



## SAFETY INVESTIGATION REPORT

201801/014

REPORT NO.: 01/2019

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The Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 prescribe that the sole objective of marine safety investigations carried out in accordance with the regulations, including analysis, conclusions, and recommendations, which either result from them or are part of the process thereof, shall be the prevention of future marine accidents and incidents through the ascertainment of causes, contributing factors and circumstances.

Moreover, it is not the purpose of marine safety investigations carried out in accordance with these regulations to apportion blame or determine civil and criminal liabilities.

### NOTE

This report is not written 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 report may therefore be misleading if used for purposes other than the promulgation of safety lessons.

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### *MV DORIS* Collision with fishing vessel *ZHE XIANG YU 24005* in position 29° 28' N 123° 13' E (East China Sea) 13 January 2018

### SUMMARY

On 13 January 2018, the Maltese registered bulk carrier *Doris*, while on a loaded voyage from Vostochny (Russia) to Huangpu (China), was involved in a collision with the Chinese fishing vessel *Zhe Xiang Yu 24005*, in the East China Sea, in position 29° 28' N 123° 13' E.

*Doris* was set on a course of 203.5°. Her speed was 13.2 knots. The second mate was the OOW and he was assisted by an able seaman. *Zhe Xiang Yu 24005* was heading East towards the fishing zone. Her speed was

about 7.5 knots. The collision occurred at night and in good visibility. At the time of the collision, *Zhe Xiang Yu 24005* was not engaged in fishing and both vessels were in a crossing situation.

The immediate cause of the accident was identified to be a close quarter situation developing to an extent that it could not be recovered.

In view of the action taken by *Doris*' managers, no recommendations are made in this safety investigation report.



## FACTUAL INFORMATION

### Bulk carrier *Doris*

*Doris* is a 23,458 gt Maltese registered bulk carrier, managed by DD Shipping Pte. Ltd. The vessel was built by SPP Shipbuilding Co. Ltd., in the Republic of Korea, in 2011. *Doris* is classed with the Korean Register of Shipping (KRS). The vessel has a length overall of 180.0 m, a moulded depth of 14.70 m and a moulded breadth of 30.0 m.

Propulsive power is provided by one internal combustion engine, producing 7,900 kW. The estimated speed of the ship is 14.0 knots. A general arrangement plan of *Doris* is shown in Figure 1.

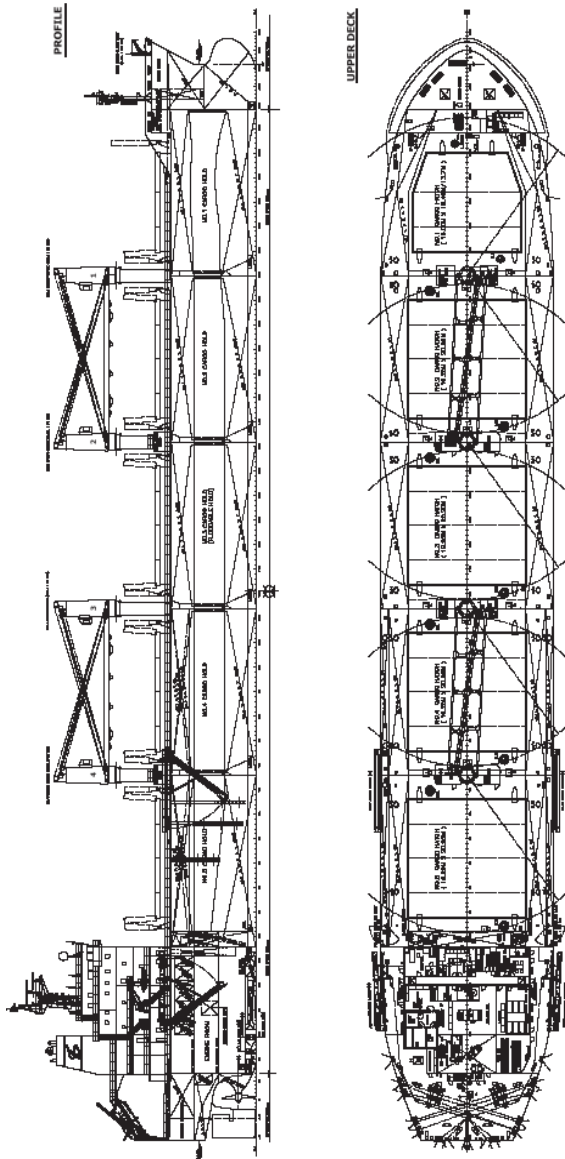


Figure 1: MV *Doris* General Arrangement Plan

*Doris* was equipped with the following navigational equipment:

- Global Positioning Systems (GPS);
- Gyro and Magnetic Compasses;
- S-Band and X-Band radars with automatic radar plotting aid (ARPA);
- Automatic Identification System (AIS);
- Speed and distance log (through the water);
- Bridge Navigation Watch Alarm System (BNWAS);
- Echo Sounder; and
- Voyage Data Recorder (VDR).

The layout of navigational equipment on the bridge is shown in Figure 2.



Figure 2: Layout of the navigational equipment

### Crew on board *Doris*

*Doris* was manned in accordance with her Minimum Safe Manning Certificate, issued by the flag State Administration. All crew members were Russian nationals and the working language on board was Russian.

The master was 57 years old. He first went to sea in 1982 and obtained his Certificate of Competency as a master in 2015. He joined the Company in 2004 and signed on

*Doris* on 08 November 2017 in Vladivostok, Russia.

At the time of the accident, the second mate was in charge of the navigational watch. He was 30 years old and held a Certificate of Competency as navigational officer (OOW). He had joined the vessel on 01 October 2017.

### **Fishing vessel *Zhe Xiang Yu 24005***

*Zhe Xiang Yu 24005* (Figure 3) sailed from the port of Shipu, China on 12 January 2018. She is a 196 gt Chinese fishing vessel, constructed in 2013. The steel hull has a length of 37.37 m, a moulded breadth of 6.40 m and a depth of 3.40 m. She is powered by a 202 kW main engine. Her navigation equipment consisted of a BDS (position tracking system), AIS, VHF radio and radar.



**Figure 3: Fishing vessel *Zhe Xiang Yu 24005* in Shipu after the collision**

At the time of the accident, *Zhe Xiang Yu 24005* was proceeding to the fishing zone in the East China Sea. She had seven persons on board.

### **Environment**

The weather on the morning of 13 January 2018 was clear with good visibility. The wind was Northerly, Beaufort Force 2, and

the swell was between 1.5 m and 2 m. The air temperature was 16 °C.

### **Narrative<sup>1</sup>**

*Doris* sailed from Vostochny, Russia on 09 January 2018, bound for the port of Huangpu, China. She had on board 33,000 tonnes of coal. Her departure draft was 9.85 m forward and 10.28 m aft.

On 13 January 2018, the second mate and an AB reported for the 0000 to 0400 navigational watch. At the time, *Doris* was off the coast of China in position 29° 40.1' N 123° 20.1' E. The autopilot was set on a course of 203.5°. The main engine's rpm was 111 and her speed was 13.20 knots.

Between 0020 and 0045, a number of fishing vessels were sighted visually and, on the radar, crossing the vessel's bow. Shortly after the fishing vessels had crossed over to the port side, the OOW turned his attention to two targets, located about 2 to 4 points<sup>2</sup> on the starboard bow.

One vessel was *Al Kharsaah*, at anchor, while the other vessel was *Zhe Xiang Yu 24005*. She was a fishing vessel reportedly steering a course of around 080°, at a speed of 7.5 knots. Her navigation lights indicated that she was underway and crossing *Doris* from starboard to port.

The OOW stated that he saw her both visually and on the radar screen. The OOW also stated that at around 0050, he instructed the AB to switch over to hand steering. About four minutes later, he reportedly initiated an alteration of course

<sup>1</sup> Unless otherwise stated, all times are ship's time (UTC + 9).

<sup>2</sup> One point is equivalent to an angle of 11¼ degrees.

of 10° to the port. Observing no change in the fishing vessel's vector, he ordered the helm hard over to port at 0059, telephoned the engineer to set the engines to manoeuvring mode and used the ship's whistle to draw the fishing vessel's attention.

Meanwhile, on board *Zhe Xiang Yu 24005*, the deck-hand on duty on the bridge saw *Doris* at 0045<sup>3</sup> sailing from the North<sup>4</sup>. He reported that at around 0053 the situation became critical and there was a risk of collision. He set the engines to 'stop', which woke up the skipper sleeping on the bridge<sup>5</sup>.

At that moment, *Zhe Xiang Yu 24005* was very close to *Doris*. At 0100/9s, the stem and bulbous bow came in contact with the ship's hull at almost 90°, starboard side of cargo hold no. 5, in position 29° 28' N 123° 13' E.

### Post-collision events

Following the collision, *Zhe Xiang Yu 24005* manoeuvred her engines astern. She remained in the area but no radio contact was established with *Doris*. At around 0200, *Zhe Xiang Yu 24005* sailed back to Shipu port.

When the master on board *Doris* arrived on the bridge, he noted that the main engine was in manoeuvring mode and the helm was hard over to port. He set the engine telegraph to 'stop' and sounded the emergency alarm. No injuries to the crew members were reported.

<sup>3</sup> Time is adjusted to UTC + 9 for consistency and ease of comparison with *Doris*' logbook entries.

<sup>4</sup> According to information provided by China Maritime Safety Agency, the deckhand on the fishing boat spotted *Doris* at 0058 (time adjusted to UTC + 9).

<sup>5</sup> Information provided by China Maritime Safety Agency indicated that 10 seconds prior to the collision (at about 0100 of 13 January), the fishing boat's main engine was set astern.

The Company and the Chinese authorities were informed but the VHF radio communication with *Zhe Xiang Yu 24005* was unsuccessful.

Following the accident, *Zhe Xiang Yu 24005* reported the collision to the local Fishery Administration and the Maritime Safety Administration.

At 0126, *Doris* dropped anchor in position 29° 28.3' N 123° 14.4' E. The crew carried out a visual inspection of the cargo hold and engine-room. A small fracture in the hull close to the waterline in way of frames 46 to 49 was plugged (Figure 4) and the water in the bilges of cargo hold no. 5 was pumped out. On 14 January 2018, the master was instructed by the Chinese Maritime Safety Agency to proceed to Ningbo, China.



Figure 4: Fractured section of the hull plugged by the crew

### Structural damages

At Ningbo, the following structural damage was reported by Korean Register of Shipping (KRS):

- a breach in the hull measuring 60 cm x 1cm at 9.80 m above keel starboard side between frame 47 and frame 50;

- indentation of shell plate between frame 50 and frame 52 in way of top side water ballast tank; and
- broken handrail, air vent and accommodation ladder.

The following damage was reportedly sustained by *Zhe Xiang Yu 24005*:

- the stem, bulbous bow and forecastle deck structures were heavily deformed;
- the fore peak tank was deformed and the bow thruster damaged; and
- four batteries were damaged, and two anchors and anchor chain were lost.

## ANALYSIS

### Aim

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

This safety investigation report has been based on voyage data recorder and documentary evidence submitted by *Doris*, survey and preliminary report on *Zhe Xiang Yu 24005*, carried out by representatives of *Doris*' managers.

### Fatigue, drugs and alcohol

The hours of rest of the OOW and the AB on lookout on board *Doris* were in accordance with the MLC and the STCW Convention requirements. Although the bridge team was not tested for drugs and alcohol after the accident, the MSIU did not come across any evidence which would have suggested a behaviour or actions influenced by fatigue, drugs or alcohol.

With respect to the deckhand of *Zhe Xiang Yu 24005*, no information was available to the MSIU.

### Data from the Voyage Data Recorder (VDR)

*Doris* was fitted with a VDR. The data saved on the VDR included images from the X-band radar<sup>6</sup>, vessel's gyro heading and course over ground (COG), speed and AIS information. Key navigational information is tabulated in Table 1, including actions reportedly taken by *Zhe Xiang Yu 24005* and *Doris*.

From the data captured on the VDR and other documentary evidence submitted to MSIU, the safety investigation was able to reconstruct the events leading to the collision.

When *Doris*' OOW and AB arrived on the bridge, the course to steer was 203.5°, speed 13.2 knots, while the AIS symbol and radar targets were displayed on the radar screen. Visibility was good and the traffic was moderate.

Except for *Al Kharsaah* which was at anchor, a number of fishing vessels in the immediate vicinity of *Doris* were underway and crossing from starboard to port. This necessitated small but frequent adjustment of course to starboard. At around 0045, *Zhe Xiang Yu 24005* was estimated to be 2 points on the starboard bow, at a distance of 4.6 nm (Figure 5) and heading East at 7.5 knots.

The navigational lights displayed by *Zhe Xiang Yu 24005* indicated that she was not engaged in fishing within the meaning of Rule 3 of the International Regulations

<sup>6</sup> X-band radar was set on a 12-mile scale, off-centred, North-up, relative motion, ground stabilized.

for Preventing Collisions at Sea 1972 (COLREGs).

the OOW on board *Doris* ascertained that both vessels were on a collision course (Figure 6).

Based on visual observations and no change in the relative vector of *Zhe Xiang Yu 24005*,

**Table 1: Navigational information extracted from *Doris*' VDR**

<i>Ship Time (UTC+9)</i>	<i>Course over ground °</i>	<i>Speed over ground Knot</i>	<i>Ship Heading °</i>	<i>Action reported by Zhe Xiang Yu 24005 and Doris</i>	<i>Analysis of events</i>
0030	205.6	13.2	206.5		.
0035			212		<i>Two fishing vessels crossed Doris' course line at a distance of about 4 nm.</i>
0045	209.5	13.0	217	<i>Zhe Xiang Yu 24005 identified Doris as a give-way vessel and maintained her course and speed.</i>	<i>Zhe Xiang Yu 24005 approximate bearing/distance from Doris 220°/4.6 nm (Figure 5).</i>
0050	209.0	13.0	212	<i>OOW on Doris noted no track/vector change of Zhe Xiang Yu 24005. Instructed AB on lookout to stand-by the steering wheel.</i>	<i>Two fishing vessels crossing Doris' course line - distance 1.5 nm (Figure 6).</i>
0051			212/205/203		
0052			212/207		
0053			203	<i>Zhe Xiang Yu 24005 stopped her engine.</i>	
0054			203-220	<i>Doris reported an alteration of course of 10° to port and then helm hard over to port.</i>	<i>Zhe Xiang Yu 24005 approximate distance from Doris 1.5 nm (Figure 7). Doris altered course to 220° before turning to port.</i>
0055	198.5	13.1	200		<i>Doris settled on a heading of around 200°.</i>
0056			202		
0057			200		
0058			203		<i>Zhe Xiang Yu 24005 very close on Doris' starboard bow.</i>
0059/24s			202	<i>Doris sounded 1 short and one long blast on the whistle to warn the crew on Zhe Xiang Yu 24005.</i>	
0059/39s			202		<i>Doris altering course to port (Figure 8).</i>
0059/55s			172	<i>Another long blast on the whistle.</i>	
0000/9s	186	11.6	153		<i>Zhe Xiang Yu 24005 struck starboard side of Doris at 90° (Figure 9).</i>

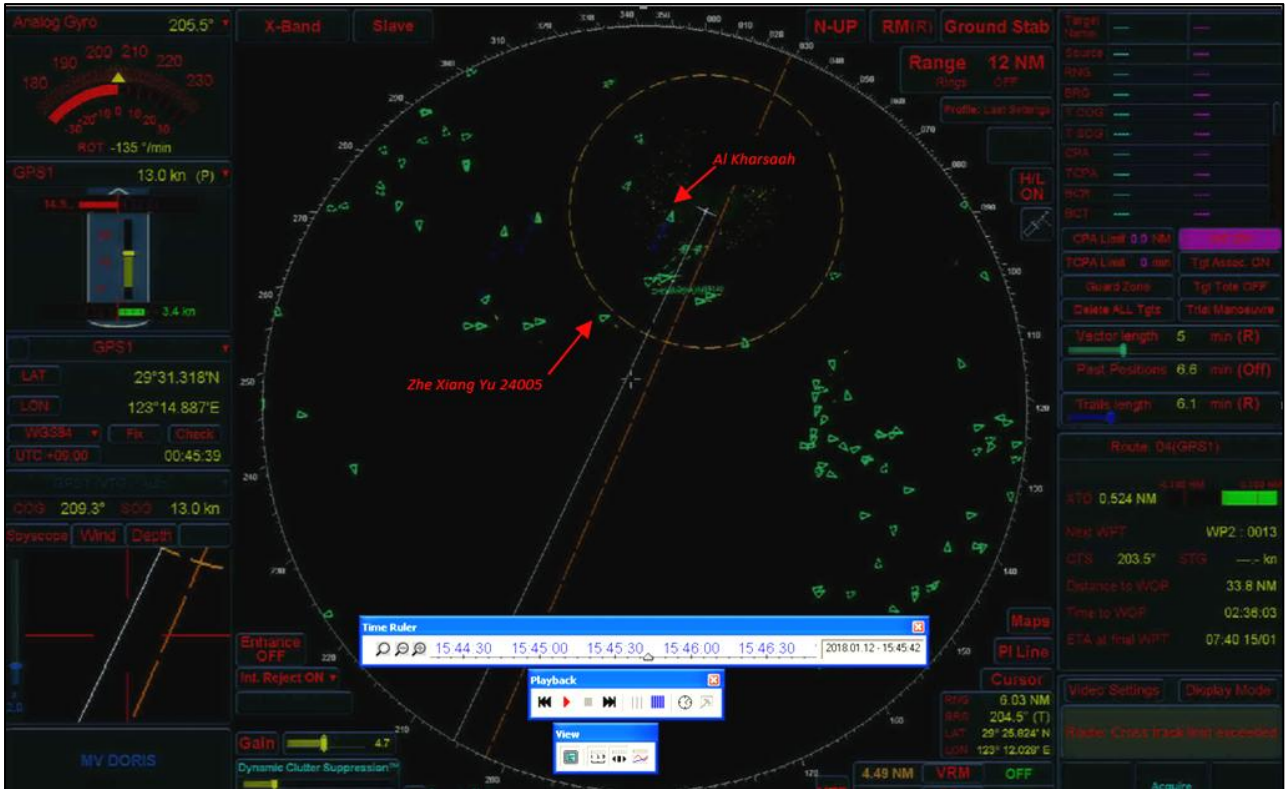


Figure 5: Screen shot at 0045 showing Al Kharsaah and Zhe Xiang Yu 24005

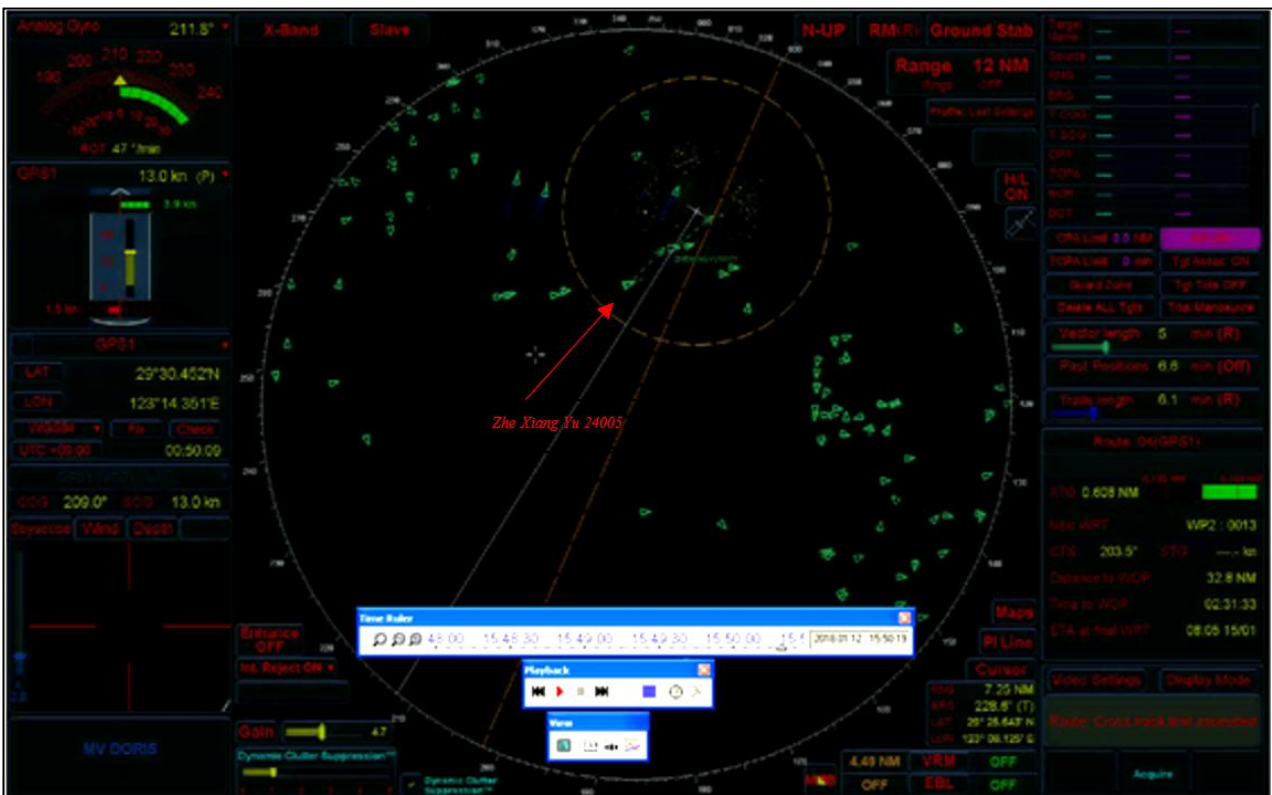


Figure 6: Screen shot at 0050 - approximate range to Zhe Xiang Yu 24005 is 3.0 nm

Rule 15 of the COLREGs states:

*When two power driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel.*

Furthermore, Rule 16 states:

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

Contradictory to what the OOW had stated, the navigational data captured from the VDR indicated that at 0054, the vessel's course was initially altered to starboard (Table 1). When the heading had reached 220°, he abruptly altered course to port, before steadying the vessel on a course of around 200° (Figure 7), which a few minutes later resulted in a close quarter situation. The safety investigation noted no traffic on the starboard side of the vessel and could not

establish why the OOW changed his decision to alter course to port.

At about 0058 (Figure 8), when collision seemed imminent, the OOW ordered the helm hard to port and at the same time sounding the ship's whistle to attract the attention of *Zhe Xiang Yu 24005*.

Meanwhile, the deck-hand on *Zhe Xiang Yu 24005* was aware of the developing situation. Anticipating *Doris* to keep out of the way, he maintained his course and speed. He neither called the skipper, who was asleep on the bridge, nor sounded any warning signal (five short and rapid blasts<sup>7</sup>) on the whistle to indicate doubt as to whether sufficient action was being taken by *Doris*.

It was only when *Doris* was very close that he stopped the main engine. However, this action was too late to be effective and avert the collision (Figure 9).

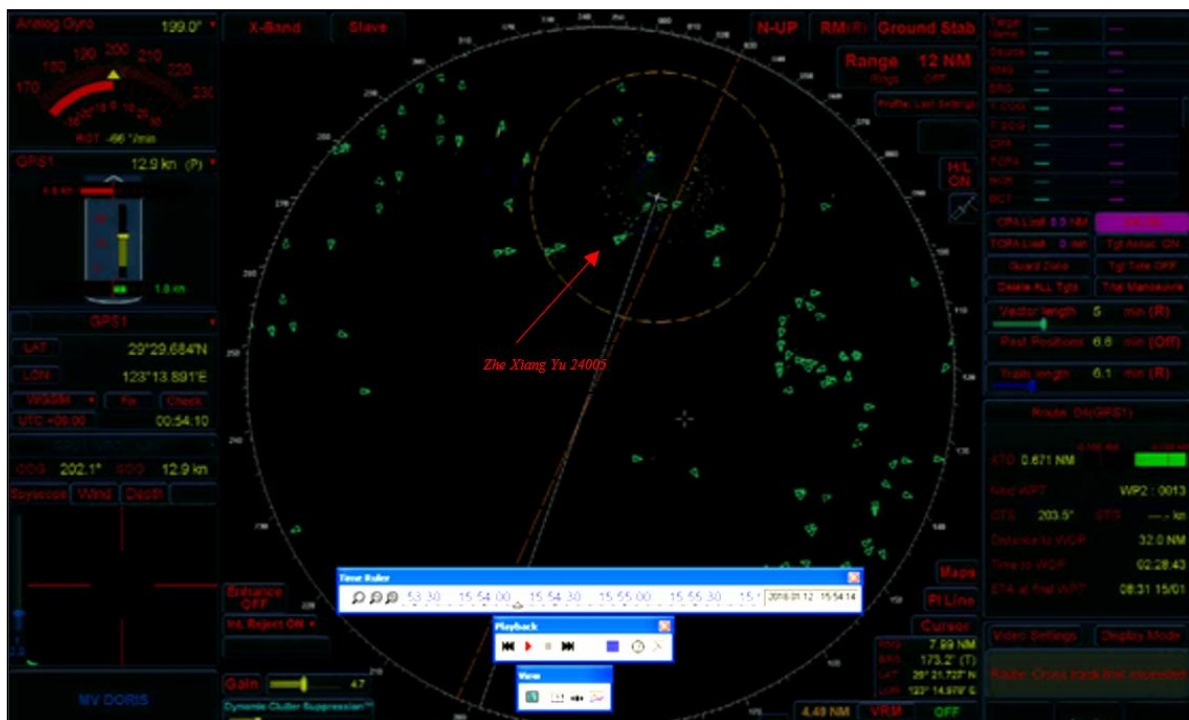


Figure 7: Screen shot at 0054. - approximate range to *Zhe Xiang Yu 24005* is 1.5 nm

<sup>7</sup> COLREGS Rule 34.





Figure 8: Screen shot at 0059 showing *Zhe Xiang Yu 24005* close ahead of *Doris*

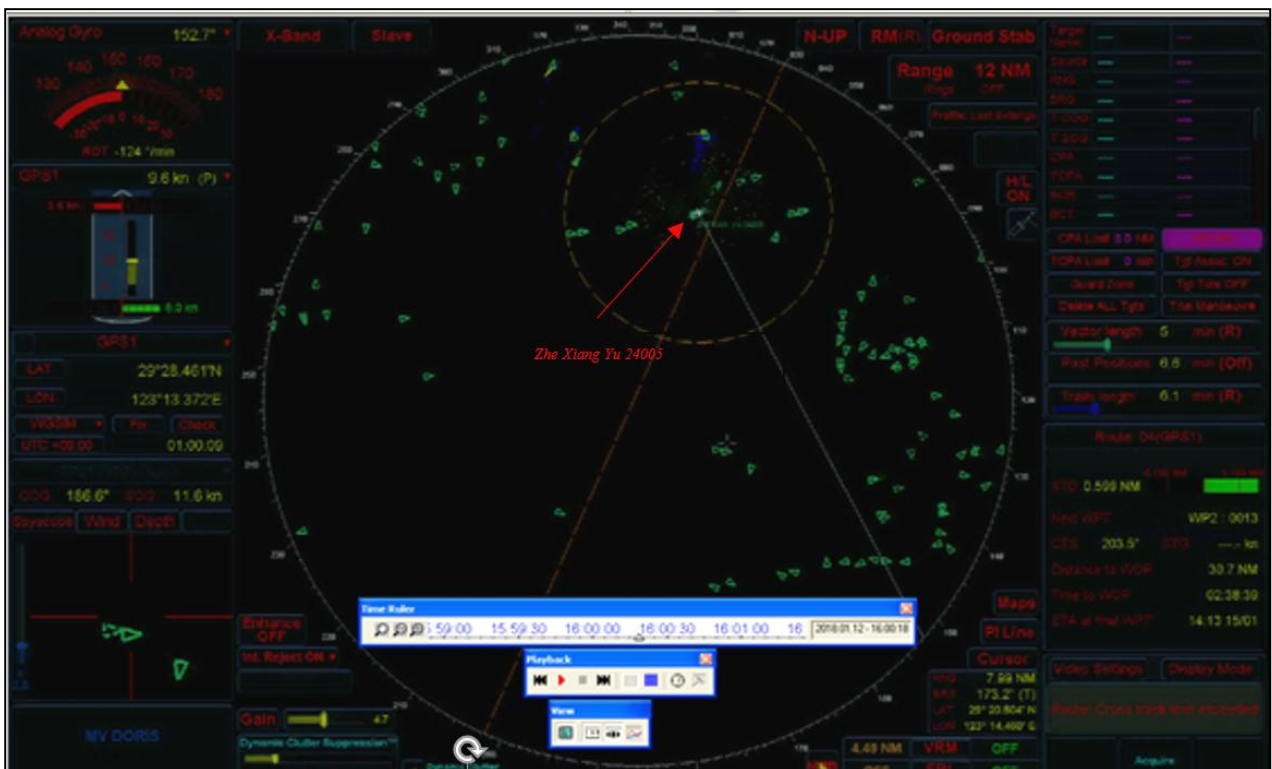


Figure 9: Screen shot showing collision at 0100/9s

## CONCLUSIONS

1. Fishing vessel *Zhe Xiang Yu 24005* was under way and not engaged in fishing;
2. *Zhe Xiang Yu 24005* was crossing *Doris* from starboard to port;
3. *Doris*' OOW observed *Zhe Xiang Yu 24005* visually and on the radar. He noted no change in the fishing vessel's aspect or vector;
4. No evidence was found of ARPA being used by *Doris* to determine close quarter situation or risk of collision;
5. Initially, *Doris* altered course to starboard and then to port steadying the vessel on the original course;
6. The OOW ordered the helm hard to port to avert the collision;
7. The deckhand on *Zhe Xiang Yu 24005* did not sound any warning signal to indicate his doubt or to clarify *Doris*' intentions, or wake-up the skipper;
8. *Zhe Xiang Yu 24005* was very close to *Doris* when action was taken by the deckhand to stop the engine.

## RECOMMENDATIONS

In view of the action taken by the Company, no recommendations are made in this safety investigation report.

## SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION<sup>8</sup>

Additional training was provided by the Company in accordance with Part 4.1 of the STCW 1978 (as amended) – Principles to be observed in keeping a navigational watch, lookout, watch arrangements, taking over the watch, performing watch under different conditions and in different areas, and International Regulations for Preventing Collisions at Sea 1972 (COLREGs).

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<sup>8</sup> Safety actions should not create a presumption of blame and/or liability.

**SHIP PARTICULARS**

Vessel Name:	<i>Doris</i>	<i>Zhe Xiang Yu 24005</i>
Flag:	Malta	China
Classification Society:	KRS	N/A
IMO Number:	9509425	N/A
Type:	Bulk Carrier	Fishing Vessel
Registered Owner:	Doris Enterprise Inc.	Private owner
Managers:	DD Shipping Pte. Ltd.,	Private owner
Construction:	Steel	Steel
Length Overall:	180.0 m	37.37 m
Registered Length:	172.0 m	<i>Not available</i>
Gross Tonnage:	23,458	196
Minimum Safe Manning:	14	N/A
Authorised Cargo:	Coal in bulk	Fish

**VOYAGE PARTICULARS**

Port of Departure:	Vostochny, Russia	Shipu, China
Port of Arrival:	Huangpu, China	Other
Type of Voyage:	International	N/A
Cargo Information:	33,000 mt	N/A
Manning:	19	7

**MARINE OCCURRENCE INFORMATION**

Date and Time:	13 January 2018, at 0100 (LT)	
Classification of Occurrence:	Serious Marine Casualty	
Location of Occurrence:	29° 28' N 123° 13' E (East China Sea)	
Place on Board	Starboard Hull	Bow
Injuries / Fatalities:	None	None
Damage / Environmental Impact:	Hull Damages (both vessels) / None	
Ship Operation:	In Passage	In Passage
Voyage Segment:	Transit	Transit
External & Internal Environment:	Weather: Clear. Visibility: Seven nautical miles. Wind: Northerly - Beaufort Force 1/2. Swell: Northerly 1.5 to 2 m. Air temperature: 16 °C.	
Persons on board:	19	7