MARINE SAFETY INVESTIGATION REPORT

Safety investigation into the collision between the Maltese registered bulk carrier CATALINA and the Chinese registered fishing vessel LU RONG YU 58398 resulting in the loss of 19 fishermen in position 29° 32.23’ N 123° 35.88’ E on 07 May 2016

201605/004

MARINE SAFETY INVESTIGATION REPORT NO. 09/2017

FINAL

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The objective of this safety investigation report is precautionary and seeks to avoid a repeat occurrence through an understanding of the events of 07 May 2016. 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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International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended

Managers MV Catalina

Maritime Safety Administration, China

Master and crew members MV Catalina

The International Regulations for Preventing Collisions at Sea, 1972 (COLREGs)

VDR of MV Catalina
**GLOSSARY OF TERMS AND ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>Able Seamen</td>
</tr>
<tr>
<td>AIS</td>
<td>Automatic Radar Plotting Aid</td>
</tr>
<tr>
<td>ARPA</td>
<td>Automatic Identification System</td>
</tr>
<tr>
<td>COLREGs</td>
<td>International Regulations for Preventing Collisions at Sea, 1972</td>
</tr>
<tr>
<td>CPA</td>
<td>Closest point of approach</td>
</tr>
<tr>
<td>DSC</td>
<td>Digital selective calling</td>
</tr>
<tr>
<td>FV</td>
<td>Fishing vessel</td>
</tr>
<tr>
<td>GPS</td>
<td>Global positioning system</td>
</tr>
<tr>
<td>gt</td>
<td>Gross tonnage</td>
</tr>
<tr>
<td>kW</td>
<td>Kilowatt</td>
</tr>
<tr>
<td>LT</td>
<td>Local time</td>
</tr>
<tr>
<td>m</td>
<td>Metre</td>
</tr>
<tr>
<td>MSA</td>
<td>Maritime Safety Administration</td>
</tr>
<tr>
<td>MSIU</td>
<td>Maritime Safety Investigation Unit</td>
</tr>
<tr>
<td>Nm</td>
<td>Nautical mile</td>
</tr>
<tr>
<td>NPM</td>
<td>Navigation Procedures Manual</td>
</tr>
<tr>
<td>OOW</td>
<td>Officer of the watch</td>
</tr>
<tr>
<td>rpm</td>
<td>Revolutions per minute</td>
</tr>
<tr>
<td>SSB</td>
<td>Single side band</td>
</tr>
<tr>
<td>STCW</td>
<td>International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended</td>
</tr>
<tr>
<td>(T)</td>
<td>True course</td>
</tr>
<tr>
<td>UTC</td>
<td>Universal Time Co-ordinated</td>
</tr>
<tr>
<td>VDR</td>
<td>Voyage Data Recorder</td>
</tr>
<tr>
<td>VHF</td>
<td>Very High Frequency</td>
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</table>
SUMMARY

On 07 May 2016, the Marine Safety Investigation Unit (MSIU) was notified by the managers of MV Catalina, that at about 0500 (UTC), the Maritime Safety Administration of the People’s Republic of China had instructed the master of the vessel, which was enroute to Samarinda in Indonesia, to alter course for Ningbo, China, as Catalina was suspected of being involved in a collision with a fishing vessel.

Preliminary information indicated that FV Lu Rong Yu 58398 was towing a fishing net with another boat, FV Lu Rong Yu 58397, off Xiangshan coast in the East China Sea. At about 0341, while making an alteration of course to starboard to prevent a collision, it was alleged that Catalina snagged the fishing gear, which resulted in Lu Rong Yu 58398 capsizing in position 29° 32.23’ N 123° 35.88’ E, with the loss of all persons on board. At the time, the weather was overcast and the visibility was poor. Both the second mate and able seaman who were on duty on the bridge, reported that they were unaware of any physical contact with the vessel.

During the course of the safety investigation, the MSIU was informed by the Maritime Safety Administration of the People’s Republic of China (MSA) that paint samples on the underwater portion of Catalina matched with the chemical characteristics of the paint on Lu Rong Yu 58398. Moreover, the safety investigation found that the bridge on Catalina was not properly manned to match the exigencies of navigation in restricted visibility and the observation of traffic by radar was inadequate.

Two recommendations have been made to TMS Bulkers, the managers of Catalina designed to assist the Company understand the way OOWs and look-outs operate on board its ships.

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1 Unless otherwise stated, all times are Ship’s Time (UTC +8).
Background to the safety investigation
No information could be obtained from the owners and crew of FV *Lu Rong Yu 58397*, and therefore the safety investigation report is not comprehensive enough to provide a full understanding of the accident dynamics. This safety investigation has been mainly based on evidence collected from the officers and crew of *Catalina*, and vessel’s managers.

The MSIU would like to acknowledge the support and assistance received from the MSA.
1  FACTUAL INFORMATION

1.1  Vessel, Voyage and Marine Casualty Particulars

<table>
<thead>
<tr>
<th>Name</th>
<th>Catalina: Lu Rong Yu 58398</th>
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<tbody>
<tr>
<td>Flag</td>
<td>Malta: China</td>
</tr>
<tr>
<td>Classification Society</td>
<td>American Bureau of Shipping: NA</td>
</tr>
<tr>
<td>IMO Number</td>
<td>9299604: NA</td>
</tr>
<tr>
<td>Type</td>
<td>Bulk carrier: Fishing / side trawler</td>
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<tr>
<td>Registered Owner</td>
<td>Borsari Shipping Co. Ltd.: Not available</td>
</tr>
<tr>
<td>Managers</td>
<td>TMS Bulkers Ltd., Greece: NA</td>
</tr>
<tr>
<td>Construction</td>
<td>Steel (Double bottom): Steel</td>
</tr>
<tr>
<td>Length overall</td>
<td>225.0 m: 39.28 m</td>
</tr>
<tr>
<td>Registered Length</td>
<td>218.22 m: Not available</td>
</tr>
<tr>
<td>Gross Tonnage</td>
<td>40485: 297</td>
</tr>
<tr>
<td>Minimum Safe Manning</td>
<td>14: Not available</td>
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<td>Authorised Cargo</td>
<td>Dry bulk: Fish stock</td>
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<td>Port of Departure</td>
<td>Lianyungang, China: Not available</td>
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<tr>
<td>Port of Arrival</td>
<td>Samarinda, Indonesia: Not available</td>
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<tr>
<td>Type of Voyage</td>
<td>International: Not available</td>
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<td>Cargo Information</td>
<td>In ballast: Fish in bulk</td>
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<tr>
<td>Manning</td>
<td>20: 19</td>
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<tr>
<td>Date and Time</td>
<td>07 May 2016 at 0341 (LT)</td>
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<td>Type of Marine Casualty or Incident</td>
<td>Very Serious Marine Casualty</td>
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<table>
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<th>Location of Occurrence</th>
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<td>Ship / Bulbous bow / over side</td>
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<tr>
<td>Injuries/Fatalities</td>
<td>None: 19 fatalities</td>
</tr>
<tr>
<td>Damage/Environmental Impact</td>
<td>None</td>
</tr>
<tr>
<td>Ship Operation</td>
<td>On passage</td>
</tr>
<tr>
<td>Voyage Segment</td>
<td>Transit</td>
</tr>
<tr>
<td>External &amp; Internal Environment</td>
<td>Poor visibility. Force 4 Northeasterly winds and slight to moderate sea</td>
</tr>
<tr>
<td>Persons on Board</td>
<td>20: 19</td>
</tr>
</tbody>
</table>
1.2 Description of Vessels

1.2.1 Bulk carrier Catalina

*Catalina*, a 40,485 gt dry bulk cargo ship (Figure 1) is owned by Borsari Shipping Company and managed by TMS Bulkers Ltd., of Greece. She is classed with American Bureau of Shipping (ABS). The vessel’s length overall is 225.0 m and her summer deadweight is 74,432 tonnes. The navigation bridge and the main machinery space are situated aft of the vessel. Propulsive power is provided by a 5-cylinder MAN-B&W 5S60MC-C, slow speed two-stroke diesel engine, producing 9,000 kW at 92 rpm. This drives a single, fixed pitch propeller at a service speed of 13.80 knots.

![Figure 1: MV Catalina](image)

The navigational equipment consists of two sets of radar (S and X band), with Automatic Radar Plotting Aids (ARPA), two sets of Very High Frequency (VHF) radiotelephone with Digital Selective Calling (DSC), Global Positioning System (GPS), a gyro and magnetic compass, an echo sounder, a course recorder and an Automatic Identification System (AIS). The vessel is fitted with a voyage data
recorder (VDR) model 100G3, manufactured by Rutter Technologies. The X and S band radars were last serviced on 08 February 2016.

1.2.2 Fishing vessel *Lu Rong Yu 58398*

*Lu Rong Yu 58398* was a 297 gt fishing vessel (Figure 2) constructed in 2011. The steel hull had a length of 39.28 m, a moulded breadth of 7.25 m and a depth of 3.80 m. She was powered by a 396 kW main engine, intended for fishing off the Chinese coast. She was fitted with a fish storage capacity of 31 m$^3$ in four refrigerated chambers. Her navigation equipment$^2$ consisted of a Beidou set (position tracking), electronic charts, AIS, VHF radio and a single side band (SSB) receiver.

*Lu Rong Yu 58398* was a sister vessel to *Lu Rong Yu 58397*.  

![Figure 2: Lu Rong Yu 58398 (photo taken during the salvage operation)](image)

It was reported that the two fishing vessels were engaged in fishing by towing a fishing net in the East China Sea. The distance between the fishing vessels is not known. At the time of the accident *Lu Rong Yu 58398* was manned by 19 crew members.

$^2$ List of navigation equipment is taken from sister FV *Lu Rong Yu 58397*.  

3
1.3 Bridge Manning on Catalina

*Catalina* was manned in accordance with her Minimum Safe Manning Certificate, issued by the flag State Administration. There were 20 persons on board. Except for the master and the fitter, all the deck officers and crew were from the Philippines. The master was a 60 year old Greek national and he had been at sea for 42 years. He was promoted as a master in 1996. He joined the Company on 25 January 2015 and signed on *Catalina* on 31 October 2015 in Vancouver.

The second mate was 39 years old. He had been at sea for 14 years, working on bulk carriers and passenger ships. He was promoted to a second mate in 2007. He holds a Certificate of Competency, issued in terms of regulation II/2 of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW Convention). He was engaged by the Company as a second mate in 2011 and embarked on *Catalina* on 07 February 2016.

The able seaman (AB) on duty with the second mate during the navigation watch was an experienced seaman. He had been at sea for over 21 years and had obtained his certificate to work as an AB in 1999. He had been working for the Company since 2005 and had joined *Catalina* on 31 October 2015.
Both the second mate and the AB were Philippine nationals and only spoke English and their native language.

1.4 Environment

Poor visibility and low to moderate swell was forecast for the East China Sea. According to the deck log book entries, wind was from the Northeast, force 4. The outside air and sea temperatures were 20 °C and 21 °C respectively.

1.5 Narrative

_Catalina_ sailed from Lianyungang, China for Samarinda, Indonesia in ballast on 05 May 2016 at 1730.

On 07 May 2016, the second mate reported for his 0000 - 0400 navigation watch, accompanied by an AB. _Catalina_ was navigating in the East China Sea (Figure 4) in water depths of about 60 m. The GPS position read 30° 16´ N 123° 46´ E. The visibility was poor and the master was on the bridge.

The vessel was on hand steering and on a planned course of 189°, making 12.9 knots. The ‘S’ band radar was set on the six nautical mile (nm) range, relative motion and North up. The ‘X’ band radar was on standby. The navigation lights were in good working condition and switched on.

At 0130, the visibility improved to about five nm. The traffic was reported to be light and the hand steering was switched back to autopilot mode. The master then retired in his cabin to rest, instructing the OOW to call him on encountering restricted visibility and to switch on both ‘S’ and ‘X’ band radars.
At about 0200, when in position 29° 50´ N 123° 42´ E, fog set in again and the visibility deteriorated to one cable. The AB was requested to take the helm and the vessel was switched to hand steering. The course steered was 195° and her speed over the ground was 13 knots. The ‘S’ band radar was adjusted to three nm scale and off centred, giving the OOW a range of four to five nm ahead of the vessel. The AIS was not interfaced with any of the radars and the identity of targets was not displayed on the screens. Numerous fishing boats were detected on the port and starboard sides.
of the vessel. The OOW recalled that about five radar echoes appeared on the starboard bow (Figure 5).

![Figure 5: Rough sketch recalling the relative positions of the five radar echoes](image)

The one closest to Catalina was at a range of three nm (Figure 6). The OOW assessed by its true vector that she was on a course of 088° (T), making three knots and crossing the bow at one cable. At about 0330, the target bearing 20° had closed to two nm and the OOW ordered the helm 20° to starboard.

![Figure 6: Rough sketch recalling the relative positions of the radar target at the 2 nm range](image)

Moments later, however, the OOW felt the ship shudder and saw the light of a fishing boat (Figure 7), one cable on Catalina’s starboard beam which he had not observed on the radar screen.
The OOW swiftly steered the stern away and moved to the starboard bridge wing, from where he observed the fishing boat pass clear on Catalina’s starboard quarter. He set the helm amidships and returned inside the bridge, when he reportedly detected two fishing boats on the vessel’s port bow (Figure 8). He then ordered the helm 10° to port and ‘hard to port’ to keep clear. Following the successful manoeuvre, the OOW gradually returned the vessel on the original course.

During the course of events, the engine-room was manned by the third engineer and the duty oiler. The telegraph setting was on full sea speed and the main engine was running steady at 75 rpm.
1.6 Action by the Master

Later during the morning, at about 0700, the master received a phone call from the Ningbo Maritime Safety Administration office, whereby he was requested to alter the vessel’s course and return to the port of Ningbo, on account of Catalina’s alleged involvement in a casualty with a fishing vessel.

At 0730, the master stopped the vessel at sea and the shell plating above the waterline was visually checked. The master observed neither any contact damage nor any scratch marks. The main engine was re-started and at 1106, with Catalina heading for Ningbo at full speed.

1.7 External Response

A search and rescue operation was launched with two rescue boats Donghaijiu 117, Donghaijiu 118 and naval ships. Two fishermen were eventually rescued but passed away later during the day. The remaining 17 fishermen remained missing. Eventually, Lu Rong Yu 58398 was found capsized by the search and rescue vessels, but sunk after three days.

1.8 Inspection of Catalina’s Side Shell Plating Afloat

At 2128, on 07 May 2016, Catalina anchored at Ningbo anchorage in position 29° 58.3´ N 121° 54.7´ E. The following morning, the ship’s hull was inspected by the owners’ representatives, master and officials from the MSA. The draft fore and aft was 5.4 m and 7.2 m respectively. No fresh indentations were reported except for some scratch marks in way of cargo hold no. 1 starboard (Figure 9) which the master dismissed as being caused by a floating crane, during loading operations at Vietnam in March 2016.
Figure 9: Close view of scratch marks in way of cargo hold no. 1 starboard

The drift nets entangled in the propeller boss (Figure 10) were also dismissed after it was confirmed that they were not of the same type as used on the sunken fishing boat.

Figure 10: Fishing nets entangled in the propeller
The vessel was trimmed by the stern and the stem and bow areas were examined. During the inspection, the following observations were made:

- slight scratch marks in way of the forepeak tank, between draft marks 5.0 m and 6.0 m;
- two indentation marks on both port and starboard sides of the stem post at draft mark 7.5 m and black / blue colour scratch marks, covering the stem post between draft mark 7.5 m and 10 m (Figure 11);
- black colour scratch mark on port bow at draft mark 3.5 m and within 4.5 m and 6.0 m;
- scratch marks with paint damage in way of cargo holds nos. 1 and 2, in the vicinity of frame 217 under draft mark 3.0 m (Figure 12);

Figure 11: Traces of black and blue scratch marks covering the stem post
Figure 12: Area where traces of paint scratches were found in way of cargo holds nos. 1 and 2

On 16 May 2016, *Catalina* entered dry-dock and the underside of the ship’s hull was examined. The following observations were made:

- Slight scratch marks in way of bilge strake at starboard bow;
- Scratch marks on the bilge strake under draft mark 4 m in way of no. 1 and no. 2 cargo hold;
- Indentations and scratch marks on port side bilge strake between frame 242 and frame 244 about 0.5 to 2.5 m above keel;
- Traces of blue paint on the scratched hull plate in way of frame 225.

1.9 Salvage and Inspection of *Lu Rong Yu 58398*

On 12 June 2016, *Lu Rong Yu 58398* was salvaged from the sea bed and towed to a dry dock. The following hull damage was reported:

- heavy indentation on the starboard bow 12 m from the stem. The largest indentation measured 2.5 m x 2.6 m (Figure 13);
- indentations on the port quarter (Figure 14);
- one indentation on the hull bottom;
- propeller entangled with the fishing nets.

Figure 13: Side shell plating heavy damage in way of the starboard bow

Figure 14: Indentions on the side shell plating in way of the port quarter
1.10 Collection of Paint Samples

A number paint samples in the indentation and scratched areas from the hull of *Lu Rong Yu 58398* and *Catalina* (Figure 15) were collected. Both sets of samples were sent to a laboratory for comparative analysis.

![Figure 15: Paint samples being collected from Catalina’s turn of bilge area](image)

1.10.1 Result of the paint samples’ analysis

On 22 June 2016, paint samples were tested by the Institute of Forensic Sciences, Soochow. The results suggested that:

- the characteristic of the first paint samples collected from the port bilge strake (Frames 217 to 245) area of *Catalina*, and the port quarter bulwark and starboard bow bulwark of *Lu Rong Yu 58398* correspond; and

- the second paint sample collected from the port bilge strake (Frames 217 to 245) of *Catalina* and the paint sample collected from starboard indentation of *Lu Rong Yu 58398* were from the same kind of paint.

Based on the above findings, it was indicative that *Catalina* and *Lu Rong Yu 58398* had actually made physical contact and collided.
1.11 Voyage Data Recorder

*Catalina* was fitted with a Rutter Technologies voyage data recorder (VDR) model 100G3. On 12 April 2016, a Certificate of Compliance was issued following a satisfactory VDR performance survey in China. On 08 May 2016, data on the VDR system was saved by the master and downloaded by a Class approved technician. A copy of the VDR data was sent to the MSIU for the scope of the safety investigation. During playback, however, records of AIS information and radar image were found to be missing. The navigational data and audio extracted from the VDR is reproduced in Tables 1 and 2.

<table>
<thead>
<tr>
<th>Time (LT)</th>
<th>Position</th>
<th>Heading</th>
<th>COG</th>
<th>SOG</th>
<th>RPM</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>hh mm ss</td>
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<td>°</td>
<td></td>
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</tr>
<tr>
<td>02 00 00</td>
<td>29° 50.9/123° 41.7</td>
<td>204</td>
<td>199</td>
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<td>84</td>
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<td>29° 34.0/123° 35.0</td>
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<td>233</td>
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<td>29° 50.9/123° 41.7</td>
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<td>03 41 31</td>
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</tr>
<tr>
<td>03 50 00</td>
<td>“South-bound Malta cargo ship”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03 51 00</td>
<td>“Malta cargo ship, you are towing me away”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>03 52 25</td>
<td>“Stop talking, we are contacting with foreign vessel”</td>
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</tr>
<tr>
<td>03 54 25</td>
<td>“Malta cargo ship, Malta cargo ship”</td>
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</tr>
</tbody>
</table>

### 1.12 Navigation Procedures Manual

The Company had adopted a policy whereby all vessels under its management navigate in accordance with the procedures and best practices documented in the Navigation Procedures Manual (NPM). These procedures were the minimum required standards for the safe navigation of its vessels. The NPM was kept on the bridge and all navigating officers were required to read it upon joining the vessel. The Company had also adopted the concept of Bridge Team Management whose primary goal was the elimination of a ‘one person error’. The bridge was thus manned by personnel approved by the NPM and the officers were expected to conduct safe navigation by the proper and effective use of navigational equipment, communication system and passage planning.

#### 1.12.1 Setting bridge watches

_Catalina’s_ manual on navigational procedures stated that the master was responsible for the vessel’s safe navigation. He was tasked with setting and adjusting the navigation watches, taking into account the conditions of navigation (ocean or coastal), traffic density and state of visibility. In this respect, the manual guided the master on the number of personnel required to keep a navigational watch.
The recommended watch categories and setting of navigation watch in open waters are reproduced in Table 3.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Category</th>
<th>Watchkeepers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear weather with little or no traffic</td>
<td>1</td>
<td>OOW and one helmsman / lookout³</td>
</tr>
<tr>
<td>Clear weather with moderate traffic</td>
<td>2</td>
<td>Two deck officers and two seaman (one helmsman and one lookout). The second deck officer is normally the master</td>
</tr>
<tr>
<td>Restricted visibility with little or no traffic</td>
<td>3</td>
<td>A total of three deck officers including the master, a helmsman and a lookout. The master has the con and one of the officer is exclusively designated for radar watch</td>
</tr>
</tbody>
</table>

1.12.2 Navigation in restricted visibility

Restricted visibility was defined in the NPM as an area where either the visibility is reduced to two nautical miles or less, or as determined by the master. Restricted visibility included fog, mist, heavy rain, sandstorms, etc. In restricted visibility, the following had to be observed by the vessel:

- The master is to set the appropriate composition of the bridge watch in accordance with the criteria documented in the NPM;
- The OOW shall advise the master of restricted visibility, post a look-out, put a helmsman on manual steering, and navigate with caution and in accordance with the International Collision regulations;
- The main engine is to be put on standby so that immediate steps can be taken to reduce to a moderate speed in strict compliance with the International Collision regulations; and

³ Category 1 is the minimum composition of personnel on the bridge.
• The radars and ARPA must be operated on an appropriate range and plot all vessels in the vicinity.

The navigation lights were required to be switched on and the secondary lights, ship’s whistle all tested and appropriate sound signals activated as required by the International Collision regulations.

1.12.3 Calling the master
The OOW was required to call the master whenever in doubt as to the vessel’s navigational safety. In any event, he had to inform the master immediately either on expecting or encountering restricted visibility, or when movements of ships were causing concern.

1.12.4 Standing orders and night order book
Relevant sections of the NPM on maintaining a safe navigational watch were summarised and posted on the bridge as Standing Orders. The master’s task-specific instructions were written down in the master’s night order book and signed by the watch keepers as having been read and understood. On the night of 06 May 2016, the master wrote the following:

• Follow master’s standing orders;
• Check positions as per PFI (position frequency interval);
• Keep a sharp look out at all times;
• Keep a safe distance from all vessels;
• Maintain fire and security rounds;
• Don’t leave the bridge unattended;
• If in doubt call the master immediately;
• If visibility reduces to three nautical miles call master;
• Keep both radar on if visibility is reduced to three nautical miles; and
• Vessel sailing according to International Regulations for Preventing Collisions at Sea.
1.14 Navigation Audit

The last internal audit was done by the master 27 December 2015. An external audit was carried out on 16 April 2016 by an official of the Company. Both internal and external audits recorded the officers performance satisfactory with respect to their navigational duties and responsibilities.
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

The record of hours of work and rest of the master, second mate and AB show that these were in compliance with the requirements of relevant international conventions, and their conduct on the bridge did not appear impaired by fatigue.

2.3 Drugs and Alcohol

The MSIU did not come across any evidence which would suggest that the watch keepers were intoxicated or in an inebriated state during the watch. The analysis of the actions taken by the OOW did not suggest that he was under the influence of alcohol or drugs.

2.4 Bridge Manning in Restricted Visibility

When the second mate reported for his navigation watch, the visibility was poor due to the fog. The master was on the bridge and the duty AB was on the wheel, with the main engine on bridge control and at full sea speed. When the visibility improved at about 0130, the master left the bridge and at this point, the vessel reverted to watch keeping Category 1.

Less than an hour later, however, the visibility reduced to one cable (about 183 m). Even though the OOW was unable see beyond the forecastle, he did not make a request for another person to assist him but he asked the look-out to hand steer the vessel. As a result of this, no adjustment was made in the level of bridge manning which remained at Category 1 in an area of restricted visibility, largely navigated by

\[4\] Navigation with two persons (OOW and look-out), clear weather in open waters and with little or no traffic.
fishing vessels. Thus, radar watches were not stepped up and the bridge lacked navigational supervision, both of which were necessary for the elimination of ‘one person error’.

2.5 Navigational Procedures and COLREGs

Upon joining Catalina, navigation officers were expected by the Company to familiarise themselves with their duties as described in the NPM. Moreover, as an aide-memoire, key elements of the navigation procedures were posted on the bridge as standing orders. These standing orders, together with the master’s night order book (signed by deck officers as having been read and understood), formed the basis of safe navigation. It was also a requirement in the NPM, standing orders and in the master’s night orders to observe International Regulations for the Prevention of Collisions at Sea (COLREGs). Thus, the OOW was obliged to comply with Rule 19 on conduct of vessels in restricted visibility, and with Rules contained in Section 1 of Part B which apply to vessels in any condition of visibility. Yet, the OOW requested the AB, who was posted as look-out, to hand steer the vessel. Rule 5 of the COLREGs states that:

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

whereas it is prescribed in Rule 19 (b) that:

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

The STCW Code prescribes that “the duties of the lookout and helmsperson are separate and the helmsperson shall not be considered to be the lookout while steering, except in small ships...” and that “the lookout must be able to give full attention to the keeping of a proper lookout and no other duties shall be undertaken or assigned which could interfere with that task.”

The reduction of speed is also justified under Rule 6, which also lists the factors to be considered when determining safe speed. Both the master and the OOW were experienced and had often transited the East China Sea in their previous voyages; yet
none of them had considered it necessary to reduce speed on encountering poor visibility or large concentrations of fishing vessels. The Company’s navigating procedures, in fact, stressed that the main engine is put on standby to allow for reduction of speed as, and when required and sound appropriate sound signals on the whistle in compliance with Rule 35.

It would appear, at least a prima facia, that the inadequate manning on the bridge had severely impacted on the vessel’s safe navigation and stretched the resources available to the OOW. Moreover, the safety investigation found no evidence that the X band radar (which had better resolution and range discrimination), had ever been switched on during the watch. With only one radar operational, the proper use of radar equipment as required by Rule 7(b) of the COLREGs, was not achieved.

2.6 Reconstruction of Action to Avoid a Collision

2.6.1 Alteration of course to starboard
The OOW reported that he detected a group of five fishing vessels close ahead of Catalina, one of which was later identified as Lu Rong Yu 58398. About 200 m from her, and even closer to Catalina, was Lu Rong Yu 58397. The OOW stated that he had not observed her on the radar. Both fishing vessels were engaged in fishing. The X band radar was not switched on and the AIS set was not effectively monitored. Owing to lack of radar image on the VDR, the safety investigation was unable to verify precisely the range at which the OOW took collision avoidance action. The subsequent events, however, suggested that an alteration of course was made at a much closer range than the two nm reported by the OOW. Soon after the helm was put to starboard, the OOW felt vibration in the ship and sighted a white light of a fishing boat, identified as Lu Rong Yu 58397.

2.6.2 Alteration of course to port
Shortly after clearing the fishing boat on the starboard quarter, the OOW stated that he detected two radar echoes approaching on the port bow. The safety investigation, however, found no evidence of the range at which these fishing boats were detected,

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5 The MSIU was unable to establish as to whether Lu Rong Yu 58397 was obscured by clutter or Lu Rong Yu 58397 and Lu Rong Yu 58398 were displayed as one target.
whether compass bearings were observed, or if a risk of collision had been determined.

Considerable doubt existed on the effectiveness of the radar watch and on the presence of two radar targets on the port bow. Considering the elapsed time between the two events, the targets which were reportedly detected appeared to be the same target (now on the port bow) against and which the OOW had initially altered to starboard to avoid colliding with. The events recounted by the second mate and analysed with the VDR navigational data indicated that the decision to act was very pressing and almost immediate. He had ordered the helm hard over to port. However, Rule 19 (d) states:

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

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

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

No navigational or traffic restrictions were reported which would have prohibited Catalina from altering course to starboard in accordance with the above Rule. No explanation was given as to why an alteration of course to port was made for an approaching target forward of the vessel’s beam. Then, even if an alteration of course to starboard was not possible and a close quarters situation was imminent, Rule 19 (e) of COLREGs require that the vessel should reduce her speed to the minimum. Instead, Catalina’s course was altered by over 90° to port soon after altering course to starboard (Table 1).

At about the same time, a sharp drop in speed was recorded without any corresponding drop in the main engine’s rpm. To this effect, the safety investigation cannot exclude the likelihood of Catalina being decelerated by an obstruction. The vibration reportedly experienced by the watch keepers at that particular moment could have been caused by the obstruction.

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6 A reduction in speed would allow the OOW more time to assess the situation, and if necessary take all way off.
Course alteration to port was contrary to Rule 19(d), and appeared to be a deliberate and decisive action to steer out of the way of *Lu Rong Yu 58398* and her trawling gear. The thick fog and the probability of *Lu Rong Yu 58398* in Catalina’s shadow zone ahead may have prevented the watch keepers from making a visual contact. Moreover, since both the OOW and the look-out did not understand Chinese, any VHF communication in the Chinese language would have not been comprehended by the crew members on Catalina. The free translation of VHF communication submitted to the MSIU, the damage sustained by *Lu Rong Yu 58398* and analysis of paint samples substantiate contact between the two vessels.

### 2.7 System Adaptations

The safety investigation is of the belief that the OOW found himself in a situation where attempted adaptations to COLREGs, master’s standing orders and Company procedures had failed.

It would appear to the MSIU that the decisions taken by the OOW had been influenced by prior actions on the bridge when the master was still present. For instance, it has already been established that at no point in time had the vessel’s speed been reduced. It may very well be that none of the officials on the bridge had felt the necessity to do so. Moreover, the MSIU finds it very possible that the OOW would have not considered the reduction in the vessel’s speed after the master had left, given that this was an option which the master himself had neither considered nor implemented.

The decision not to call the master (even if the Night Order Book so prescribed) when the visibility became poor again, may have also been influenced by the fact that the master had only been on the bridge with the OOW, barely one hour before.

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7 If one had to look into the dynamics of this accident from the outside, it would be easily perceived that the crew members on board Catalina had neither followed the Company’s instructions nor the COLREGs. However, the concern of the safety investigation was not the navigational practices as much as the strict procedural adherence. This may sound odd, however, the MSIU is very concerned that in occurrences which involve collisions, there is a general expectation that the safety investigation identifies the COLREGs which have been breached, recommend corrective actions to this effect and conclude the safety investigation. If that had been the case, then what has been written up to sub-section 2.6 of this safety investigation report would have sufficed. However, the MSIU believes that the safety investigation should go deeper than this and hence the consideration of system adaptations in sub-section 2.7.
The MSIU did not exclude the possibility that after all, the OOW may have seen ‘success’ by not calling the master and instead mitigate the situation by applying his own skills. No doubt, for the OOW, this was innovation in the presence of local challenges (in the form of poor visibility and traffic ahead of the vessel’s bow).

As much as the above could be true, it may have been also a situation where the OOW was actually in a dilemma as to whether or not the master should be called back to the bridge, eventually opting for the latter option.

Access to additional crew members to take over the role of a look-out or helmsman was also not considered to be a viable option, unless of course, the master is called in his cabin. Thus, as much as the above may be seen as a non-conformity, the OOW may have well seen this as an opportunity to apply his skills (potentially even instigated by professional pride) to cope with the prevailing challenges.

The OOW had implemented adaptations which, at the end, had failed. Possibly, the adaptations operationalised by the OOW, and their consequences were not supported by the training which the OOW had received – even more so when in actual fact, training received by the OOW would have indoctrinated him to strictly follow procedures to the letter, without being encouraged (and trained) to develop the skills to judge at how and when to make adaptations and when not to.
THE FOLLOWING CONCLUSIONS, SAFETY ACTIONS 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. The sinking of the fishing vessel was attributed to the loss of reserve buoyancy after she made contact with Catalina.

3.2 Latent Conditions and other Safety Factors

1. The thick fog and the probability of Lu Rong Yu 58398 in Catalina's shadow zone ahead may have prevented the watch keepers from making a visual contact;

2. At the time of the collision, the navigational watch consisted of the OOW and the look-out;

3. Radar watches were not stepped up and the bridge lacked navigational supervision, both of which were necessary for the elimination of 'one person error';

4. The look-out was assigned the role of a helmsman;

5. Neither the master nor the OOW considered a reduction in the vessel’s speed;

6. The X band radar was not switched on and the AIS set was not effectively monitored;

7. The OOW found himself in a situation where adaptations to Company procedures had failed.
3.3 Other Findings

.1 The record of hours of work and rest of the master, second mate and AB showed that these were in compliance with the requirements of relevant international conventions;

.2 The conduct on the bridge did not appear impaired by fatigue;

.3 The analysis of the actions taken by the OOW did not suggest that he was under the influence of alcohol or drugs.
4 RECOMMENDATIONS

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

TMS Bulkers is recommended to:

09/2017_R1 disseminate the findings of this safety investigation on board all ships under its management.

09/2017_R2 deploy shore personnel to carry out observations at sea in order to obtain an understanding of the actual conditions on board, with the aim to enhance knowledge of Company’s OOWs and look-outs on safe navigation.