Marine Safety Investigation Unit

Transport Malta

MARINE SAFETY INVESTIGATION REPORT

Safety investigation into the collision involving the

Maltese registered bulk carrier

GORTYNIA

and the Liberian registered bulk carrier

DZ QINGDAO

in the Singapore Strait

on 17 May 2017

201705/025

MARINE SAFETY INVESTIGATION REPORT NO. 11/2018

FINAL

Investigations into marine casualties are conducted under the provisions of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 and therefore in accordance with Regulation XI-I/6 of the International Convention for the Safety of Life at Sea (SOLAS), and Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009, establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and amending Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council.

This safety investigation report is not written, in terms of content and style, with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The objective of this safety investigation report is precautionary and seeks to avoid a repeat occurrence through an understanding of the events of 17 May 2017. Its sole purpose is confined to the promulgation of safety lessons and therefore may be misleading if used for other purposes.

The findings of the safety investigation are not binding on any party and the conclusions reached and recommendations made shall in no case create a presumption of liability (criminal and/or civil) or blame. It should be therefore noted that the content of this safety investigation report does not constitute legal advice in any way and should not be construed as such.

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Report of Investigation by the Liberia Maritime Authority – 31 October 2018

GLOSSARY OF TERMS AND ABBREVIATIONS

AB	Able bodied seaman
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
BNWAS	Bridge Navigation Watch Alarm System
BSM	Bernard Schulte Shipmanagement
BV	Bureau Veritas
COG	Course over ground
COLREGs	International Regulations for Preventing Collisions at Sea 1972 (as amended)
CPA	Closest point of approach
E	East
ECDIS	Electronic Chart Display and Information System
ETA	Estimated time of arrival
GMDSS	Global Maritime Distress and Safety System
GPS	Global Positioning System
GT	Gross tonnage
IMO	International Maritime Organization
kW	Kilowatt
LOA	Length overall
LT	Local time
m	Metres
MPA	Maritime and Port Authority of Singapore
MSIU	Marine Safety Investigation Unit
N	North
nm	Nautical miles
NUC	Not under command
OOW	Navigational officer of the watch
PEBG B	Pilot Eastern Board Ground Bravo
RPM	Revolutions per minute
SMCP	Standard Marine Communication Phrases
SMS	Safety Management System
SOG	Speed over ground
SOLAS	International Convention for the Safety of Life At Sea, 1974, as amended
STCW Convention	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended

STRAITREP	A mandatory ship reporting system in the straits of Malacca and Singapore
TSS	Traffic Separation Scheme
UTC	Universal Time Coordinated
VDR	Voyage data recorder
VHF	Very high frequency
VTIS	Vessel Traffic Information System

SUMMARY

At about 0029:30 (UTC + 8) on 17 May 2017, motor vessel *DZ Qingdao* collided with a fully laden deep draught, capesize, bulk carrier *Gortynia*, in Singapore Strait. The collision occurred in the Eastbound deep water route of the Traffic Separation Scheme (TSS), off Batu Berhanti.

Gortynia sustained major damage to her port side forward ballast tanks above and below the waterline. The vessel also sustained varying degrees of damage to the port side hull and deck fittings from cargo hold no. 1 to just forward of the accommodation. *DZ Qingdao* also sustained major damages to her bow.

The safety investigation concluded that prior to *DZ Qingdao* suffering a power loss resulting in a loss of propulsion and steering, both vessels were approaching each other in their respective traffic separation lanes and were to pass clear of each other. The subsequent change in *DZ Qingdao*'s heading to port meant that she now was at risk of collision with *Gortynia* as she approached the separation zone and Eastbound deep-water route. *DZ Qingdao* neither warned the VTIS nor the surrounding vessels that she was not under command. When she did not comply with the VTIS instructions to return back to her designated lane, it was too late to allow *Gortynia* to take effective action to avoid the collision.

The Marine Safety Investigation Unit (MSIU) has made two recommendations to Eastern Mediterranean Maritime Ltd, the managers of *Gortynia*, aimed at addressing safety of navigation on board vessels under its management.

Cooperation

During the course of this safety investigation, the MSIU received all the necessary assistance and cooperation from the Ship Investigation Department of the Maritime and Port Authority of Singapore. Where deemed appropriate, given that no detailed information on events on board *DZ Qingdao* was available to the MSIU, reference was made to the Report of Investigation compiled by the Liberian Maritime Authority, during the preparation of this safety investigation report.

1 FACTUAL INFORMATION

1.1 Vessel, Voyage and Marine Casualty Particulars

Name	*Gortynia*	*DZ Qingdao*
Flag	Malta	Liberia
Classification Society	Bureau Veritas	Korean Register of Shipping
IMO Number	9702584	9116656
Type	Bulk carrier	Bulk carrier
Registered Owner	Premier Shipholdings Co Ltd	*DZ Qingdao* Shipping Corp Ltd
Managers	Eastern Mediterranean Maritime Ltd	Sea Ray Shipping Co Ltd
Construction	Steel (Double bottom)	Steel (Double bottom)
Length overall	292.00 m	189.99 m
Registered Length	288.42 m	181.46 m
Gross Tonnage	93,297	27,763
Minimum Safe Manning	15	*Not available*
Authorised Cargo	Dry bulk	Dry bulk
Port of Departure	Saldanha Bay	Tianjin, China
Port of Arrival	Singapore	Kelang, Malaysia
Type of Voyage	International	International
Cargo Information	Iron Ore	General cargo
Manning	22	22
Date and Time	17 May 2017 at 0030 (LT)	
Type of Marine Casualty	Serious Marine Casualty	Serious Marine Casualty
Place on Board	Forecastle, Freeboard Deck	Forecastle, Freeboard Deck
Injuries/Fatalities	None	None
Damage/Environmental Impact	Structural damage to the bow	Structural damage to the bow
Ship Operation	Normal Service / In passage	Normal Service / In passage
Voyage Segment	Transit	Transit
External & Internal Environment	Good visibility. Light Southeasterly breeze with slight seas.	
Persons on Board	22	22

1.2 Description of Vessels

1.2.1 MV *Gortynia*

The Maltese registered *Gortynia* (Figure 1) was a capesize bulk carrier, built in 2015 by Japan Marine United Ariake Shipyard. The vessel was classed by Bureau Veritas (BV) for unrestricted navigation.

Figure 1: MV *Gortynia*

Gortynia was owned by Premier Shipholdings Co. Ltd. and the technical management was carried out by Eastern Mediterranean Maritime Ltd., based in Piraeus, Greece.

Gortynia had nine cargo holds, of which, nos. 1, 3, 5, 7 and 9 were strengthened for alternate cargo hold loading. Her gross tonnage (GT) was 93,297 and net tonnage was 58,940. The vessel had a length overall of 292.0 m and a beam of 45.0 m. Her

depth was 24.55 m and the maximum deadweight was 182,608 tonnes at a summer draught of 18.18 m. A General Arrangement Plan can be found in Figure 2.

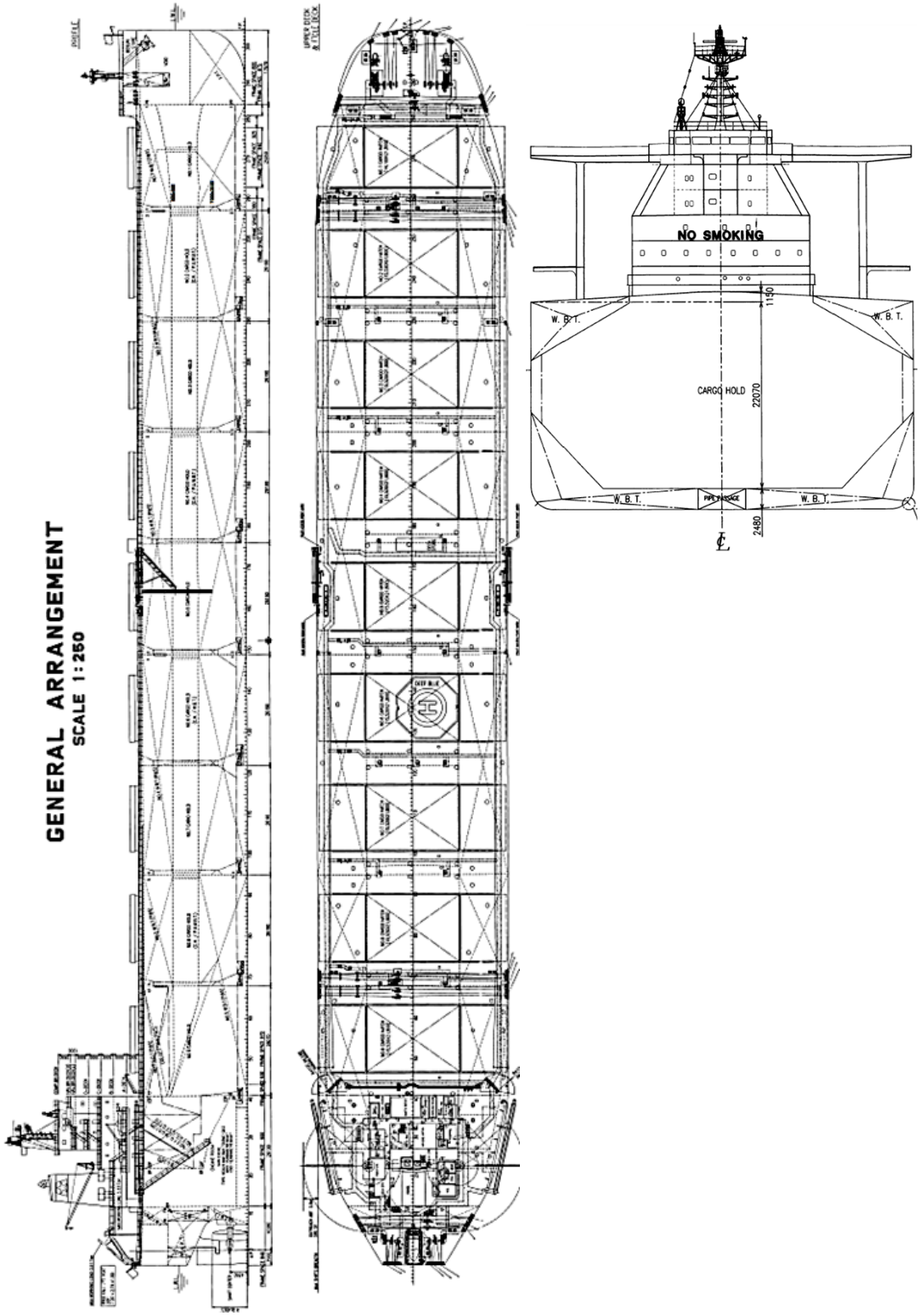

Figure 2: MV *Gortynia* General Arrangement Plan

Gortynia's propulsive power was provided by a 2 stroke, single acting, 7-cylinder MAN-B&W medium speed diesel engine, producing 15,860 kW. The vessel had one fixed pitch propeller and her service speed was 15.5 knots[1].

The vessel was traded by her managers on the bulk ore trade usually between Brazil and the Far East or between Australia and the Far East.

1.2.2 Bridge layout and equipment

Gortynia was equipped with the required navigation equipment as listed on her Record of Equipment for Cargo Ship Safety Equipment Certificate - Form E.

The main equipment included the following:

- two Global Positioning Systems (GPS);
- gyro and magnetic compasses;
- two radars –S and X-Band with automatic radar plotting aid (ARPA);
- automatic Identification System (AIS);
- Bridge Navigation Watch Alarm System (BNWAS);
- automatic pilot;
- echo sounder;
- Voyage Data Recorder (VDR); and
- electronic chart display and information system (ECDIS).

The main navigation consoles, fitted on either side of the main steering console, housed two radars and an ECDIS on the starboard side, and another ECDIS and the main engine controls the port side console house (Figure 3).

[1] One knot is equal to 1.852 $kmhr^{-1}$.

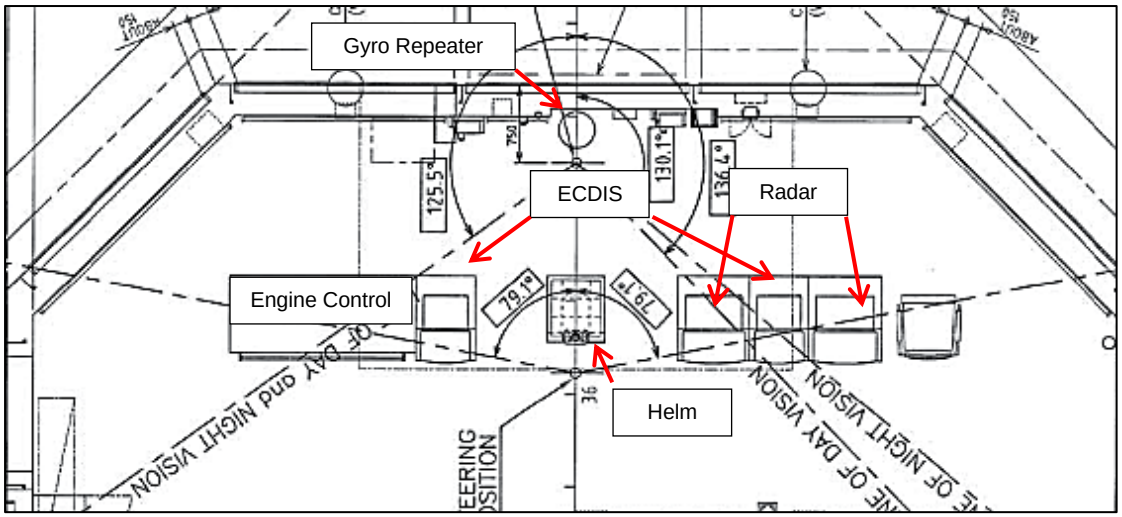

Figure 3: Bridge layout

The hand steering position was located midship in line with the navigation and engine control panel (Figure 3). The vessel's primary means of navigation was ECDIS. The bridge layout was spacious. The chartroom was fitted behind the starboard navigation instrument console (Figures 4 and 5). The main GMDSS station was situated within the bridge area, on the starboard side, aft.

Figure 4: Radar sets and ECDIS located on the starboard side

Figure 5: Main bridge panel from starboard side

At the time of the collision, all navigational equipment were reported to be operating satisfactorily.

1.2.3 MV *DZ Qingdao*

The Liberian registered *DZ Qingdao* was a 27,763 GT bulk carrier, owned by DZ Qingdao Shipping Corp Ltd., located in China. The vessel was managed by Sea Ray Shipping Co Ltd. The vessel was built in 1996 by Oshima Shipbuilding Company, Japan and was classed by the Korean Register of Shipping. *DZ Qingdao* was classed as a handysized, bulk carrier and had five cargo holds and four deck cargo cranes.

Propulsive power was provided by a 6-cylinder B&W 6S50MC, two-stroke, medium speed diesel engine, producing 6,650 kW at 100 rpm. This drove a fixed pitch propeller to give a service speed of about 14.50 knots.

1.3 Manning and Crewing on board *Gortynia*

Gortynia was manned by a crew of 22 officers and ratings, all of whom were Filipino nationals. At the time of the accident, the vessel was manned in excess of the Minimum Safe Manning Document issued by the flag State Administration. The crew had been supplied by Bernard Schulte Shipmanagement (BSM) under a crew management contract to Eastern Mediterranean Maritime Ltd. The working language on board was English.

As the vessel was manned with three navigation officers (excluding the master), the watchkeeping hours were divided between the three officers on a '4-on, 8-off' basis. Although the master did not keep a navigational watch, he was on call at all times.

1.3.1 Master

The master was 59 years old and had been at sea for the past 30 years. He had obtained his Master's Certificate of Competency in 1993 and had revalidated his license in July 2015 for another five years. The master had an 'Endorsement Attesting the Recognition of a Certificate' from Transport Malta's Merchant Shipping Directorate dated 31 March 2017.

The master had been sailing in this rank since 2003 and his experience had mainly been on bulk carriers. This was his first contract with the technical managers. He had joined the vessel on 25 January 2017 in Singapore.

1.3.2 Chief mate

The chief mate was 48 years old and had 25 years of seagoing experience. He obtained his Master's Certificate of Competency in 2011. He had an 'Endorsement Attesting the Recognition of a Certificate' from Transport Malta's Merchant Shipping Directorate dated 6 September 2016.

This was the chief mate's first contract with Eastern Mediterranean Maritime Ltd. He had been in the present rank for the last 10 years and had joined the vessel on 03 April 2017 in Singapore.

1.3.3 Second mate

The second mate was 42 years old and had 13 years of sea experience. He had obtained his STCW II/1 (OOW) Certificate of Competency in 2007 and had an 'Endorsement Attesting the Recognition of a Certificate' from Transport Malta's Merchant Shipping Directorate dated 14 February 2017.

The second mate had been in rank for the past four years, of which the last two years were with BSM. He had joined the vessel on 01 December 2016 in Saldanha Bay.

1.3.4 Cadet

This was the cadet's first trip at sea. He had just joined the vessel on 23 March 2017 in Jingtang, China. At the time of the accident, he had only completed his basic training STCW VI/1.

1.3.5 Helmsman

The helmsman was 35 years old and had seven years of seagoing experience. He had an Able Bodied Seaman's (AB) certificate enabling him to be a 'Rating Forming Part of a Navigational Watch'. The certificate had been issued on 20 February 2015 by the Republic of the Philippines. He had been working with BSM for six years and this was his first contract with Eastern Mediterranean Maritime Ltd.

All of the bridge watch keeping officers, bar the cadet, had attended an ECDIS and Bridge Team Management courses.

1.4 Environment

On 16 May 2017 at 2400, *i.e.*, when the third mate handed over the watch to the second mate, the environmental conditions recorded in the deck log book were as follows:

wind speed	Beaufort 3;
wind direction	Southeast;
visibility	Good.

1.5 Narrative

1.5.1 Background

Gortynia departed Saldanha Bay, South Africa at 1400 on 26 April 2017. The vessel had loaded 179,554 tonnes of iron ore bound for China. Her departure draughts were 18.07 m forward, and 18.17 m aft.

Since the vessel was scheduled to stop at Singapore, the master followed a passage plan that took the vessel past One Fathom Bank into the Malacca Strait towards Singapore.

In anticipation of increased traffic conditions and the deep draught of the vessel, the master doubled up the watches just before the vessel arrived off One Fathom Bank on 16 May 2017.

The watch schedule was adjusted to:

0000 – 0600 / 1200 - 1800 chief mate and second mate; and
0600 – 1200 / 1800 - 2400 master and third mate.

Gortynia cleared One Fathom Bank at 0517 on 16 May 2017.

DZ Qingdao departed Tianjin, China on 02 May 2017. She was reportedly laden with approximately 39,179 tonnes of general cargo. She was bound for the port of Kelang, Malaysia and Yangon, Myanmar. Her mean draft was 10.5 m.

1.5.2 Events on board *Gortynia* leading up to the collision[2]

At about 2000 on 16 May, the main engine was set to standby and the master took the con of the vessel. End of sea passage was rung at 2100 when the vessel was approximately abeam of 'The Brothers' light, about one nautical mile prior to the vessel's exit from the Malacca Strait Traffic Separation Scheme (TSS). The master, the third mate and an able bodied seafarer (AB) were present on the bridge. The helm was changed over from autopilot to manual. The cadet joined the bridge team at 2200 to assist with look-out duties. *Gortynia* was bound for Pilot Eastern Boarding Ground 'B' (PEBG B).

[2] Times in this report refer to local time (UTC + 8).

At about 2249, *Gortynia* entered the deep-water route in the Singapore main strait TSS and at 2258, her engine was set at full ahead (manoeuvring). The vessel's speed[3] was 10.1 knots.

At 0000 on 17 May, the chief mate and the second mate took over the watch from the third mate. The AB on the wheel was also relieved and the vessel continued to be manually steered. The chief mate was tasked with anti-collision duties, while the position fixing and monitoring of the vessel's planned track were delegated to the second mate. The master retained the con of the vessel and the third mate and the cadet remained on the bridge. The estimated time of arrival (ETA) to PEBG B was 0100 and the traffic in the immediate vicinity was heavy (Figure 6).

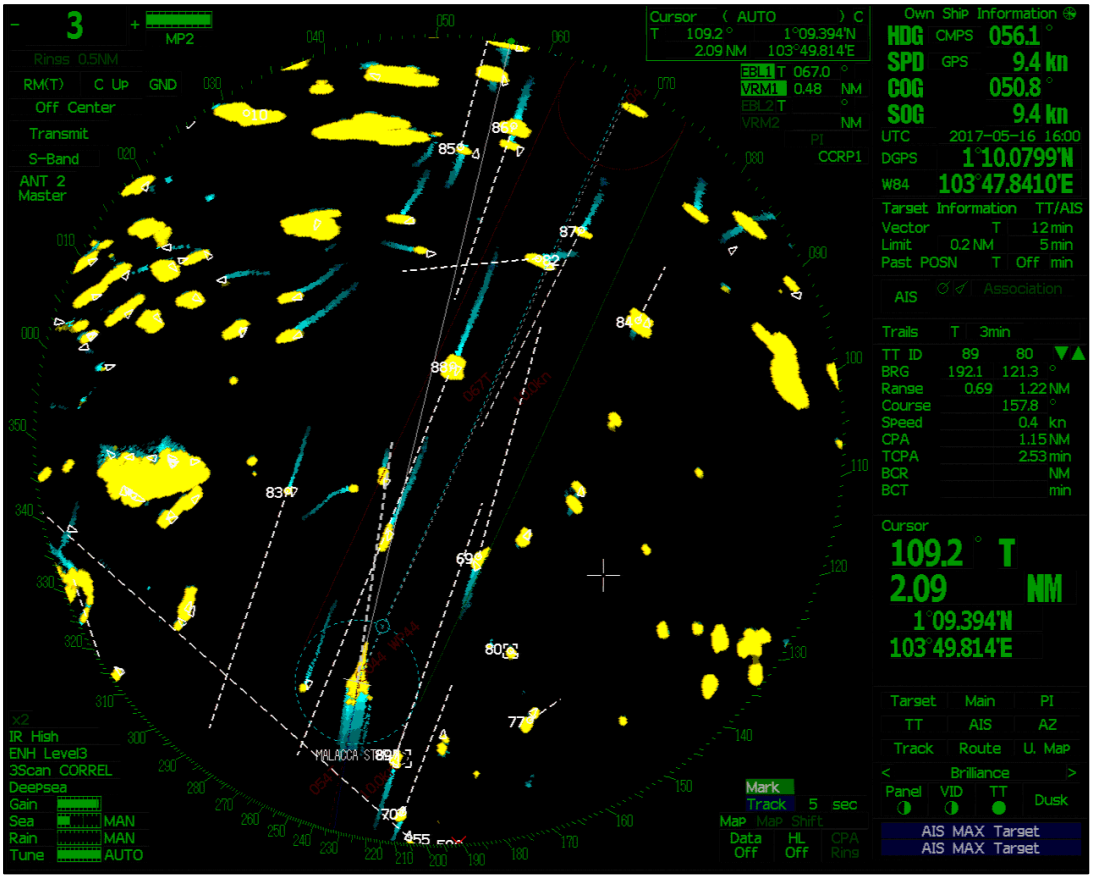

Figure 6: *Gortynia's* radar screen showing her in the deep water route at 0000

At about 0015, *DZ Qingdao* and *African Loon* were noticed by the chief mate on the S-band radar that he was monitoring on the three nautical mile (nm) range. He acquired both targets in the AIS mode (Figure 7).

[3] Speed over ground (SOG).

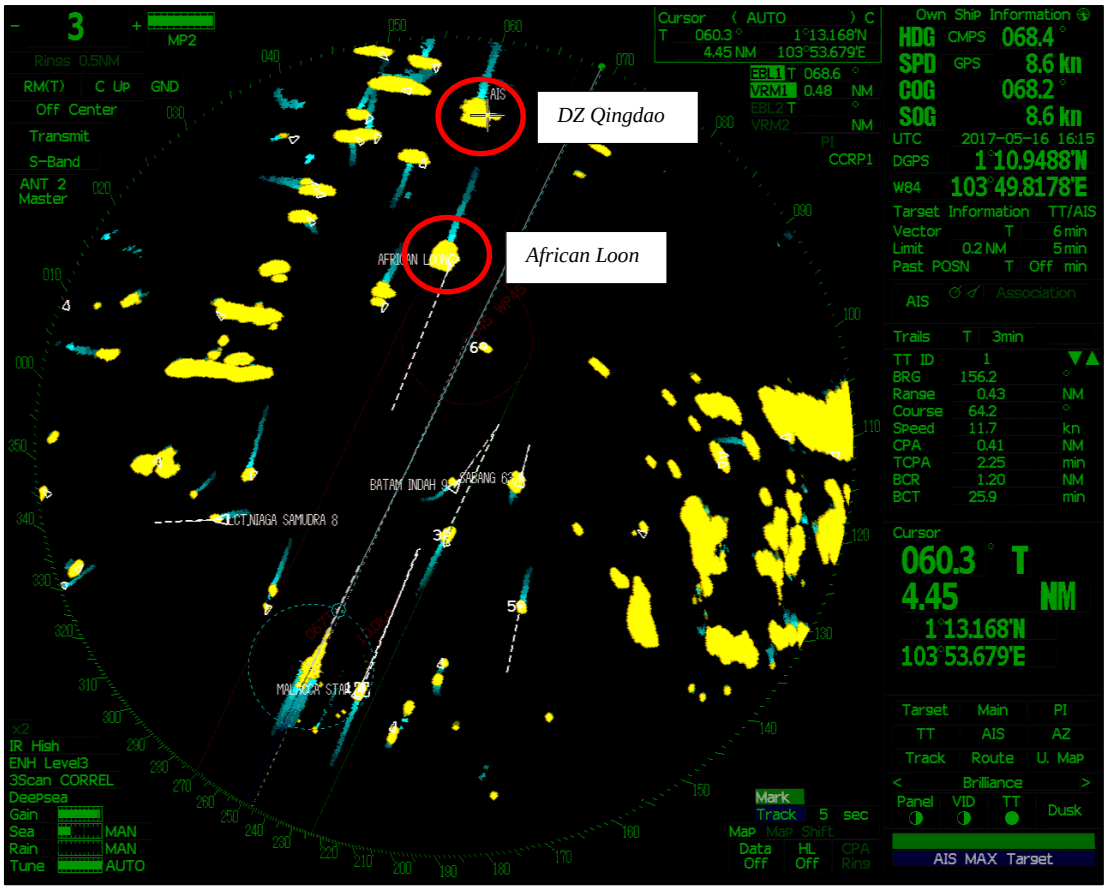

Figure 7: *DZ Qingdao*'s target acquired by chief mate

Gortynia's heading and speed were 068.4° and 8.6 knots respectively. *DZ Qingdao* was about 4.4 nm distant. The subsequent AIS plot of *African Loon* at 0016 indicated that it would pass *Gortynia* at about four cables on the port side. It was stated by the chief mate that it was normal for vessels to pass within two to three cables in the Singapore Strait. *DZ Qingdao* was following the *African Loon* in the Westbound traffic lane. At the same time, *Malacca Star* was overtaking *Gortynia* on her starboard side with a closest point of approach (CPA) of about four cables (Figure 7).

At about 0020, *DZ Qingdao* was about 2.9 nm distant and the vessel's AIS vectors continued to indicate that she would pass clear of *Gortynia* (Figure 8).

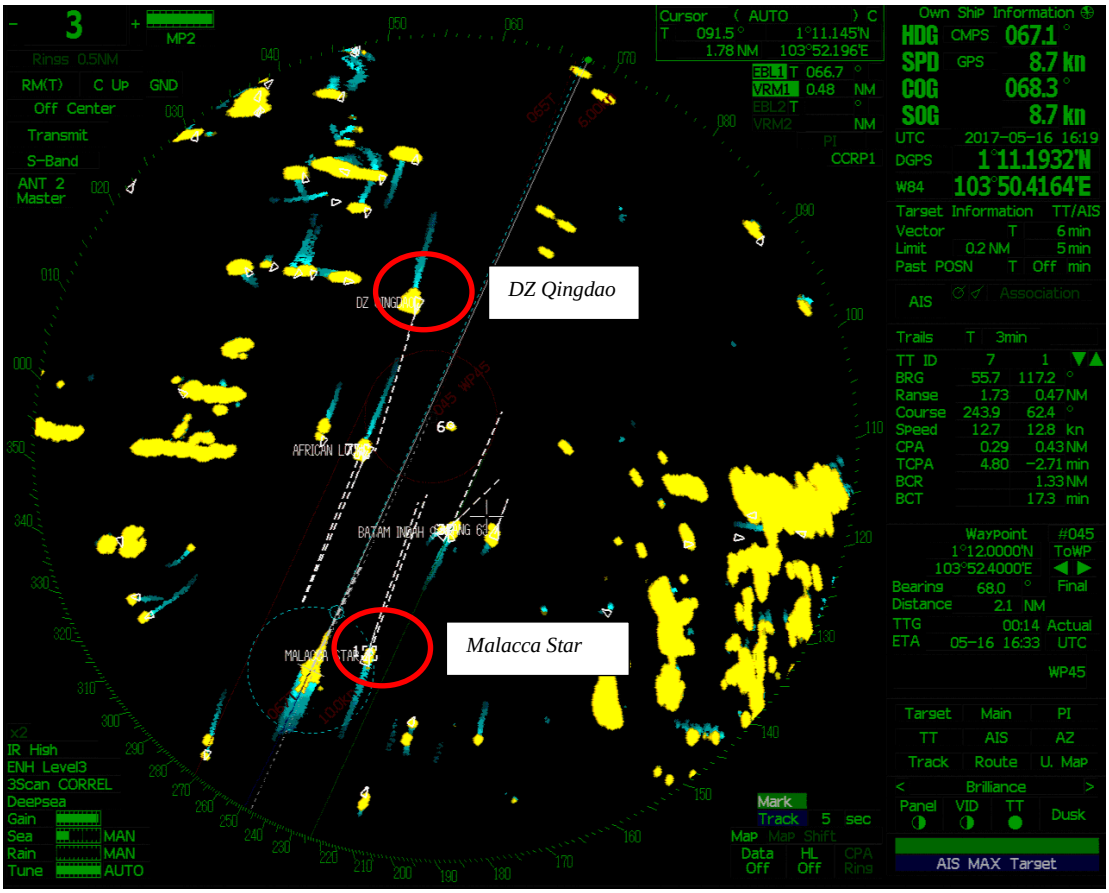

Figure 8 – *DZ Qingdao's* target at 0020

At 0022:05, *Malacca Star* called Vessel Traffic Information System (VTIS) Central[4] on VHF radio and advised them of their intentions:

> *I will be crossing TSS to proceed to pilot boarding ground Alpha, over.*

VTIS Central acknowledged that message and advised *Malacca Star*:

> *Sir, please, let the deep draft vessel[5] know that you are crossing sir, you are very close to her.*

At about 0022, the AIS vector of *DZ Qingdao* disappeared from the S-band radar of *Gortynia*[6] (Figure 9). The AIS symbol (triangle) reappeared at around 0023, but had no directional vector (Figure 10).

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4 *Verbatim* transcript of VHF recorded by VTIS provided by Maritime and Port Authority of Singapore (MPA).

5 MV *Gortynia*.

6 The AIS data recorded by *Gortynia*'s VDR indicated no AIS signal from *DZ Qingdao* from 0021:25 to 0023:19 - a duration of about 1 minute 55 seconds.

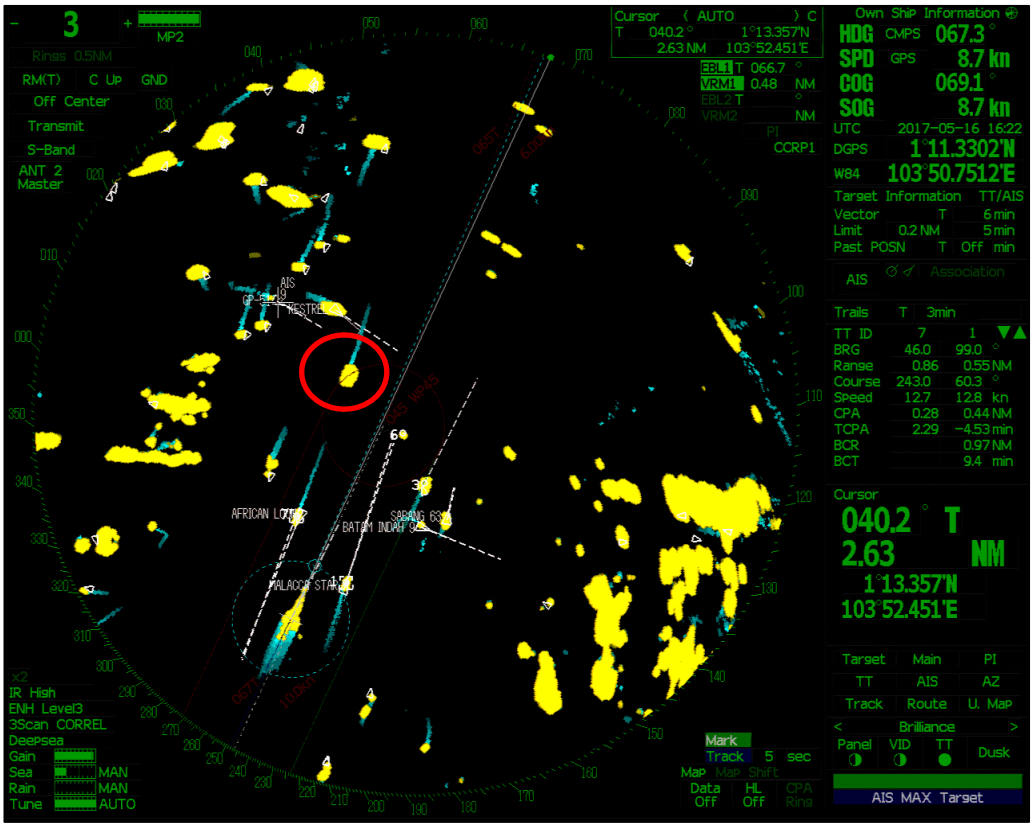

Figure 9: AIS vector of *DZ Qingdao* disappeared

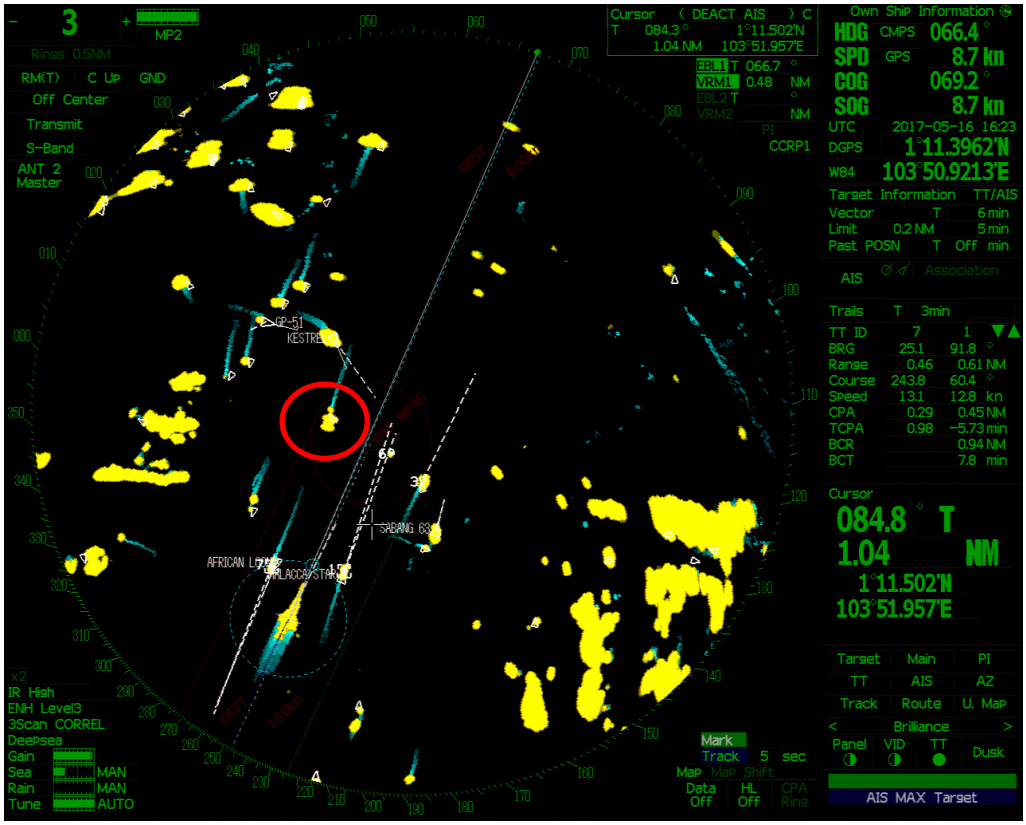

Figure 10: AIS symbol reappeared but with no vector

At 0022:52, VTIS Central called *Gortynia*:

> *Gortynia, Gortynia did you copy that? The container ship Malacca Star intends to cross the channel now over.*

This message was duly acknowledged by *Gortynia* at 0023:26.

At 0026:52, VTIS Central called *DZ Qingdao* and advised the officer of the watch (OOW) that:

> *You are observed to be coming into the deep water route, can you please go back into the Westbound lane as soon as you can, over?*

This message was acknowledged by *DZ Qingdao* at 0027:08 when *Gortynia* was about six cables distant (Figure 11).

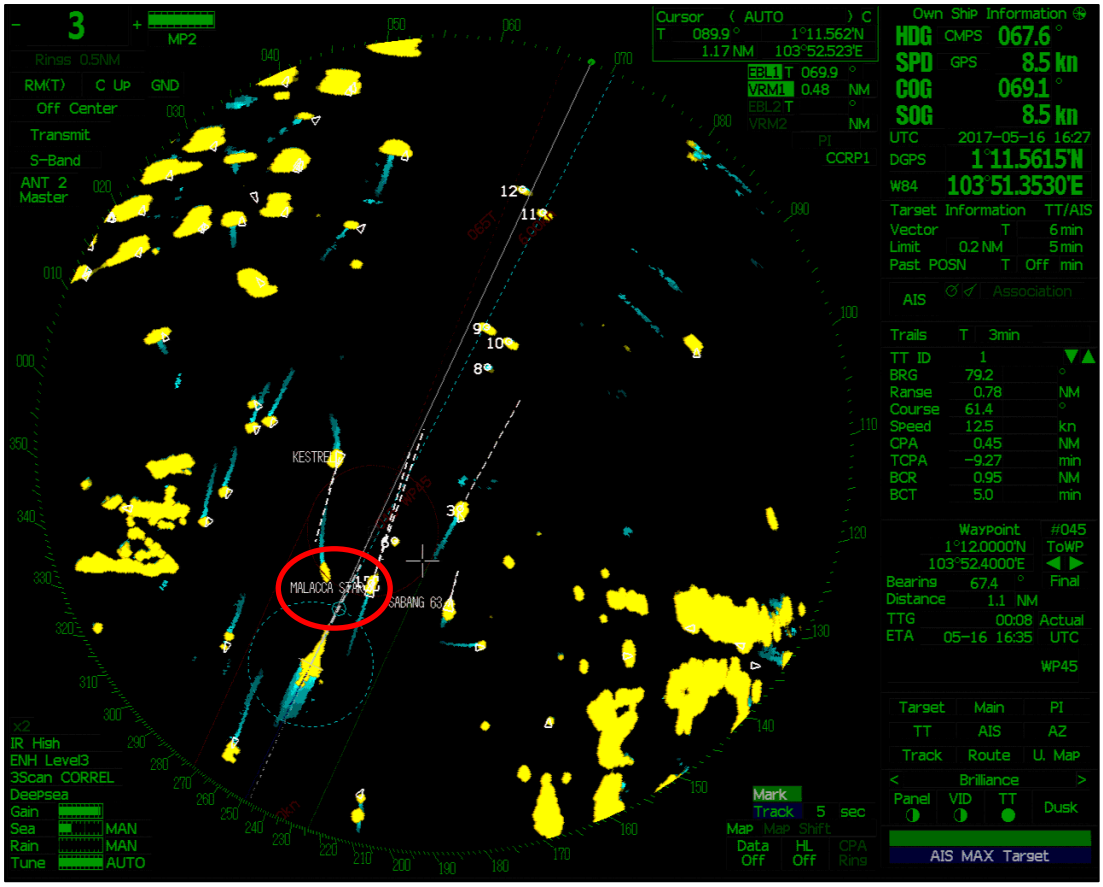

Figure 11: *DZ Qingdao* at 0027, about six cables distant

Soon afterwards, the bridge team members on board *Gortynia* observed *DZ Qingdao* heading towards them, instead of turning for her lane as directed by the VTIS. A warning was sounded on the whistle and the master initially ordered the engine to

'half ahead' at 0027:29 and the helm to starboard 20° at 0028:04, followed by 'dead slow ahead' and wheel amidships.

Although the MSIU could not hear clearly the voice on *Gortynia*'s VDR playback, it appeared that *DZ Qingdao* was calling vessels over the VHF radio to keep clear. This message was recorded by VTIS Central at 0027:58:

> *...this is DZ Qingdao. Please alter ship keep clear.*

At 0028:39, *Gortynia*'s master ordered 'stop engine' and a few seconds later, he ordered the wheel hard over to starboard to increase the rate of turn. The master subsequently ordered that the main engine is progressively set to 'full astern'. However, *DZ Qingdao* continued to swerve to the port, crossing the separation zone and entering the Eastbound deep-water route.

The bridge team members on *Gortynia* reported seeing the masthead light and the red side light, which changed to green. At about 0029:30, *DZ Qingdao* hit *Gortynia* in position 01° 11.66' N 103° 51.64' E (Figure 12). At the time of the collision, *DZ Qingdao*'s course and speed respectively were 208° and seven knots.

The two vessels remained in contact with each other for about a minute, causing extensive damage to their respective structures.

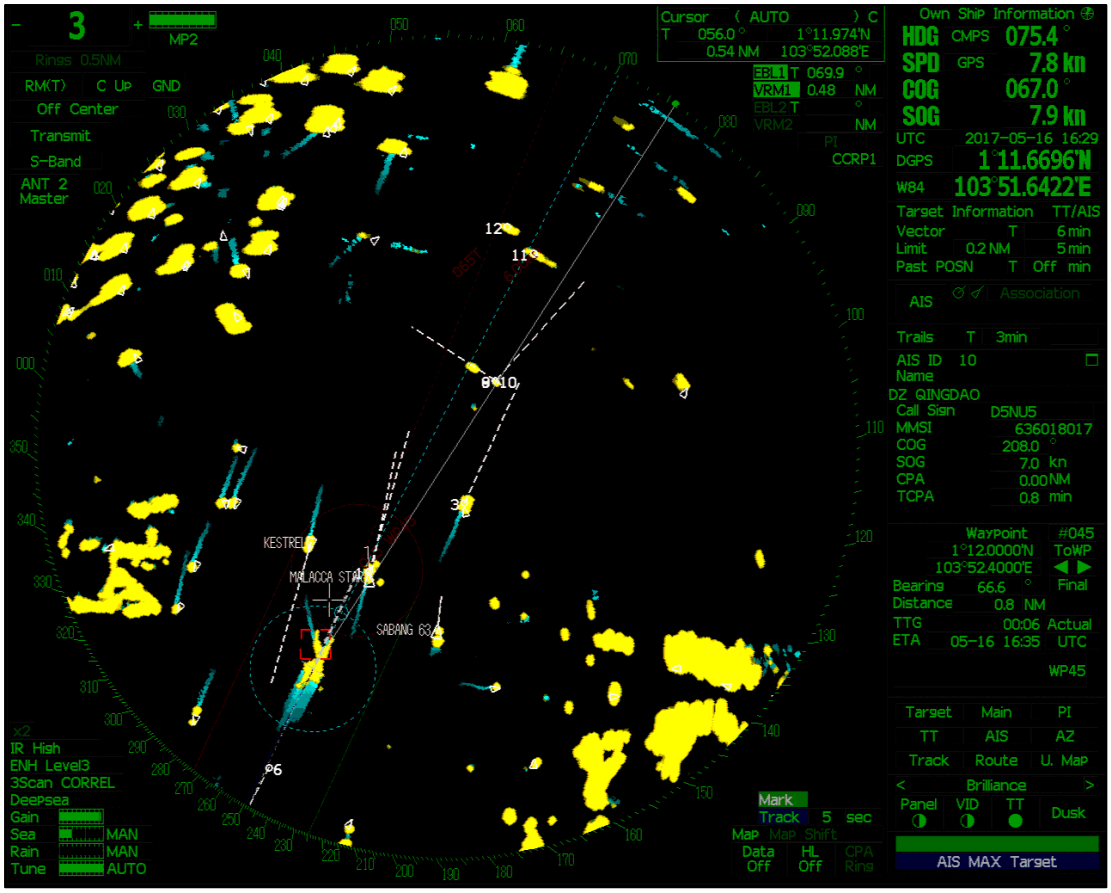

Figure 12: Collision in position 01° 11.66' N 103° 51.64' E

A one-minute interval plot of both vessels from 0014 to 0029 can be seen in Figure 13.

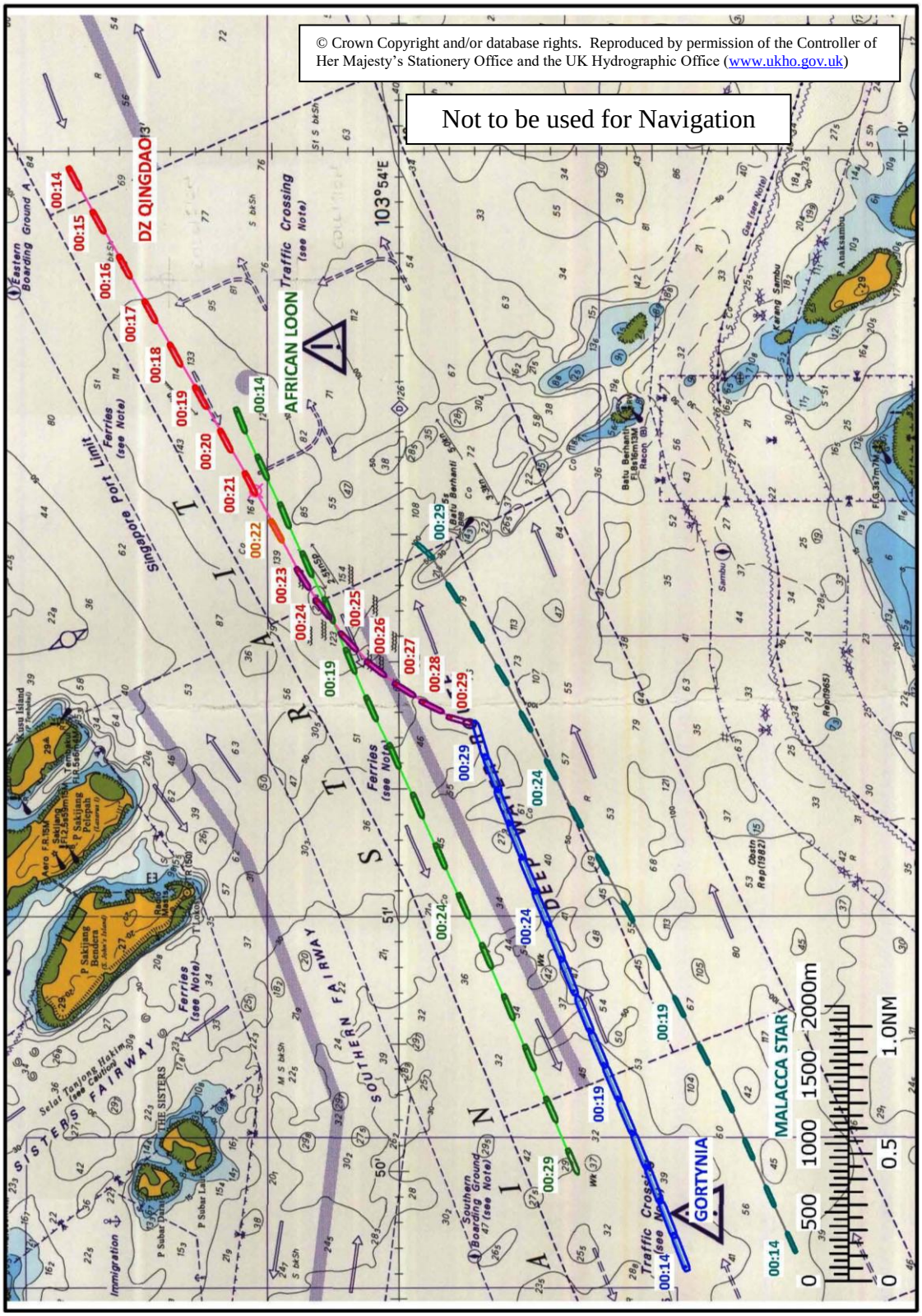

Figure 13: Collision plot on extract of BA Chart 4041

1.5.3 Post collision events on board *Gortynia*

Following the collision, the master reported the collision to VTIS at 0031. He then concentrated his efforts in controlling the vessel's movements and avoid the shallow waters off Batu Berhanti (Figure 14). The vessel avoided running aground and cleared the bank at about 0040.

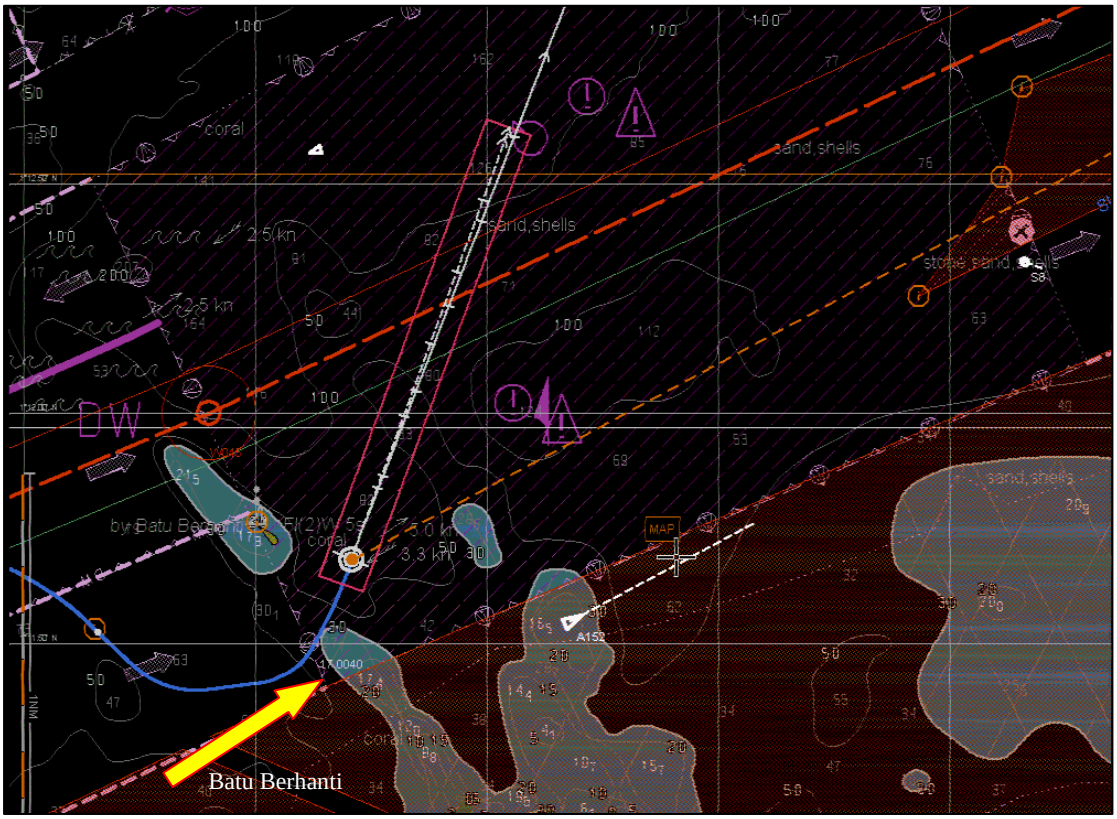

Figure 14: Vessel's track following the collision with *DZ Qingdao*

The master then instructed the chief mate to check the vessel for any water ingress into the cargo holds, ballast tanks and engine-room. Due to the extreme noise generated by the collision, all of the crew were awake. The master was advised by VHF that all were accounted for and no one had been injured. The master completed the 'Collision Checklist' contained in the safety management system (SMS) and subsequently contacted the vessel's technical managers.

The pilot boarded at 0151 and the vessel anchored safely at 0340 in position 01° 06.7' N 103° 59.7′ E, in the Eastern anchorage 'Bravo'.

1.5.4 Events on board *DZ Qingdao*[7]

At 2355 on 16 May 2017, the second mate took over the navigational watch from the third mate. An AB was on lookout and the master was on the bridge. At 0015, on 17 May 2017, *DZ Qingdao* was in the Westbound lane of the Singapore Strait TSS steering 240° and speed 10.9 knots. *African Loon* was 1.3 nm ahead of *DZ Qingdao* in the same lane. Her speed was about 12.9 knots.

Sometime between 0021 and 0022[8], *DZ Qingdao*'s generator failed, resulting in a power failure which affected the vessel's propulsion, steering and navigational system. The emergency generator was started and power restored to the critical navigational systems including the X-band radar[9]. Meanwhile, the master instructed the second mate to switch on the 'not under command' (NUC) lights. He reportedly called VTIS Central on VHF channel 14 to report the power failure and loss of navigational control but there was no response.

The master did not notice that *DZ Qingdao* had started to veer gently to the port, towards the traffic separation zone, which separate the Westbound lane from the Eastbound deep-water route. She was making good speed of 10 knots.

VTIS Central warned *DZ Qingdao* that she was coming into the deep-water route and requested her to return back to the Westbound lane, and the master acknowledged the message. At this time, *DZ Qingdao* was about four cables distant and advancing towards *Gortynia* instead of turning to the starboard; the risk of collision was rapidly developing. *DZ Qingdao* attempted to warn approaching vessels on the VHF radio to keep clear. At about 0028, electric power was restored on board. At this time, however, propulsion still had to be restored for manoeuvring and *Gortynia* was about two cables from *DZ Qingdao*'s bow. Shortly afterwards, *DZ Qingdao* was in the Eastbound deep-water route and collided with *Gortynia* at seven knots, advancing the impact towards her navigation bridge.

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[7] Information in this sub-section of the safety investigation report has been taken from the Liberian Authority investigation report and the VTIS' VHF transcript by the Maritime and Port Authority of Singapore.

[8] The investigation report issued by Liberia stated that the vessel's log book recorded generator failure at 0025.

[9] *DZ Qingdao*'s VDR playback had no record of AIS / GPS data between 0021 and 0041 and radar image from 0021 to 0048.

1.6 Damage to *Gortynia*

Gortynia sustained extensive damage to her hull in way of port side ballast tank no. 1, which included:

- breach of the upper topside tank and double bottom (Figures 15 and 16);
- cracks in the side shell plating, in way of cargo holds nos. 1 and 2;
- buckling of the shell plating and fish plate extending from frames nos. 41 to 263;
- deformation of web frames in way of the above mentioned damage;
- damage to deck railings and fittings at various locations (port side);
- damage to the hatch cover opening railway (port side);
- damage to various ballast and fuel oil tanks vent heads; and
- fuel oil hose handling davits (port side).

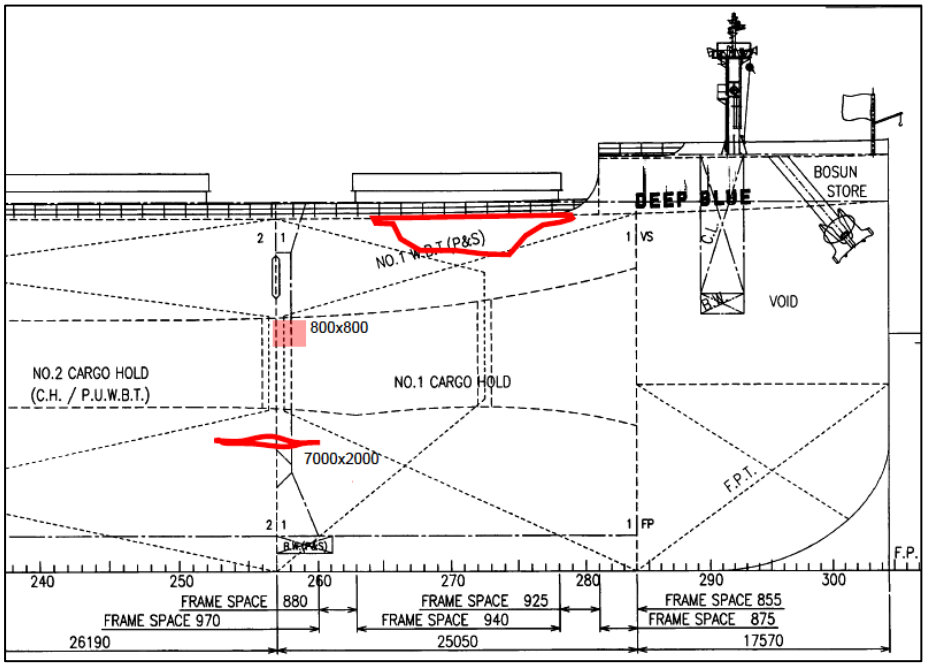

Figure 15: Damaged areas to *Gortynia*, in way of port side ballast tank no. 1

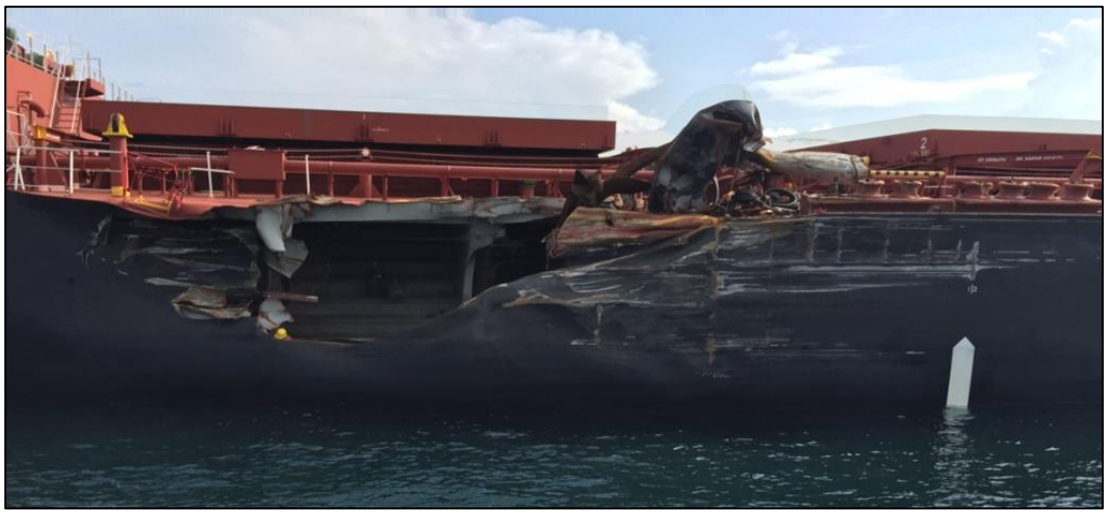

Figure 16: Point of contact and extreme damage section on *Gortynia* (port side)

1.7 Damage to *QZ Qingdao*

DZ Qingdao sustained considerable hull damage from her port bow to her bulbous bow, and from the fore peak tank to no. 1 port ballast tank. The forecastle deck plating was fractured, the bulbous bow was heavily distorted with severe bends and fractures and there were several lacerations on her underwater hull. The port anchor with six shackles of anchor chain was detached and stuck on to the port side of *Gortynia* (Figure 17).

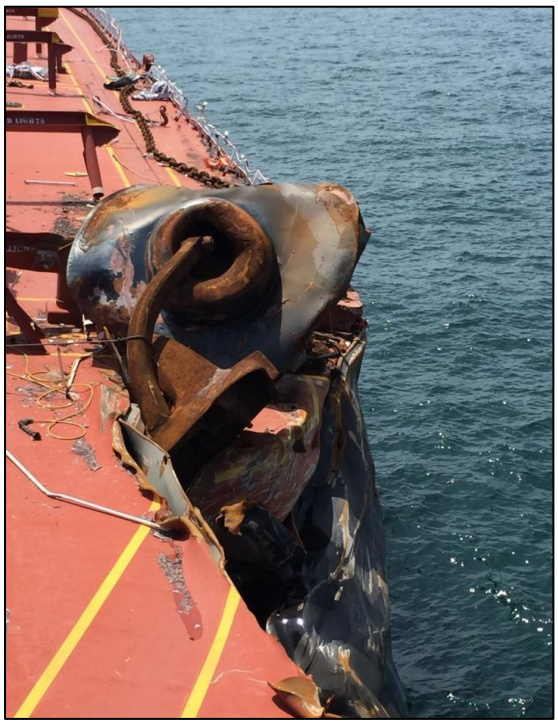

Figure 17: Detached section (anchor and anchor chain) of *DZ Qingdao* on *Gortynia*'s deck

1.8 The Singapore Strait

Both the Singapore Strait and Singapore port waters are two of the busiest areas in the world and therefore a Mandatory Ship Reporting System is used. This system covers the Straits of Malacca and Singapore and is known as STRAITREP, which has been in operation since 1998. The operational area of STRAITREP covers the straits between longitudes 100° 40' E and 104° 23' E.

The objectives of the STRAITREP are to:

- enhance the safety of navigation;
- protect the marine environment;
- facilitate the movements of vessels; and
- support SAR and oil pollution response operations.

The monitoring of safe and efficient navigation of ships in Singapore Straits TSS is undertaken by Singapore's VTIS, operated by the MPA, covering sectors 7 to 9 (Figure 18).

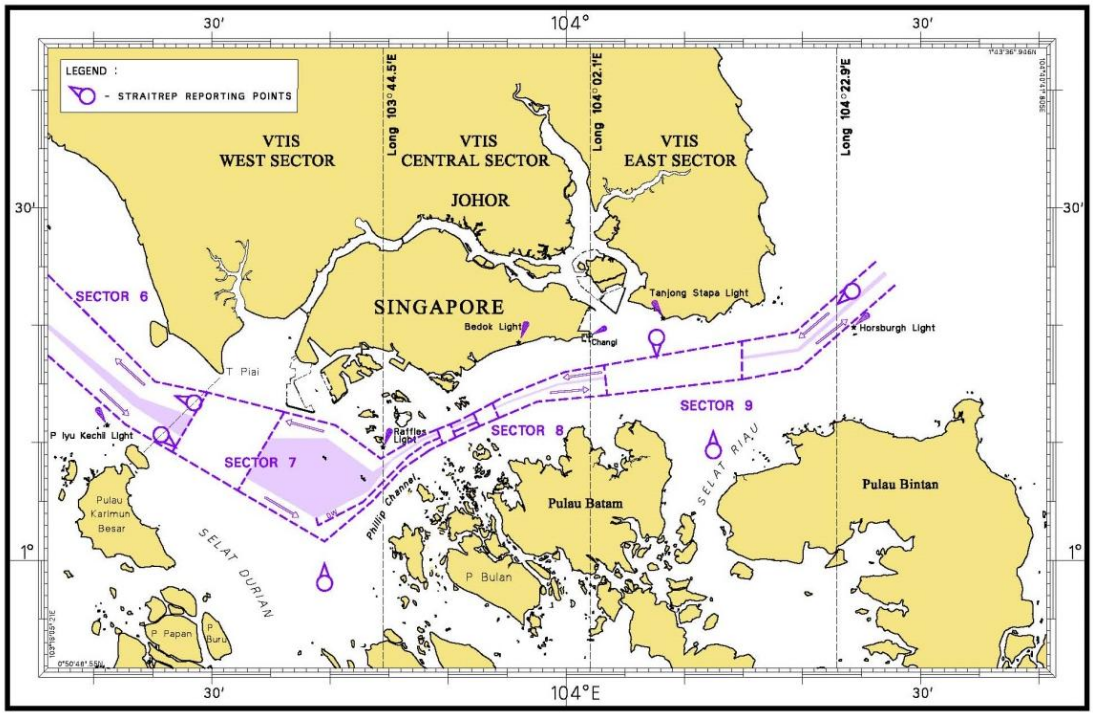

Figure 18: Singapore VTIS operational areas 7, 8 and 9

Source: https://www.mpa.gov.sg/web/portal/home/port-of-singapore/operations/vessel-traffic-information-system-vtis/operational-areas

2 ANALYSIS

2.1 Purpose

The purpose of a marine safety investigation is to determine the circumstances and safety factors of the accident as a basis for making recommendations, to prevent further marine casualties or incidents from occurring in the future.

2.2 Fatigue and Alcohol

The bridge team on board *Gortynia* reported being well rested at the time of the accident. The hours of rest records were in order and showed that rest hours were in excess of those required by STCW and the Maritime Labour Convention. Although there were no records of hours of (quality) sleep, there were no indications of any signs of fatigue. Alcohol tests were carried out shortly after the accident on all crew members who were on duty at the time, including the master and the results were reported to be negative.

Records of hours of rest and work of the bridge and engine watch keepers on board *DZ Qingdao* were reviewed by the Liberian Maritime Authority and were reported to be in compliance with international convention requirements. Alcohol tests on the bridge watchkeepers were also reported to be negative.

Since all tests results were negative on both vessels, fatigue and alcohol were not considered to be a contributing factors to this collision.

2.3 Look-out

Evidence submitted to the MSIU showed that both *Gortynia* and *DZ Qingdao* had at least one person on lookout duty on the bridge.

2.4 Overview of the Collision Dynamics

During TSS transit in the Singapore Strait (Main Strait and off St John's Island), *Gortynia*'s master had the con. The chief mate and second mate were on duty and the

vessel was on hand steering. As the vessel was about to approach the pilot station at PEBG B, the third mate and the cadet remained on the bridge.

As noted in sub-section 1.5.4, *DZ Qingdao*'s bridge was manned by the master, the second mate and an AB.

At about 0015, *DZ Qingdao* and *Gortynia* were approaching each other in the Singapore TSS, monitored by VTIS Central. *Gortynia* was following the deep-water route, while *Malacca Star*, which was in the same lane, was overtaking her from the starboard. *DZ Qingdao* and *African Loon* (Figure 7) in the Westbound lane were on the port bow of *Gortynia*. *DZ Qingdao*, which was close astern of *African Loon* and displaying her red navigational side light, was projected to pass clear of *Gortynia* (Figure 8).

There were neither indications of any risk of collision, nor indications that any vessel had intended to cross the TSS, except for *Malacca Star*. However, the power failure on *DZ Qingdao*, shortly after 0021, and the subsequent loss of propulsion and steering control significantly altered the dynamics of the situation unexpectedly.

Although, the master of *DZ Qingdao* was reported to have ordered the activation of NUC lights, there was no documentary evidence to corroborate if these instructions were acted upon by the second mate. Moreover, in the immediate aftermath of the auxiliary engine failure, no record was found in the MPA's 'transcript of VHF recording' that an electrical failure and loss of vessel control were reported to either the VTIS Central or other ships on the VHF radio. Although electrical supply was restored, *DZ Qingdao* remained largely without propulsion power. Maintaining a fairly good momentum within her own designated lane, *DZ Qingdao* had started to take a gentle sheer to the port[10]. This was not noticed by *DZ Qingdao*'s master.

At 0027:08, *DZ Qingdao* was approaching the traffic separation zone, separating the Eastbound and Westbound lanes, at a considerable speed. VTIS Central called her on VHF channel 14 and directed her to return back to her designated lane. Although the message was acknowledged, *DZ Qingdao* did not advise VTIS Central of her inability

[10] Rate of turn was estimated 5° to 6° per minute.

to either turn back / manoeuvre because of a lack of propulsion and steering, or that she was not under command.

DZ Qingdao was turning to port and was fast closing in on *Gortynia*. The latter sounded the whistle and the master instantly executed orders to get out of the way, taking care not to run the risk of going over the shallow waters of Batu Berhanti, which now lay ahead. *DZ Qingdao* continued veering to port. About two minutes before the collision, she called on the VHF radio. Unaware of the identity of *Gortynia*, *DZ Qingdao* addressed her call to all ships to keep clear. The radio message, as sent out by *DZ Qingdao*, was neither in SMCP, nor specifically addressed to the bridge team on *Gortynia*.

In any case, evasive actions had already been taken by *Gortynia*'s master and *DZ Qingdao*'s VHF warnings neither had significant effects nor did they alter the collision dynamics. The MSIU assessed that at this point in time, the actions of *Gortynia* alone were highly unlikely to be sufficient to avert the two ships from colliding in the Eastbound deep-water route of the TSS.

Subsequent communications between VTIS Central and *DZ Qingdao* were conducted in Mandarin and were not considered by the safety investigation to have had any material effect in the deterrence of the collision.

2.5 Post Collision Actions on *Gortynia*

Following the collision, the master concentrated his efforts in regaining control of the vessel and place her in a safe position, which he did. He then shifted his attention to the requirements of the emergency checklist. Although the master did not sound the general alarm or muster the crew, he was aware that all crew had been accounted for and directed his crew in establishing the damage sustained to the vessel.

Following initial reports that ballast tanks no. 1 (double bottom and top side tank) had flooded, the master contacted the owners so that they could seek assistance from the 'Emergency Response Service' provided by the vessel's Classification Society. The master subsequently received information confirming that although the vessel's hull had been breached, she had sufficient residual strength and adequate reserve

buoyancy to remain in a safe position at the anchorage. This allowed the master to focus on mitigating the damage to his vessel and cargo, as well as plan temporary repairs to the breached hull.

2.6 Complexity of events on Board *DZ Qingdao*

In view that *DZ Qingdao* suffered a total power failure, disabling critical navigational systems, propulsion and steering, there were a number of actions which do not appear to have been taken by *DZ Qingdao*.

The situation on board *DZ Qingdao* must have been very complex, with numerous issues happening simultaneously and competing for attention. As noted in sub-section 1.5.4, the master was reported to have ordered the NUC lights to be switched on. During the course of the safety investigation, the MSIU found no information to show that the NUC lights were actually switched on. Then, *Gortynia*'s bridge team members stated that they saw *DZ Qingdao*'s masthead light and her red side light, the latter then turning to green as she continued turning to port.

Moreover, as it has already been stated, the master was not aware that his vessel was turning slowly to port, towards the separation zone. VTIS remained unaware of the status of the vessel and how things were developing on board. The complexity was such that even when VTIS instructed the vessel to return to the lane, it was still neither informed of the loss of power, nor of the vessel's inability to manoeuvre.

THE FOLLOWING CONCLUSIONS AND RECOMMENDATIONS SHALL IN NO CASE CREATE A PRESUMPTION OF BLAME OR LIABILITY. NEITHER ARE THEY BINDING NOR LISTED IN ANY ORDER OF PRIORITY.

3 CONCLUSIONS

Findings and safety factors are not listed in any order of priority.

3.1 Immediate Safety Factor

.1 *DZ Qingdao* entered the Eastbound deep-water route in an 'NUC' condition.

3.2 Latent Conditions and other Safety Factors

.1 When VTIS advised *DZ Qingdao* that she was entering the deep-water route, the crew members only acknowledged the transmission thereby suggesting that the vessel was under control and that she would take corrective action;

.2 VTIS Central and the surrounding vessels were not aware that *DZ Qingdao* was not under command;

.3 Following the total power failure and loss of control, *DZ Qingdao* did not display the relevant signals for a vessel not under command;

.4 *DZ Qingdao,* which was initially going to pass clear of *Gortynia* was unable to turn to starboard and return to its designated lane in the TSS;

.5 *DZ Qingdao*'s radar trail indicated that *DZ Qingdao*'s heading was changing but this did not initially raise alarm as she was still navigating within her designated lane;

.6 Distinct change in the aspect of the vessel and a transition in the navigation side lights from red to green affirmed that *DZ Qingdao* was persistent in her turn to port and had not returned to her lane as directed by the VTIS;

.7 The situation on board *DZ Qingdao* must have been very complex with numerous issues happening simultaneously and competing for attention.

3.3 Other Findings

.1 Fatigue and alcohol were not considered to be contributing factors to this collision.

4 RECOMMENDATIONS

In view of the conclusions reached and taking into consideration the safety actions taken during the course of the safety investigation,

Eastern Mediterranean Ltd. is recommended to:

11/2018_R1 review the lessons highlighted in this investigation and circulate to all vessels in the fleet;

11/2018_R2 review the requirement of using radar for plotting by ARPA rather than reliance on AIS only.