engine from the bridge telegraph.

Figure I-25: The bridge engine telegraph unit

At the time of collision, the engine control location is place to engine control room and there is no engineer on duty. The engine room is manned by an oiler who is working in the lower engine flat and he did not hear the telegraph alarm. If the engineer is not in the engine control room, moving the bridge telegraph will not stop the engine. It will merely ring the telegraph alarm in the engine control room. The alarm will continue ringing until the telegraph in the engine control room is place in the same command.

I.11.4. The crew

Antea had a crew of 23. The crew consists of Filipino, Indonesian, Turkish, Myanmar and Indian nationalities. On departure Singapore and during the transit through Singapore Strait TSS, the bridge watch arrangement on board for deck officers was six hours' watch followed by six hours' rest.

Those of the crewmembers who were directly involved in the accident had the following background and responsibilities on board:

Master : 54 years of age. Certificate of competency STCW Master II/2, IV/2. Had been work with the company for more than 2 years. Having rank experience of 4.4 years. Have sailed in command of eight ships including *Antea* and joined the vessel on 24 June 2018.

Third Officer : 38 years of age. Certificate of competency STCW Officer in Charge of a Navigational Watch II/1, IV/2. Had been work with the company for more than 4 years. Having rank experience of 2.8 years. Previously have sailed as third officer on the other ships and joined *Antea* on 15 November 2018.

Able Seaman : 30 years of age. Able seaman since 2017. First contract on board *Antea* and joined the vessel on 14 August 2018.

I.12. *STAR CENTURION* (Shipowner, Operator, Vessel and Crew)

I.12.1. Shipowner

Star Centurion had changed the ownership several time. On the collision date, *Star Centurion* registered owner is Trevaskis Limited. The operation and ISM responsibility was delegated to an operator company.

I.12.2. Operator

At the time of accident, *Star Centurion* is managed by the shipowner subsidiary company, Vallianz Offshore Marine Pte Ltd based in Singapore.

I.12.3. The vessel

Star Centurion (former name: *Lewek Centurion*; *Caesar*; *Baron*) was built in 2002 by Hyundai Mipo Dockyard in Ulsan, South Korea. At first, the vessel was built as a cable layer and then converted to a pipe laying ship in 2008 by Cosco Shipyard in China. The vessel has an overall length of 146.50 m, a beam of 30.0 m and a depth of 17.10 m.

Star Centurion is a S-lay pipeline installation vessel. The vessel is a worldclass platform for installing various diameter pipelines in shallow and deep water. The vessel can lay coated pipe up to 42 inch outer diameter with transit speed of 12 knots.

At the stern of the vessel, a stinger is mounted which facilitates the process of installing the subsea pipelines. The stinger structure maximum length is 90 m and its in transit position at

time of collision. The vessel is of all steel contruction and has a layout with superstructure forward and closed deck aft for subsea pipelines joining works.

Star Centurion is a dynamic positioning (DP) vessel class 2 with equipment Kongsberg SDP-32. The vessel main power is from four diesel electric generators MAN 8L32/40, each rated at 3,840 kW. The vessel has eight azimuth thrusters[8] and one tunnel thruster. Two of the azimuth thrusters located at aft considered as the main propulsion, and for station keeping is through thrusters at bow (tunnel and retractable azimuth), at mid ship (swing down azimuth) and at stern (swing down azimuth). The vessel also has two auxiliary engines CAT 3512C - 1785 kW each, one harbor gen set MAN 6L32/30 - 967 kW and one emergency gen set MAN D2876 - 436 kW.

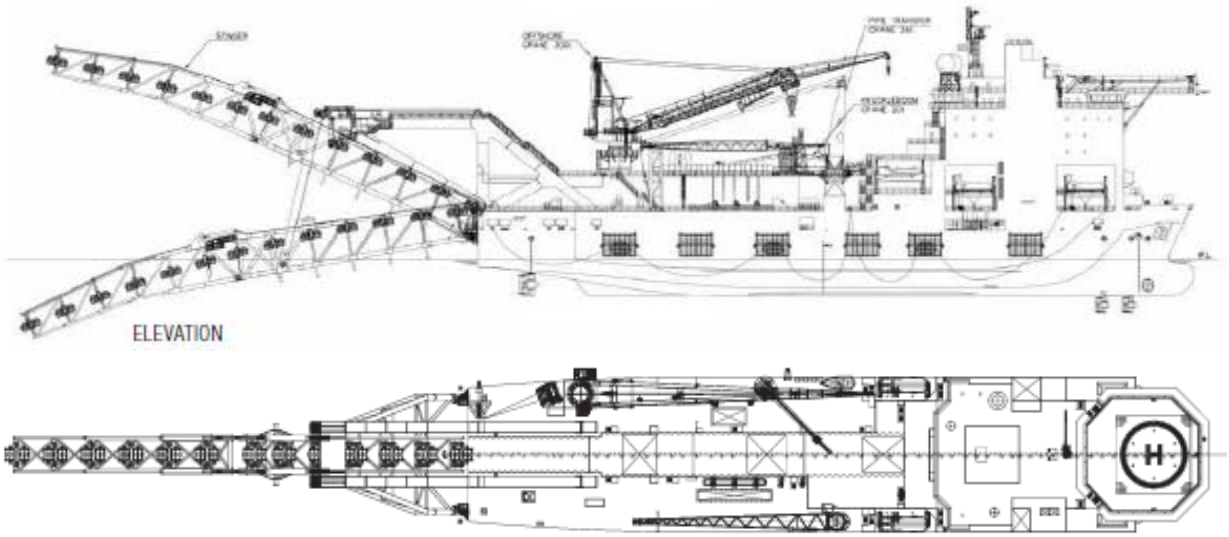


Figure I-26: Star Centurion overall side and plan view

At the time of collision there was approximately 400 cubic metres of marine gas oil (MGO) remained on board. Its distributed between no. 4 center, No. 1 and 2 port and starboard and in the port and starboard daily and settling tanks.

Whilst stand by at anchorage, the vessel carried out routine maintenance. All planned maintenance was up to date as per electronic based maintenance plan.

I.12.4. The crew

Star Centurion had a crew of 22. The crew consists of Dutch, Ukrainian, Iranian, Indian, Mexican, Polish, Indonesian, Malaysian and Myanmar nationalities.

Master : 62 years of age. Had been on board about 60 days. Have been a Master since 1992 and previously served as Master on the vessel during 2008-2009.

[8] An arrangement in which the propeller is placed in pods that can be rotated in any direction in the horizontal plane.

Chief Engineer : 47 years of age. Certificate of competency STCW Chief Engineer. Have been a Chief Engineer on *Star Centurion* since 2009.

I.13. Regulation to prevent collisions at sea

Antea was a power-driven vessel that was underway, while *Star Centurion* was a power-driven vessel that was at anchor. Rule 1 of the *International Regulations for Preventing Collisions at Sea, 1972* (Colregs) commences by stating that the rules apply to all vessels. This includes vessels underway or at anchor by day and by night. It is applied to the navigation in the Singapore Strait and its proximity for *Antea* and *Star Centurion*. The circumstances at that time the weather was overcast with good visibility of around 8-10 nm. The vessels in visual in sight of one another.

In accordance with the below rules may be emphasized, though this report should not serve to ascertain the violation of any rules.

Colreg Rule 5 – Lookout

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 or the risk of collision.

STCW – Lookout

A proper lookout shall be maintained at all times in compliance with rule 5 of the International Regulations for Preventing Collisions at Sea, 1972, as amended, and shall serve the purpose of:

.1 maintaining a continuous state of vigilance by sight and hearing, as well as by all other available means, with regard to any significant change in the operating environment;

.2 fully appraising the situation and the risk of collision, stranding and other dangers to navigation; and

.3 detecting ships or aircraft in distress, shipwrecked persons, wrecks, debris and other hazards to safe navigation

Colreg Rule 7 – Risk of collision

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions if risk of collision exists. If there is any doubt 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 observations of detected objects.

Colreg Rule 8 – Action to avoid collision

(a) Any action taken to avoid collisiom 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.

(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.

Colreg Rule 16 – Action by give-way vessel

Every vessel which is directed to keep out of the way of another vessel shall, so far as possibele, take early and substantial action to keep well clear.

I.14. Navigation in the Singapore Strait and approaches

The Singapore Strait is a narrow and busy waterway where a large number of vessels transit daily and a significant number of ships are anchoring outside port limits waiting for further instructions, waiting for berth, waiting for bunker, to make crew changes, to pick up spares or to undergo repairs et cetera. Take into considerations that potential risks of collision occur regularly.

On that background the Maritime and Port Authority of Singapore (MPA) has issued Port Marine Circular no. 20 of 2016 about safety of navigation in the Singapore Strait.

II. ANALYSIS

II.1. *Antea* first sighting of *Star Centurion*

After leaving the eastern sector of the Singapore Strait TSS, *Antea* continue navigating eastward in coastal waters with traffic toward to join the TSS, traffic exiting the TSS and vessels at anchor on the outer port limit.

At approx. 0537 hours, the second officer as the officer on watch of *Antea* commenced altering course to 085° (T) by using autopilot. At 0544 hours, when *Antea* steady on a new course, the officer on watch observed a vessel visually fine on the starboard bow and later he found out that it was *Star Centurion*. The officer on watch subsequently acquired *Star Centurion* by using the S-band radar. The *Antea's* S-band radar computed value *Star Centurion* distance of the CPA around 0.2 – 0.3 nm and it would have close that distance on starboard beam of *Antea* in about 30 minutes. In the marine operations manual, chapter 05 Equipment, Bridge equipment and limitation - *8) Radar and ARPA, point f – consider CPA of less than 1 nm with extreme caution*. Thereafter for about the next 32 minutes *Star Centurion* remained visible on the S-band radar until the collision at 0616 hours. The officer on watch had aware of *Star Centurion,* however this was not considered the situation to be serious.

During handover the watch to third Officer, the second officer explain of surrounding traffic situation that all the vessels ahead of *Antea* were at anchor and there was a vessel name *Lauren* underway in the same direction and getting more distance because faster than *Antea*. At about 0607 hours, the third officer taking over the watch after completed hand over. The third officer as the officer on watch could see the accommodation lights and the deck lights of a vessel fine on starboard, which he later found out it was *Star Centurion*. About a minute later, a CPA/TCPA on the X-band radar alarm sounded in relation to *Star Centurion*. The officer on watch intention was to altering course in advance to starboard to pass between two vessels at anchor rather than to make course adjustment by auto pilot at early stage to keep clear from anchor vessels.

II.2. COLREGs

International regulations for preventing collisions at sea, 1972 (Colreg) provide guidance to all seafarers with regard to the actions that should be taken by those responsible for navigating a vessel. Since the Colreg applied to the watchkeepers on board *Antea* and *Star Centurion*, they were both responsible for maintaining a proper lookout in order to determine if a risk of collision existed, so that they could take appropriate action to avoid it. With respect to keeping a lookout, rule 5 clearly states the purpose of maintaining a lookout. All round lookout by sight and hearing is necessary at all times by available means to maintain and enhance keeping a lookout usually include radar/ARPA, AIS and traffic information from other sources, such as radio broadcasts from vessel traffic services station or adjacent ships. An effective lookout can ensure the early detection of objects/targets, making possible a full and timely appraisal of the developing situation and of the risk of collision.

Antea is in underway state following the planned course. It is stated in rule 3 (i) of the Colreg that *'the word "underway" means that a vessel is not at anchor, or made fast to the shore, or aground'*. The bridge team on *Antea* was aware of the forthcoming close-quarters situation. The second officer of *Antea* and his reliever could see the *Star Centurion* visually by the naked eyes, it means the vessel was in sight of one another which correspond to rule 3 (k). Rule 3 (k) states that vessels shall be deemed to be in sight of one another only when one can be observed visually from the other. For the vessel underway, it is bounden duty to keep clear of the anchored vessel, even the vessel is in a fairway or elsewhere at an improper position.

Star Centurion is at anchor with purpose waiting for further instructions from the ship management. The vessel had anchored for five days at same position since day one. For a vessel at anchor is still considered 'at sea'. As such, an effective and proper watches must continue to be kept at all times to: verify the vessel's anchor position and proper operation of the vessel's lights and whistle signals; let out additional chain; detect a dragging anchor and take reasonable measures upon the approach of another vessel. The officer on watch should have all relevant information and maintain an anchor watch adequate for the foreseeable circumstances and conditions.

When *Antea* underway with the steering was not respond properly approaching *Star Centurion,* the situation of *Antea* considered as a vessel 'not under command' (NUC). When in NUC, the vessel is not able to carry out a manoeuvre to prevent the collision, her movement is depending on the prevailing weather. For the anchored vessel, action that can be taken is very limited and dependent on the time available. If time is ample, the anchored vessel should be preparing to weigh the anchor and shift to another location. In the case that time is very limited, in conjunction with sheering her steer, the anchored vessel with power ready can and should use her engines to assist avoiding a collision.

II.3. Assessment of risk of collision and action to avoid collision

The ship's officer should keep an effective lookout at all times and ensure they know the operation and limitations of all their navigational equipment. They should ensure that their vessels are easily detected by watchkeepers on board other vessels.

During the second officer of *Antea* on watch, he had assessed and acquired the *Star Centurion* by using the S-band radar, and then during the hand over he passed the traffic situation include existed vessels at anchor to his reliever.

From 0604 hours, *Star Centurion* visible on the *Antea's* X-band radar when the radar range scale was changed from 1.5 nm to 3 nm. At that time, *Antea* was on a heading of 085.2° (T) and making good a course of 089° (T) with speed over ground 11.4 knots. The echo of *Star Centurion* appeared on the starboard bow at distance about 2.5 nm. As evidenced from the radar screen, *Antea* did not use speed over water for collision avoidance while navigating the coastal waters. The X-band radar was the only radar configured in the *Antea's* VDR[9]. There was no AIS information on the X-band radar while the echo of *Star Centurion* remained visible.

[9] Voyage data recorders, SOLAS 74 V/20 as amended – To assist in casualty investigations.

Figure II-1: Extract from X-band radar on Antea at 06:13:37 hours. The AB inform to the OOW that there was no response after he applied the steering to starboard

At 0608:36 hours, about 8 minutes before the collision, CPA/TCPA alarmed on the *Antea's* X-band radar. The officer on watch by using the offset EBL[10] on the X-band radar intended to altering the course in between the two vessels at anchor. Actually It was not a way point dedicated to make a course alteration as per passage plan, however, the officer on watch consideration to take action in advance because of incoming traffic and the difference in distance to altering point is not too far.

At 0612 hours, about 4 minutes before the collision, the officer on watch of *Antea* took a stand by running the second steering gear motor and changed the steering mode from auto to manual. The steering change over procedures has been made and placed on the upper steering console where every bridge team personnel can read and follow. The officer on watch decided to change over the steering from auto to hand because the degrees of alteration was quite large[11], roughly it measured more than 50 degrees. At the time when the AB handling the steering wheel, the officer on watch perform as the lookout. The AB confirmed checking the manual or auto switch whilst handling with the steering. However, he did not check the system switches at that time.

[10] Electronic bearing line: A straight dashed line extending out from the own ship position up to the circumference of the radar picture.

[11] As set out in Master's Standing Orders and Instructions - a small alteration can be done using the auto Pilot, if any alteration is a large then hand steering should be used.

And in the meanwhile, *Antea* still maintain its course and speed. As evidence from the X-band radar screen, the vessel was on a heading of 085.7° (T) and making good a course of 090° (T) with speed over ground 11.5 knots, and distance to *Star Centurion* was at range of 0.8 nm.

From the X-band radar screen, *Antea* were approaching four vessels at anchor. In this traffic situation, *Antea* was the vessel to give-way for those vessels. The action should be made in ample time, implies that the assessment of risk of collision should be made well in time by observing the situation for quite some time and from a great distance and at regular intervals of time. Assessment and the time of action to avoid collision should be made accordingly. The helmsman applied the steering wheel to starboard as ordered, meanwhile *Antea* getting close to *Star Centurion*. Two times the helmsman inform the officer on watch that no steerage after the steering wheel was put to starboard from 15 to 20 degrees until hard over to starboard. When the bridge team realised that the steering wheel was no response, it only the confusion that struck personnel in the bridge and there was no attempt to use the lever following the perceived steering failure.

The action of the officer on watch moving the bridge telegraph without the engineers in the engine control room will not stop the engine or reduce the engine speed. Although there are engineers in the engine control room, they will require at least 15 minutes notice to get the engine ready to change speed. The officer on watch did take avoiding action at about 4 minutes before the collision, the late action did not provide sufficient time to deal with it alone when something undesirable arises or call the engineers for assistance. The presence of Master on the bridge in less than a minute before impact was too late to find out the situation that occurred and to avoid the collision by manoeuvring.

II.4. Bridge team and watch arrangement

The watchkeeping officers of *Antea* including the Master have undergone the advance bridge resource management course held by the operator. The course is included in the operator manual for fleet personnel. The training schedule is arranged by the crew manning office and implemented at the ship operator-training centre.

The bridge organisation on *Antea* is properly supported by a clear navigation policy incorporating shipboard operation procedures, in accordance with the company's safety management system onboard a ship as required by the ISM code.

The bridge team of *Antea* was consisting of one navigational officer and one able seaman as a lookout. The AB play role as helmsman when he instructed to handle the steering wheel manually, at that time his continuity lookout ceased. The duties of the lookout and helmsman are separate, and the helmsman shall not be considered to be the lookout while steering.

In accordance with the phases of navigation, *Antea* sailing tracks is in the coastal phase. In the marine operations manual, chapter 02: navigation, sub-chapter: coastal and restricted navigation is stated that *coastal waters are defined as 12 to 24 nm off shore or away from nearest danger. Restricted waters are defined as less than 12 miles off shore or away from nearest danger*. In this condition, coastal and restricted navigation was required for navigating on the Singapore Strait and adjacent waters. This required the Master, deck officer, helmsman and lookout to be present on the bridge. The SMS allow for the Master to

be relieved by the chief officer during prolonged passages in order to maintain rest hour compliance as stated in the marine operations manual, chapter 02, sub-chapter: bridge team composition.

The workload for deck officers during the vessel port call in Singapore is very high which it is one of the world's busiest ports. The watchkeeping system on *Antea* whilst navigating until collision is six hours on/six hours off. Navigating in the Singapore TSS and the adjacent waters demands high levels of concentration especially at night. The two watch system promotes fatigue and contributes to performance degradation, thus increasing risks.

Antea personnel on board is comply with the applicable minimum safe manning certificate. There were sufficient deck officers available for the Master to make arrangement and to have implemented a watch system as per ship marine operations manual (see table II-1).

Table II-1: Marine Operations Manual of Antea, Chapter 02 Navigation, Bridge Team Composition

Condition	Master	OOW	Helmsman / Lookout	Lookout
A. Open Sea (Daylight)		Required		On call
B. Open Sea (Night)		Required	On call	Required
C. Visibility Restricted	Required	Required	Required	Required
D. Deep sea pilotage	On call	Required	Required	Required
E. Port Approach/Departure, Pilotage, Restricted Waters	Required	Required	Required	Required
F. Anchorage		Required		On call

At the time of collision, the second officer of *Star Centurion* as the officer on watch was not present on the bridge. Right after heard and felt an impact, the Master was about to leave his cabin then the second officer came to the cabin door. Both of them proceeded to the forward bridge where alarms were sounding. The second officer was not fulfilling his watchkeeping responsibility when the vessel at anchor. A deck officer should at all times maintain responsibility for a safe anchor watch. These requirements are contained in the STCW Code[12], as amended.

Whilst at anchor, an alert watch must be maintained at all times i.e. constant monitoring of the vessel's position, carefully monitor for drag, radio watch, observing the movements of

[12] International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended, Section A-VIII/2, part 4-1, paragraph 51.

other vessels, the surrounding area, and observing any change of the weather which may necessitate the watches to be strengthened or leaving the anchorage in time. If another vessel is approaching on a collision course, and avoiding action cannot be taken, a warning must be given immediately by light and sound, the engines brought on stand-by, call the Master and the anchor crew mustered. *Star Centurion* laid her anchor at an unsheltered anchorage where traffic is abundant and where small errors might lead to full scale disasters, the anchorage might be a time to be extra vigilant.

II.5. EXCLUSIONS

At the time of collision, seas were 0.5 - 1.25 metres and visibility was about 8 - 10 nm. The crews from the *Antea* reported no concerns related to the weather. The weather was not a factor in the accident.

The crew of both vessels reported no problem with the vessel's navigation equipment and radio communication prior to the accident. The *Antea's* bridge team members were trained and certified for the capacity in which they were working. The vessel navigation equipment and radio communication as well as the certificates of the *Antea's* bridge team personel were not factors in the accident.

Following the collision, a technician from maker dispatched to *Antea* upon requested by the ship operator to carried out manoeuvering test of the steering gear. The result of the test found no sign of abnormalities. The *Antea* reported no issues with the propulsion system. The functioning of the *Antea's* steering and propulsion systems was not a factor in the accident.

III. CONCLUSION

The bridge team on board *Antea* did not take appropriate actions to avoid the collision. The collision occurred due to late action taken by the second officer and the third officer even though they are aware that the vessel in a collision course with an anchor vessel in good time.

Antea exited the Singapore Traffic Separation Scheme and continue navigating in coastal waters, however the bridge team composition was not complying with the operator's existing procedure. The planning of the bridge manning for the passage was based on the assumption that no unexpected situation would arise.

The third officer of *Antea* late action causes nervous when the steering is not responding likely due to the system switches not place in the correct mode. The bridge crew was probably not adequate familiarized with the vessel's navigation equipment.

The bridge team on *Star Centurion* had not observed the surrounding traffic, they did not aware that *Antea* course and speed lead to close quarters until very late. The anchored vessel must maintain an effective and proper watch at all times and be well prepared for emergency operations.

IV. ACTION TAKEN

The operator of *Antea* has:

- Completed its internal investigation.
- Disseminate the findings of their investigation to the operator fleet and stakeholders, specifically highlighting the relevant sections of company procedures that were not followed.
- Instructed the crew service center / fleet personnel department for all officers to undergo a bridge resource management (BRM) refresher course irrespective of refresher course cycle before their next contract.
- Instructed the operator own network of the maritime training center to develop simulation scenario for officers to exercise similar situations.
- Increase frequency of VDR analysis to confirm consistency of watch hand-over / take-over.
- Fleet technical department correspondence with steering system makers to check feasibility of installing sensor to activate alarm when wheel not near midships position when the system is still on auto pilot.

The operator of *Star Centurion* has:

- Completed the oil removal phase.
- Deployed marking buoy at the surrounding wreck location to alert the traffic. This activity had approved and supervised by Distrik Navigasi Kelas I Tanjung Pinang and KUPP Kelas I Tanjung Uban.

V. SAFETY RECOMMENDATIONS

The following KNKT safety recommendations shall in no case create a presumption of blame or liability.

Referring to the Government Regulation of Transport Accident Investigations No. 62 Year of 2013 Article 47 stipulates that the interested parties must follow up the safety recommendations on this report and report the progress of those recommendation to the chairman of the KNKT.

V.1. The operator of *Antea*

- To review its navigational watch system arrangement for ensuring the safety of the vessel during navigation.
- Consider whether the navigational watch system strategy is adding to congestion in the traffic separation scheme and adjacent waters.

V.2. The operator of *Star Centurion*

- Consider elaborating the already existing procedures regarding bridge discipline and responsibility. The officer on watch is responsible for safe navigation of the vessel throughout the watch.
- Ensure wreck removal work conducted with no hampered to the surrounding traffic.

SOURCE OF INFORMATION

Crews of *Antea;*

BSM Singapore;

Pertamina International Shipping;

Spica Services Indonesia;

IMO Resolution MSC.255 (84) Code for The Investigation of Marine Casualties and Incidents;

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