MA2013-2

MARINE ACCIDENT
INVESTIGATION REPORT

February 22, 2013

Japan Transport Safety Board

The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board is to determine the causes of an accident and damage incidental to such an accident, thereby preventing future accidents and reducing damage. It is not the purpose of the investigation to apportion blame or liability.

Norihiro Goto
Chairman,
Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report.

MARINE ACCIDENT INVESTIGATION REPORT

Vessel type and Name: Cargo ship MARUKA
IMO number: 8626599
Gross tonnage: 1,416 tons

Vessel type and Name: Fishing vessel KAIRYO MARU No.18
Fishing vessel registration number: FO2-6572
Gross tonnage: 16 tons

Accident type: Collision
Date and time: Around 04:58 hours, November 27, 2011
(local time, UTC+9 hours)
Location: Off the northern coast of Okinoshima, Munakata City, Fukuoka Prefecture, Japan
Around 354° true bearing, 14.6 nautical miles from the Okinoshima Lighthouse
(Approximately 34° 29.2' N, 130° 04.6' E)

January 31, 2013
Adopted by the Japan Transport Safety Board
Chairman Norihiro Goto
Member Tetsuo Yokoyama
Member Kuniaki Shoji
Member Toshiyuki Ishikawa
Member Mina Nemoto

SYNOPSIS

< Summary of the Accident >

On November 27, 2011, the cargo ship MARUKA, with a master and seven crew members on board, was proceeding northwestward for Masan Port, Republic of Korea, and the fishing vessel KAIRYO MARU No. 18, with a skipper and one crew member on board, was proceeding south-southeastward for Hakata Fishing Port, Fukuoka City, Fukuoka Prefecture. At around 04:58, both vessels collided with each other off the northern coast of Okinoshima.

One crew member aboard the KAIRYO MARU No. 18 went missing, while the master suffered injuries including a rib fracture, and the vessel was cut in two parts at the center of the hull, and sank leaving only the bow section over the sea.

MARUKA sustained a fracture at the starboard section of the bulbous bow and a crack at the center of it.

< Probable Causes >

It is probable that the accident occurred by the collision of both vessels off the northern coast of Okinoshima at night, for such reasons as a chief officer of MARUKA had not kept a loolout for KAIRYO MARU No. 18, and as the skipper of KAIRYO MARU No. 18 had not been engaged in the maneuvering although engaged in the squid packing after leaving the wheel house, while MARUKA was proceeding northwestward, and KAIRYO MARU No. 18 was proceeding south-southeastward.

It is probable that the reason for the chief officer of MARUKA having not kept a lookout for KAIRYO MARU No. 18 was that he believed MARUKA would be able to pass by KAIRYO MARU No. 18 starboard to starboard, by seeing the starboard side light of KAIRYO MARU No. 18 on the starboard bow of MARUKA when KAIRYO MARU No. 18 turned to port about 10 minutes before the collision in order to alter the heading directed to the west and set the course at approximately 170°.

It is probable that the reason for the skipper of KAIRYO MARU No. 18 having not been engaged in the maneuvering although engaged in the squid packing after leaving the wheel house was that he believed there would be yet time before his vessel came close to MARUKA.

1 PROCESS AND PROGRESS OF THE INVESTIGATION

1.1. Summary of the Accident

On November 27, 2011, the cargo ship MARUKA, with a master and seven crew members on board, was proceeding northwestward for Masan Port, Republic of Korea, and the fishing vessel KAIRYO MARU No. 18, with a skipper and one crew member on board, was proceeding south-southeastward for Hakata Fishing Port, Fukuoka City, Fukuoka Prefecture. At around 04:58, both vessels collided with each other off the northern coast of Okinoshima.

One crew member aboard the KAIRO MARU No. 18 went missing, while the skipper suffered injuries including a rib fracture, and the vessel was cut in two parts at the center of the hull, and sank leaving only the bow section over the sea.

MARUKA sustained a fracture at the starboard section of the bulbous bow and a crack at the center of it.

1.2. Outline of the Accident Investigation

1.2.1 Setup of the Investigation

The Japan Transport Safety Board appointed an investigator-in-charge and another marine accident investigator to investigate this accident on November 28, 2011.

1.2.2 Collection of Evidence

November 28, 29 and December 9, 2011: On-site investigation and interviews
November 30, 2011 and July 6, 2012: Interviews
December 6 and 21, 2011: Collection of written replies to questionnaires

1.2.3 Comments of Parties Relevant to the Cause

Comments on the draft report were invited from the parties relevant to the cause of the accident.

1.2.4 Comments from Flag State

Comments on the draft report were invited from the flag State of the MARUKA.

2 FACTUAL INFORMATION

2.1 Events Leading to the Accident

2.1.1 Navigational Conditions according to the Records of Automatic Identification System

According to the records of Automatic Identification System*1 (hereinafter referred to as "AIS records") received by the private company, navigational conditions of MARUKA (hereinafter referred to as "Vessel A") at the time of 03:30:05 and during the time of 04:18:46 to 05:02:04 on the day of November 27, 2011 were as follows:

*1 "Automatic Identification System (AIS)" is a device used by vessels to transmit and exchange call sign, type, name, position, course, speed, destination, navigational status and other safety-related information with other vessels and shore-based navigational aid facilities, etc.

Time	Speed Over the Ground	Vessel Position		Course Over the Ground	Heading
		North Latitude	East Longitude		
(hh : mm : ss)	(knot (kn))	(deg.-min.-sec.)	(deg.-min.-sec.)	(°) *	(°) *
03 : 30 : 05	9.1	34-21-39.8	130-18-04.3	300.9	288
04 : 18 : 46	9.1	34-25-40.3	130-10-37.5	305.7	293
04 : 19 : 05	9.3	34-25-42.0	130-10-34.6	306.4	292
04 : 20 : 05	9.0	34-25-47.1	130-10-25.4	304.0	291
04 : 21 : 44	9.1	34-25-55.7	130-10-10.2	306.3	293
04 : 22 : 25	9.1	34-25-59.2	130-10-04.1	304.3	292
04 : 22 : 44	9.0	34-26-00.9	130-10-01.1	303.2	292
04 : 23 : 05	9.0	34-26-02.6	130-09-58.2	306.4	291
04 : 24 : 35	9.0	34-26-10.5	130-09-44.5	306.0	293
04 : 26 : 24	9.1	34-26-20.1	130-09-28.0	307.3	293
04 : 27 : 55	9.1	34-26-14.1	130-09-14.1	303.8	292
04 : 29 : 25	9.2	34-26-36.2	130-09-00.7	307.5	293
04 : 33 : 15	9.1	34-26-56.8	130-08-25.8	305.7	292
04 : 34 : 44	9.2	34-27-04.9	130-08-12.5	306.3	292
04 : 35 : 15	9.2	34-27-07.7	130-08-07.8	306.3	291
04 : 35 : 24	9.3	34-27-08.5	130-08-06.4	306.7	291
04 : 36 : 36	9.2	34-27-15.0	130-07-55.4	307.2	293
04 : 37 : 06	9.1	34-27-17.7	130-07-50.9	307.7	293
04 : 37 : 24	9.3	34-27-19.3	130-07-48.2	306.2	293
04 : 39 : 15	9.3	34-27-29.4	130-07-31.3	303.5	292
04 : 42 : 25	9.1	34-27-47.0	130-07-02.9	309.2	292
04 : 44 : 25	9.3	34-27-58.0	130-06-44.8	306.7	292
04 : 47 : 25	9.1	34-28-14.4	130-06-17.4	302.0	288
04 : 48 : 44	9.4	34-28-21.0	130-06-05.1	306.2	288
04 : 53 : 54	9.3	34-28-47.6	130-05-16.3	304.0	289
04 : 54 : 54	9.4	34-28-52.6	130-05-06.7	300.1	289
04 : 55 : 06	9.5	34-28-53.7	130-05-04.8	303.3	289
04 : 55 : 55	9.5	34-28-57.9	130-04-57.3	303.4	289
04 : 57 : 06	9.3	34-29-04.0	130-04-46.0	301.6	289
04 : 57 : 45	9.3	34-29-07.4	130-04-39.8	306.8	289
04 : 58 : 16	7.4	34-29-10.1	130-04-35.1	303.8	297
05 : 00 : 04	8.4	34-29-22.5	130-04-30.5	016.1	357
05 : 01 : 25	7.3	34-29-33.0	130-04-33.8	045.0	053
05 : 02 : 04	6.8	34-29-34.7	130-04-38.7	084.4	089

*：Course Over the Ground and Heading indicate true bearing. The same will apply hereinafter.

2.1.2 Events Leading to the Accident According to the Statements of Crew Members

According to the statements of the master of Vessel A (hereinafter referred to as "Master A") and the chief officer of Vessel A (hereinafter referred to as "Officer A"), and according to the statement of the skipper (hereinafter referred to as "Skipper B") of KAIRYO MARU No. 18 (hereinafter referred to as "Vessel B") and his reply to the questionnaire, events leading to the accident were as follows:

(1) Vessel A

Vessel A, boarded by Master A, Officer A and six other crew members and loaded with about 1,209 tons of steel wire rod[*2], departed from Higashi Harima Port, Hyogo Prefecture for Masan Port, Republic of Korea at around 01:00, November 26, 2011.

At around 03:30 on the following day, November 27, Officer A undertook the one-man bridge watch duties after taking it over from the second officer with a message that there were a lot of fishing vessels engaged in squid fishing in areas except in the bow direction. He set the course at approximately 305° by autopilot and navigated the vessel with a course over the ground of approximately 307° affected by an ocean current by about 2° to starboard,and at a speed of about 9 kn (speed over the ground, the same will apply hereinafter).

At around 04:20, Officer A sighted Vessel B operating with fish-luring lights on by radar and visually at a distance of around 6.0 nautical miles (M) on the starboard bow.

At around 04:40, sighting Vessel B by radar and visually at a distance of around 3.0 M on the starboard bow, Officer A switched the radar range from 6.0 M to 3.0 M scale. After that, by seeing Vessel B to have turned fish-luring lights off and a green light on, he thought that Vessel B had started to navigate by finishing the fishing operation, and he flashed daylight signaling lights toward Vessel B.

As Vessel B which had shown the green light started to turn round, Officer A thought that both vessels would be able to pass by each other starboard to starboard in the course of time.

As Vessel B began to show a red light instead of the green light by turning round when a radar image of Vessel B came within a range of around 0.23 M, Officer A switched to manual steering to put the helm hard to starboard, and shifted the engine clutch in neutral, although Vessel A and Vessel B collided with each other.

After the collision, Officer A pressed the GPS receiver's MOB button[*3] to record the position of the collision on the receiver, and reported to the master on the internal phone.

Master A was in bed in his cabin and looked out only to learn that it was too dark to see anything when he felt an impact. After a while, he was advised by Officer A that his ship had collided with a fishing vessel. Master A went up to the bridge at around 05:05 to confirm that the engine clutch was in neutral.

Master A immediately reported to the Japan Coast Guard by VHF radio telephone that his ship had collided with a fishing vessel.

After that, Officer A confirmed that the GPS receiver had recorded 05:01, 34° 29.575' N, 130° 04.608' E.

(See Photo 1: Time and Location Displayed on the Screen of the GPS Receiver of Vessel A)

[*2] "steel wire rod" is a coiled wire rope product made of high carbon steel.

[*3] "MOB (Man Overboard) button" is a built-in GPS receiver unit that activates the function of recording such information as the position and the time of the occurrence of the falling overboard of a person.

(2) Vessel B

Vessel B, boarded by Skipper B and Crew Member B, departed from the Fukuoka funadamari (a basin for small vessels) in the Hakata Port, Fukuoka City, Fukuoka Prefecture, for fishing grounds off the northwestern coast of Okinoshima at around 13:00, November 26.

At around 18:30, Vessel B turned on fish-luring lights and working lights, and turned off navigation lights to start the operation of squid fishing at 34° 23' N, 129° 54' E.

As Vessel B was in the fishing operation with a parachute anchor[*4] cast into the sea, her bow was headed in the south to south-southeast direction.

At around 04:40 on the following day, November 27, Skipper B switched off the automatic squid fishing machines to stop the fishing operation at 34° 31' N, 130° 04' E, and turned navigation lights on and fish-luring lights off.

When Crew Member B heaved up the parachute anchor, the bow of Vessel B made a starboard turn to head the west. Skipper B did not notice the flashing daylight signaling lights from Vessel A at that time.

Skipper B shifted the clutch of the main engine to a forward position, and ported the helm manually to start navigation by altering the course to approximately 170° toward the light buoy at Shitae Sone plotted on the GPS monitor beforehand, which was situated north of Shikanoshima, Fukuoka City, Fukuoka Prefecture.

Skipper B switched to autopilot when the course was set at approximately 170°. At around 04:50 while navigating at a speed of about 10 kn, he sighted a masthead light and a green light of Vessel A on the port bow. As he measured with the eye the distance to Vessel A at around 5.0 to 6.0 M, he thought that there would be yet time before approaching Vessel A, and decided to join Crew Member B in the squid packing. He left the wheel house to go on the bow deck.

Skipper B carried out the squid packing on the port side in the fish hold on the bow deck, while Crew Member B did the same on the starboard side. It took either of them about one minute to complete packing a boxful of squid.

When Skipper B completed packing of 10 boxes, he felt something in his back and turned around. He sighted the starboard bow of Vessel A approaching from the port side of Vessel B, and immediately after that, Vessel A collided with the port section of Vessel B diagonally from the forward left of Vessel B at an angle of approximately 50°, causing Vessel B to capsize and Skipper B as well as Crew Member B to fall overboard. Skipper B was rescued by Vessel A, although Crew Member B went missing.

The accident occurred at around 04:58, November 27, 2011, and the location was in the vicinity of the position 354°, 14.6 M from the Okinoshima Lighthouse.
(See Figure 1: Location of Occurrence of the Accident, Figure 2: Situation of the Collision of Both Vessels, Photo 2: Vessel A, Photo 3: Vessel B)

2.2 Injuries to Persons

(1) Vessel A

There were no injuries or deaths.

[*4] "parachute anchor" is a type of navigation equipment to be utilized during fishing operation to keep the bow of a vessel resisting the force of winds and waves. The parachute anchor will be cast overboard from the bow, and the water resistance under the sea will make it open like a parachute when deployed.

(2) Vessel B

The following was found by the information from the Japan Coast Guard and by the medical report for Skipper B.

Crew Member B went missing.

The doctor for Skipper B diagnosed his injuries as the left knee sprained and bruised, the right fourth rib bone fractured, the neck sprained, the waist bruised and sprained, the abdomen bruised, and the right hand bruised.

2.3 Damage to Vessels

According to the statements of Master A, Officer A and Skipper B, and to the photo of the damage sustained by Vessel B, damage to the vessels involved was as follows:

(1) Vessel A

A fracture at the starboard section of the bulbous bow and a crack at the center of it.

(See Figure 3: Damage to Vessel A)

(2) Vessel B

Cut in two parts at the center of the hull, and sank leaving only the bow section over the sea.

(See Figure 4: Damage to Vessel B, Photo 4: Situation of the Drifting Bow Section of Vessel B)

2.4 Crew Information

(1) Gender, Age and Certificate of Competence

a. Master A: Male, Nationality of the Republic of Korea, 62 years old
Second grade navigation officer (issued by the Republic of Korea)
Date of Issue October 30, 2009
(Valid until October 29, 2014)

b. Officer A: Male, Nationality of the Republic of Korea, 57 years old
Third grade navigation officer (issued by the Republic of Korea)
Date of Issue November 2, 2002
(Valid until November 1, 2012)

c. Skipper B: Male, 46 years old
First class boat's operator, personal water craft operator, with passenger service license
Date of Issue October 15, 1987
Date of Revalidation January 24, 2008
(Valid until January 29, 2013)

d. Crew Member B: Male, 58 years old
Fifth grade maritime officer (engineering), internal combustion
Date of Issue August 8, 1975
Date of Revalidation September 22, 2005
Expired on the date of September 21, 2010

(2) Major Seagoing Experience

a. Master A

According to the statement of Master A, his seagoing experience was as follows:

Master A served at the navy since he was around 25 years old. When he was around 30 years old, he started to work aboard merchant vessels with a gross tonnage of around

1,000 to 3,000 tons, and obtained a master's position around 20 years before.

It was 4 years and 6 months since Master A had become the master of Vessel A, and the last date of boarding Vessel A immediately before the accident was June 6, 2010.

He was in good health conditions at the time of the accident.

b. Officer A

According to the statement of Officer A, his seagoing experience was as follows:

Officer A served as a navigation officer on fishing vessels when he was between 23 and 28 years old, and as a skipper of fishing vessels until he became 42 years old. After that, he served as a second officer on a cargo ship for 6 years, and as her chief officer for 3 years and 5 months.

He started to serve as a chief officer on Vessel A since May 2, 2011.

He was in good health conditions at the time of the accident.

c. Skipper B

According to the statement of Skipper B, his seagoing experience was as follows:

Skipper B started to serve as an ordinary seaman on a refrigerated cargo carrier with a gross tonnage of around 90 tons, and he obtained a license of a fifth grade maritime officer (navigation) at the age of 21 years old. When he became 22 years old, he started to serve as a skipper of squid fishing vessels. It was almost 24 years since he had become a skipper of fishing vessels.

He was in good health conditions at the time of the accident.

d. Crew Member B

According to the statement of an interviewed employee of KAIRYO SUISAN Ltd., Crew Member B started boarding squid fishing vessels after graduation, and he was in charge of the engine of Vessel B.

He was in good health conditions at the time of the accident.

2.5 Vessel Information

2.5.1 Particulars to Vessels

(1) Vessel A

IMO number:	8626599
Port of registry:	Busan, Republic of Korea
Owner:	YU JIN SHIPPING CO., LTD. (Republic of Korea)
Management company:	YU JIN SHIPPING CO., LTD. (Republic of Korea)
Classification society:	Korean Register of Shipping
Gross tonnage:	1,416 tons (international gross tonnage)
L x B x D:	75.73 m x 11.50 m x 7.20 m
Hull material:	Steel
Engine:	One diesel
Output:	882 kW
Propulsion:	Single 4-blade fixed pitch propeller
Date of construction:	April 15, 1985

(2) Vessel B

Fishing vessel registration number: FO2-6572

Port of registry:	Fukuoka City, Fukuoka Prefecture
Owner:	KAIRYO SUISAN Ltd.

Gross tonnage:	16 tons
Lr x B x D:	16.14 m x 3.73 m x 1.35 m
Hull material:	FRP (Fiber Reinforced Plastic)
Engine:	One diesel
Output:	150 (Engine Performance Index by Fishing Vessel Act)
Propulsion:	Single 4-blade fixed pitch propeller
Date of launch:	October 5, 1987

2.5.2 Loading Conditions

(1) Vessel A

According to the statement of Officer A, Vessel A was loaded with about 1,209 tons of steel wire rod. The draught at the time of departure was around about 3.0 meters at the bow and 4.5 meters at the stern.

(2) Vessel B

According to the statement of Skipper B, Vessel B was loaded with around 210 boxes containing 20 squids each when the fishing operation was over, and the draught was about 1.0 meter at the midship.

2.5.3 Equipment and Instruments

(1) Vessel A

a. Hull structure

A complete twin-decker-after-bridge type cargo ship

b. Visibility from the bridge

There was no dead angle in the bow direction.

c. Navigation Instruments

There was a steering stand installed in the center of the front section of the wheel house. There were two radars placed on the port side of the steering stand, and engine remote control equipment on its starboard side. There was also a magnetic compass in the front of the steering stand, in which a gyro compass was fitted.

In the rear of the wheel house, there were a chart table and a GPS receiver placed on the port side, and radio equipment from the center to the starboard side.

d. Vessel Maneuverability

The performance table showing the maneuverability of Vessel A was as follows:

(a) Engine and speed

Operational State of the Engine	Full Ahead	Half Ahead	Slow Ahead	Dead Slow Ahead
Revolution per Minute (rpm)	310	270	240	230
Speed (kn)	11	10	8	6

(b) Tactical diameter

Turning to port: about 232 meters

Turning to starboard: about 284 meters

e. Other Information

According to the statement of Officer A, no malfunctions or troubles were found to the hull, engine, equipment and the instruments of Vessel A at the time of the accident.

(2) Vessel B

a. Hull structure

According the general arrangement plan of Vessel B, it was a squid fishing vessel with a wheel house placed in the center of the hull.

b. Navigation Instruments

According to the statement of Skipper B and his reply to the questionnaire, navigation instruments were placed as follows:

There was a steering wheel in the front of the wheel house, and there were two radars, a water temperature indicator and a fish finder placed on the port side of the steering wheel. On its starboard side, there were navigation instruments, a clutch lever and a speed acceleration/deceleration lever of the main engine. There was a GPS plotter placed in a shelf under the steering wheel, and a switch board for navigation lights and working lights as well was installed under the GPS plotter.

There were a control panel for the squid fishing machines and a switch board for the fish-luring lights installed on the side wall on the port side.

The GPS plotter was in operation and the radars were on standby at the time of the accident.

While navigating at night, Skipper B kept navigation lights － masthead lights, side lights and stern lights－turned on.

c. Other Information

According to the statement of Skipper B, no malfunctions or troubles were found to the hull, engine, equipment and the instruments of Vessel B at the time of the accident.

2.5.4 Information on the Bridge Watch-Keeping Arrangement of Vessel A

According to the statement of Master A and the working shift table posted in the bridge at the time of the navigation, the watch-keeping arrangement was operated in 3 shifts with 4 hour duty each, by which the second officer was assigned to 00 to 04 hours and 12 to 16 hours, Officer A to 04 to 08 hours and 16 to 20 hours, and Master A to 08 to 12 hours and 20 to 24 hours. However, one-man working shift was changed to two-man shift as necessary such as when passing through narrow channels.

2.6 Weather and Sea Conditions

2.6.1 Weather and Wave Observation Data

a. The weather data observed at the time of occurrence of the accident by the Izuhara Special Regional Meteorological Station located at around 43.0 M southwest of the site of the accident was as follows:

04:00 Wind Direction: NW, Velocity: 0.8 m/s, Visibility: 10.1 km

05:00 Wind Direction: NNW, Velocity: 1.4 m/s, Visibility: 10.4 km

06:00 Wind Direction: NNW, Velocity: 2.0 m/s, Visibility: 13.9 km

b. The wave data observed at the NOWPHAS[*5] observation point of "Genkai Nada" located at around 44.0 M southeast of the site of the accident was as follows:

04:40 Significant Wave Height: 0.49 m, Wave Direction: NNE

05:00 Significant Wave Height: 0.47 m, Wave Direction: NNE

05:20 Significant Wave Height: 0.41 m, Wave Direction: NNE

c. The sunrise on the day of the accident was at 07:03.

d. The civil twilight[*6] on the day of the accident started at approximately 06:33.

e. According to the Japan Meteorological Agency's Daily Sea Surface Temperature data covering the Kyushu and Okinawa sea area, the water temperature in the vicinity of the site of the accident was approximately 20°C on the day of the accident.

2.6.2 Observation by Crew

According to the statements of Officer A and Skipper B, the weather and sea conditions in the vicinity of the site of the accident at the time of occurrence of the accident were as follows:

(1) Officer A

Weather: fine, Wind Direction: SE, Velocity: 3, Visibility: around 10.0 M, Wave Height: around 0.5 m

(2) Skipper B

Weather: fine, Wind Direction: SSE, Velocity: 3 to 4, Visibility: around 6.0 M, Wave Height: around 1.0 m

2.6.3 Ocean Current

(1) According to the Quick Bulletin of Ocean Conditions No.222 published by the Japan Coast Guard and to the Daily Sea Surface Temperature data covering the Kyushu and Okinawa sea area issued by the Japan Meteorological Agency, the sea conditions on the date of November 27 in the sea area where the accident occurred were marked by an ocean current flowing at a speed of about 0.3 to 0.9 kn in the northeast direction.

(2) According to the statement of Skipper B, there was an ocean current flowing at a speed of about 0.8 to 0.9 kn in the northeast direction at the time of occurrence of the accident.

2.7 Information on Search and Rescue

(1) Vessel A

Master A and Officer A stated as follows:

After placing Officer A and the chief engineer on the watch, Master A returned to the vicinity of the site of the accident by steering Vessel A by himself, and searched for Vessel B with working lights on.

[*5] "NOWPHAS" stands for Nationwide Ocean Wave Information Network for Ports and Harbours, established at Ports and Harbours Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT) for the purpose of conducting wave observation along the coasts surrounding Japan. It has been organized and operated under the cooperation of the following organizations: Ports and Harbours Bureau, Regional Development Bureaus, Hokkaido Bureau, all at MLIT, and Okinawa General Bureau at Cabinet Office, together with National Institute for Land, Infrastructure and Management (NMLIM) and Port and Airport Research Institute (PARI), both under MLIT.

[*6] "civil twilight" is the period of time between when the center of the sun is geometrically 6 degrees below the horizon and the time of sunrise or sunset. (Source: a nautical almanac issued by the Japan Coast Guard)

At around 07:00, when Officer A was advised by the chief engineer that there was some object in the bow direction, he sighted with his binoculars the bow section of Vessel B, capsized with the bottom turned upward as well as a person on its top.

After approaching the bow section of Vessel B, Vessel A threw a life-buoy to the person on the top of the bow section of Vessel B, and pulled Skipper B with his body thrust through the life-buoy toward the broadside of Vessel A, and rescued him by drawing him up with a rope ladder at around 07:10.

As Master A was advised by Skipper B that there had been one more person aboard Vessel B, he continued to search for that person. However, he was unable to find that person.

Officer A bathed Skipper B, and provided him clothing and warm coffee.

After that, Skipper B was transported to a hospital in Tsushima City, Nagasaki Prefecture by a helicopter of the Japan Coast Guard.

(2) Vessel B

Skipper B stated as follows:

After rising to the surface of the sea, Skipper B held onto a lid of the fish hold floating on the sea. As he later became able to hold onto the bow section of Vessel B drifting nearby, he entered the fish hold through the fracture on it.

Skipper B remained inside the fish hold for a while. However, as the bow section of Vessel B started to sink around 30 to 40 minutes after that, he moved onto the top of the bow section of Vessel B and kept himself warm by putting styrene foam boxes against the wind for around 1 hour.

When it was becoming light, Skipper B saw Vessel A to be engaged in searching with working lights on.

After going up by himself the rope ladder let down by Vessel A, Skipper B called KAIRYO SUISAN Ltd. over the maritime telephone on Vessel A at around 07:30.

Skipper B was transported to a hospital after he was interviewed on Vessel A by a Japan Coast Guard officer.

Neither Skipper B nor Crew Member B wore a life-jacket at the time of occurrence of the accident.

(3) The Japan Coast Guard

The information obtained from the Japan Coast Guard was as follows:

Immediately after being notified by Vessel A of the occurrence of the accident at around 05:16 on the 27th, the Japan Coast Guard dispatched a patrol vessel and an airplane to search for Crew Member B who went missing between the 27th and the 29th. However, they were unable to find Crew Member B.

The Japan Coast Guard decided to finish the task specializing in the searching for Crew Member B at the sunset on the 29th, and to resume the searching on the occasion of regular patrols.

2.8 Characteristics of the Area

According to the Chart W196 published by the Japan Coast Guard, the site of the accident was located around 50.0 M northwest of the west entrance to the Kanmon Straits, and was in the sea area navigated by vessels bound for the Republic of Korea after departing from ports in Japan via the Kanmon Straits.

According to the statement of Skipper B, the consort vessels engaged in the squid fishing with

Vessel B had returned to port at the time of occurrence of the accident, and there were no other vessels observed in the vicinity than Vessel A when Vessel B started returning to port.

2.9 Other Relevant Information

According to the statement of Officer A, small-sized fishing vessels so often crossed ahead the bow of his ship that he felt small-sized fishing vessels as dangerous.

According to the statement of Skipper B, relatively large-sized vessels would give way at an early stage while vessels with a similar size of Vessel A would not do so from time to time, and there were several occasions when he sensed danger and gave way even though his vessel was a stand-on vessel.

3 ANALYSIS

3.1 Situation of the Accident Occurrence

3.1.1 Course of the Events

According to 2.1, events leading to the accident were as follows:

(1) Vessel A

a. It is probable that Officer A undertook the one-man bridge watch duties after taking it over from a second officer at around 03:30, and navigated with autopilot at a heading of approximately 288° and at a speed of about 9.1 kn.

b. It is probable that at around 04:20, Officer A saw Vessel B to be engaged in fishing with fish-luring lights on at a distance of around 6.0 M on the starboard bow.

c. It is probable that at around 04:40, Officer A saw Vessel B at a distance of around 4.8 M on the starboard bow to have turned the starboard side light on and fish-luring lights off.

d. It is probable that Officer A saw the port side light of Vessel B, when the distance to Vessel B became around 0.23 M.

e. It is probable that immediately before the collision, Officer A switched to manual steering to put the helm hard to starboard, and shifted the engine clutch in neutral.

f. It is highly probable that during the time of 04:57:45 to 04:58:16, Vessel A changed its heading from 289° to 297°, and its speed from 9.3 kn to 7.4 kn.

g. Vessel A collided with Vessel B after that.

(2) Vessel B

a. It is probable that at around 04:40, Vessel B switched off the automatic squid fishing machines to finish the fishing operation at 34°31' N, 130°04' E.

b. It is probable that Skipper B then turned navigation lights on and fish-luring lights off.

c. It is probable that Vessel B made a starboard turn to head the west while it was heaving up the parachute anchor.

d. It is probable that Skipper B navigated with autopilot by turning to port manually to set the course at approximately 170° toward the light buoy at Shitae Sone.

e. It is probable that Skipper B left the wheel house to go on the bow deck, and joined in the squid packing, although he sighted a masthead light and the starboard side light of Vessel A on the port bow at around 04:50 while navigating with autopilot at approximately 170° and at a speed of about 10.0 kn.

f. It is probable that during the squid packing, Skipper B sighted the starboard bow section of Vessel A approaching from the direction of the port bow of Vessel B, immediately after which Vessel B collided with Vessel A.
(See Figure 5: Estimated Navigational Route 1, Figure 6: Estimated Navigational Route 2)

3.1.2 Situation of the Collision

According to 2.1, 2.3 and 3.1.1, the collision occurred in the following situation:

(1) It is probable that Vessel B was at a course approximately 170° at the time of occurrence of the accident.

(2) It is probable that Vessel A collided with Vessel B when the course of Vessel A turned to approximately 297°.

(3) It is somewhat likely that the speed of Vessel A was about 7.4 kn while that of Vessel B was about 10.0 kn.

(4) It is probable that the bow section of Vessel A and the port middle section of Vessel B collided with each other at an angle of approximately 50° from the port bow of Vessel B.

3.1.3 Time, Date and Location of the Occurrence of the Accident

According to 3.1.1 and 3.1.2, it is probable that the time and date of the occurrence of the accident was around 04:58, November 27, 2011, and the location was in the vicinity of the position 354°, 14.6 M from the Okinoshima Lighthouse.

3.1.4 Injuries to Persons

According to 2.2, injuries to persons were as follows:

(1) Vessel A

There were no injuries or deaths.

(2) Vessel B

Crew Member B went missing.

Skipper B suffered the following injuries: the left knee sprained and bruised, the right fourth rib bone fractured, the neck sprained, the waist bruised and sprained, the abdomen bruised, and the right hand bruised.

3.1.5 Damage to Vessels

According to 2.3, it is probable that Vessel A sustained a fracture at the starboard section of the bulbous bow and a crack at the center of it, while Vessel B was cut in two parts at the center of the hull, and sank leaving only the bow section over the sea.

3.2 Causal Factors of the Accident

3.2.1 Situation of the Crew and the Vessels

(1) Crew

According to 2.4, situations related to the status of the crew were as follows:

a. Master A possessed a legal and valid seamen's certificate of competence.
It is probable that Master A was in good health conditions.

b. Officer A possessed a legal and valid seamen's certificate of competence.
It is probable that Officer A was in good health conditions.

c. Skipper B possessed a legal and valid boat's operator certificate.

It is probable that Skipper B and Crew Member B were in good health conditions.

(2) Vessels

According to 2.5.3, it is probable that situations of the vessels were as follows:

a. There were no malfunctions or troubles to the hull, engine, equipment and the instruments of Vessel A, and there was no structure on the deck to block the sight of the watch-keeping.

b. There were no malfunctions or troubles to the hull, engine, equipment and the instruments of Vessel B.

3.2.2 Weather and Sea Conditions

According to 2.6.2 and 2.6.3, it is probable that the weather was clear with a wind direction of SE to SSE and a wind velocity of 3 to 4, and the visibility was good, while there was an ocean current flowing at a speed of 0.3 to 0.9 kn in the northeast direction.

3.2.3 Analysis of Watch-Keeping Arrangement and Maneuvering of Vessels

According to 2.1, 2.9, 3.1.1 and 3.1.2, situations related to the watch-keeping arrangement and maneuvering of the vessels were as follows:

(1) Vessel A

a. It is somewhat likely that Officer A tried to notify Vessel B of the presence of Vessel A by flashing daylight signaling lights toward Vessel B, because, by seeing Vessel B located at a distance of around 4.8 M on the starboard bow to have turned the starboard side light on and fish-luring lights off while Vessel A was proceeding northwestward, Officer A who was on the one-man bridge watch duties thought that Vessel B had started navigation by finishing the fishing operation, and because there were several occasions when he felt endangered by small-sized fishing vessels crossing ahead the bow of his ship.

b. It is probable that Officer A believed that Vessel B would continue navigation by showing the starboard side light, and that both vessels would be able to pass by each other starboard to starboard, because he saw the starboard side light of Vessel B while turning to port about 10 minutes before the collision in order to alter the heading directed to the west and set the course at approximately 170°.

c. Officer A stated that when the distance to Vessel B became around 0.23 M, Vessel B which had shown the starboard side light turned round to show the port side light instead. However, it is probable that Officer A would have been able to see the port side light of Vessel B since about 10 minutes before the collision, based on the description as in b that Vessel B was navigating with autopilot with a course set approximately 170° after turning to port about 10 minutes before the collision.

d. It is probable that Officer A had not kept a lookout for Vessel B for the time period since about 10 minutes before the collision until the time the distance to Vessel B became around 0.23 M, because he was navigating during that time without being aware of Vessel B approaching by showing the port side light.

e. It is probable that Officer A, being unaware of Vessel B approaching by showing the port side light, believed that Vessel B had been navigating by showing the starboard side light until the time the distance to Vessel B became around 0.23 M. However, it is probable that Officer A had not kept a lookout for Vessel B, because, as described in b, he believed that Vessel B continued navigation by showing the starboard side light, and that Vessel A would be able to

pass by Vessel B starboard to starboard.

f. It is probable that although, becoming aware of the port side light of Vessel B, Officer A put the helm hard to starboard and shifted the clutch of the main engine in neutral, Vessel A and Vessel B collided with each other.

(2) Vessel B

a. It is probable that as Vessel B, engaged in the operation of squid fishing with a parachute anchor cast in the sea off the northern coast of Okinoshima, made a starboard turn in the middle of heaving up the parachute anchor after finishing the fishing operation and turning navigation lights on and fish-luring lights off, Skipper B turned Vessel B to port manually about 10 minutes before the collision in order to set the course at approximately 170° toward the light buoy at Shitae Sone displayed on the GPS plotter, and navigated with autopilot after the course was fixed at approximately 170°.

b. It is probable that Skipper B had not been engaged in the maneuvering of Vessel B until colliding with Vessel A, because, by seeing the masthead light and the starboard side light of Vessel A on the port bow while navigating with autopilot at approximately 170° and at a speed of about 10 kn, Skipper B measured with the eye the distance to Vessel A at around 5.0 to 6.0 M and thought that there would be yet time before approaching Vessel A, and he left the wheel house to go on the bow deck and engaged himself in the squid packing.

c. It is probable that during the squid packing, Skipper B sighted the bow section of Vessel A approaching from the direction of the port bow of Vessel B, immediately after which Vessel B and Vessel A collided with each other.

(See Figure 7: Movement of Vessel B by Manual Steering, Figure 8: Analysis of Watch-Keeping Arrangement and Maneuvering of Vessels, Figure 9: Crew Positioning of Vessel B when the Collision Occurred)

3.2.4 Analysis of the Occurrence of the Accident

According to 3.1.1, 3.1.2 and 3.2.3, situations leading to the accident were as follows:

(1) Vessel A

a. It is probable that Officer A undertook the one-man bridge watch duties from around 03:30, and was proceeding northwestward by autopilot at a speed of about 9 kn.

b. It is somewhat likely that Officer A tried to notify Vessel B of the presence of Vessel A by flashing daylight signaling lights toward Vessel B, because at around 04:20, he sighted for the first time Vessel B operating with fish-luring lights on at a distance of around 6.0 M on the starboard bow, and at around 04:40, he saw Vessel B at a distance of around 4.8 M on the starboard bow to have turned the starboard side light on and fish-luring lights off, and he thought that Vessel B had started navigation by finishing the fishing operation.

c. It is probable that Officer A believed that Vessel B would continue navigation by showing the starboard side light, and that Vessel A would be able to pass by Vessel B starboard to starboard, because he saw the starboard side light of Vessel B on the starboard bow of Vessel A when Vessel B turned to port about 10 minutes before the collision in order to alter the heading directed to the west and set the course at approximately 170°.

d. It is probable that Officer A had not kept a lookout for Vessel B, because he was navigating without being aware of Vessel B approaching by showing the port side light, although since about 10 minutes before the collision, he would have been able to see the port side light of Vessel B, which was navigating with autopilot with a course set at approximately 170°.

e. It is probable that Officer A had not kept a lookout for Vessel B, as he thought that Vessel A would be able to pass by Vessel B starboard to starboard.

f. It is probable that as Officer A had not kept a lookout for Vessel B, Vessel A collided with Vessel B, although he became aware of the port side light of Vessel B when the distance to Vessel B became around 0.23 M, and put the helm hard to starboard to shift the clutch of the main engine in neutral.

(2) Vessel B

a. It is probable that at around 04:40, Skipper B finished the operation of the squid fishing which Vessel B had been engaged in with a parachute anchor cast into the sea, and turned navigation lights on and fish-luring lights off.

b. It is probable that as having headed the west in the middle of heaving up the parachute anchor, Vessel B turned to port about 10 minutes before the collision in order to set the course at approximately 170° toward the light buoy at Shitae Sone displayed on the GPS plotter, and navigated with autopilot after the course was fixed at approximately 170°.

c. It is probable that while navigating with autopilot at approximately 170° and at a speed of about 10 kn at around 04:50, Skipper B sighted a masthead light and the starboard side light of Vessel A on the port bow, measured with the eye the distance to Vessel A at around 5.0 to 6.0 M and thought that there would be yet time before approaching Vessel A, and he left the wheel house to go on the bow deck.

d. It is probable that Skipper B had been engaged in the squid packing on the bow deck without being engaged in the maneuvering of Vessel B.

e. It is probable that during the squid packing, Skipper B sighted Vessel A approaching from the direction of the port bow of Vessel B, immediately after which Vessel B and Vessel A collided with each other.

3.2.5 Analysis of Measures to Mitigate the Injuries

According to 2.7, it is analyzed as follows:

It is somewhat likely that although Skipper B did not wear a life-jacket, he was able to avoid drowning because he could hold onto a lid of the fish hold floating on the sea and onto the drifting bow section of Vessel B after thrown into the sea, and was also able to avoid suffering hypothermia because he could shelter from the wind in the fish hold of Vessel B capsized, and could keep himself warm from the wind with the styrene foam boxes even after going up on the bow section of Vessel B as it began to sink, until he was rescued by Vessel A at an early stage of the search and rescue operation.

It is somewhat likely that Crew Member B could have been rescued if he had worn a life-jacket, although he went missing.

It is probable that immediately after the collision, Vessel A started the search operation for the crew members of Vessel B and made such arrangements as getting the bath ready for the crew member to be rescued.

4 CONCLUSIONS

4.1 Findings

(1) It is somewhat likely that Officer A flashed daylight signaling lights toward Vessel B, because he thought that Vessel B had finished the fishing operation and started navigation, by seeing Vessel B on the starboard bow to have turned the starboard side light on and fish-luring lights off while Vessel A was proceeding northwestward. (3.2.3 (1) a)*7

(2) It is probable that Officer A had not kept a lookout for Vessel B for the time period since about 10 minutes before the collision until he saw the port side light of Vessel B when the distance to Vessel B became around 0.23 M, because he believed that Vessel A would be able to pass by Vessel B starboard to starboard, by seeing the starboard side light of Vessel B on the starboard bow of Vessel A when Vessel B turned to port about 10 minutes before the collision in order to alter the heading directed to the west and set the course at approximately 170°. (3.2.3 (1) d, e)

(3) It is probable that as Vessel B, engaged in the operation of squid fishing with a parachute anchor cast in the sea, made a starboard turn to head the west in the middle of heaving up the parachute anchor after finishing the fishing operation and turning navigation lights on and fish-luring lights off, Skipper B turned Vessel B to port manually about 10 minutes before the collision in order to set the course at approximately 170° toward the light buoy at Shitae Sone displayed on the GPS plotter, and navigated with autopilot after the course was fixed at approximately 170°. (3.2.3 (2) a)

(4) It is probable that Skipper B had not been engaged in the maneuvering of Vessel B although engaged in the squid packing on the bow deck after leaving the wheel house, because he believed that there would be yet time before approaching Vessel A upon sighting the masthead light and the starboard side light of Vessel A on the port bow at around 04:50 while navigating with autopilot at approximately 170° and at a speed of about 10 kn. (3.2.3 (2) b)

(5) It is probable that both vessels collided with each other at around 04:58 in the vicinity of the position 354°, 14.6 M from the Okinoshima Lighthouse. (3.1.3)

4.2 Probable Causes

It is probable that the accident occurred by the collision of both vessels off the northern coast of Okinoshima at night, for such reasons as Officer A had not kept a lookout for Vessel B, and as Skipper B had not been engaged in the maneuvering although engaged in the squid packing after leaving the wheel house, while Vessel A was proceeding northwestward, and Vessel B was proceeding south-southeastward.

It is probable that the reason for Officer A having not kept a lookout for Vessel B was that he believed Vessel A would be able to pass by Vessel B starboard to starboard, by seeing the starboard side light of Vessel B on the starboard bow of Vessel A when Vessel B turned to port 10 minutes before the collision in order to alter the heading directed to the west and set the course at approximately 170°.

It is probable that the reason for Skipper B having not been engaged in the maneuvering although engaged in the squid packing after leaving the wheel house was that he believed there would be yet time before Vessel B came close to Vessel A.

*7 The numbers shown at the end of each paragraph under "4.1 Findings" refer to the numbers of related paragraphs and sub-paragraphs under "3 ANALYSIS."

5 SAFETY ACTIONS

It is probable that while Vessel A was proceeding northwestward, and Vessel B was proceeding south-southeastward, the accident occurred by the collision of both vessels off the northern coast of Okinoshima at night, because Officer A had not kept a lookout for Vessel B, as he believed that Vessel A would be able to pass by Vessel B starboard to starboard by seeing the starboard side light of Vessel B which was turning to port to set the course after starting navigation, and because Skipper B had not been engaged in the maneuvering although engaged in the squid packing after leaving the wheel house, as he believed that there would be yet time before Vessel B came close to Vessel A by seeing Vessel A.

In view of the above, crew members to be assigned to the bridge watch-keeping duties must pay attention to the following to prevent recurrence of similar accidents:

(1) Those on the bridge watch should keep a proper lookout at all times.

(2) When vessels on the point of starting to navigate come in sight while underway pay attention to the subsequent movements.

Figure 1: Location of Occurrence of the Accident

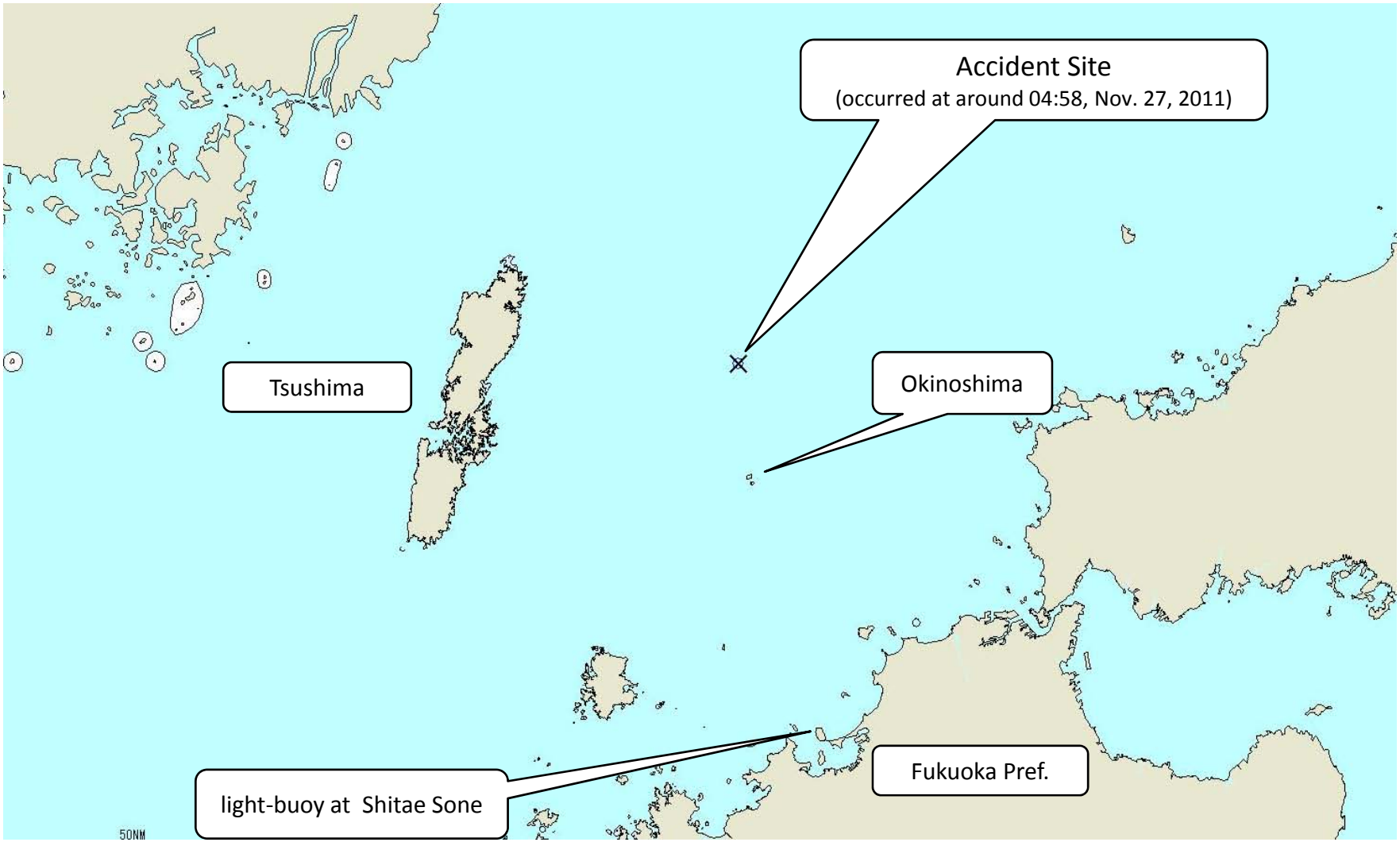

Figure 2: Situation of the Collision of Both Vessels

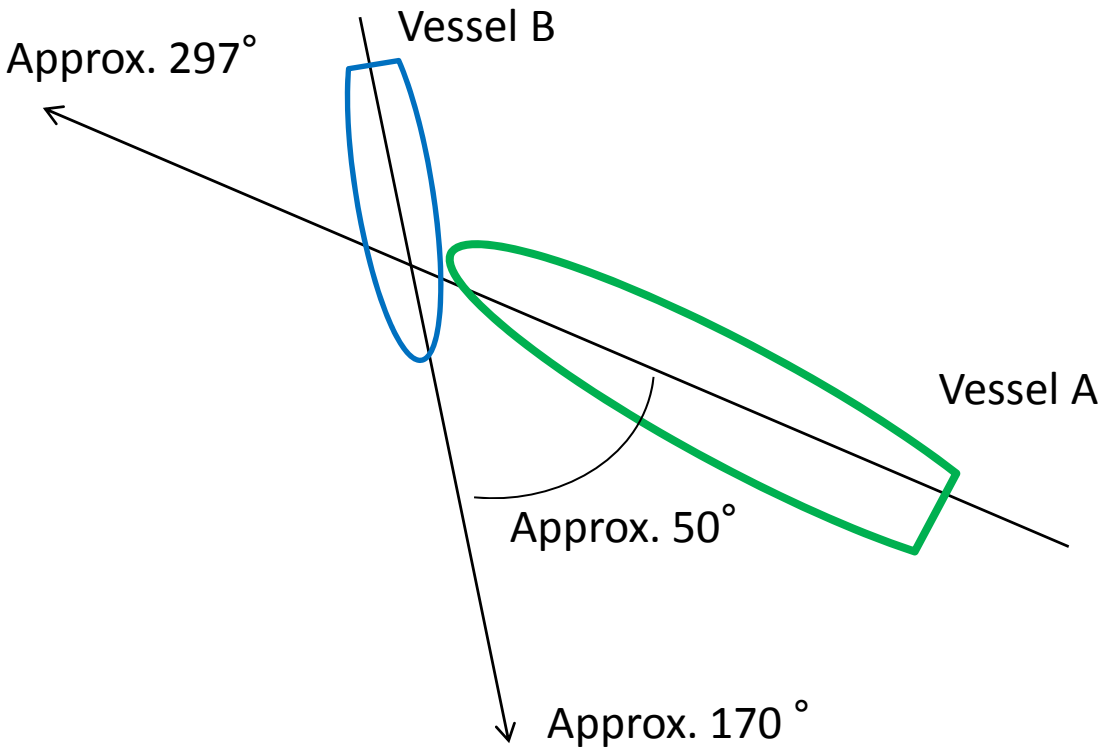

Figure 3: Damage to Vessel A

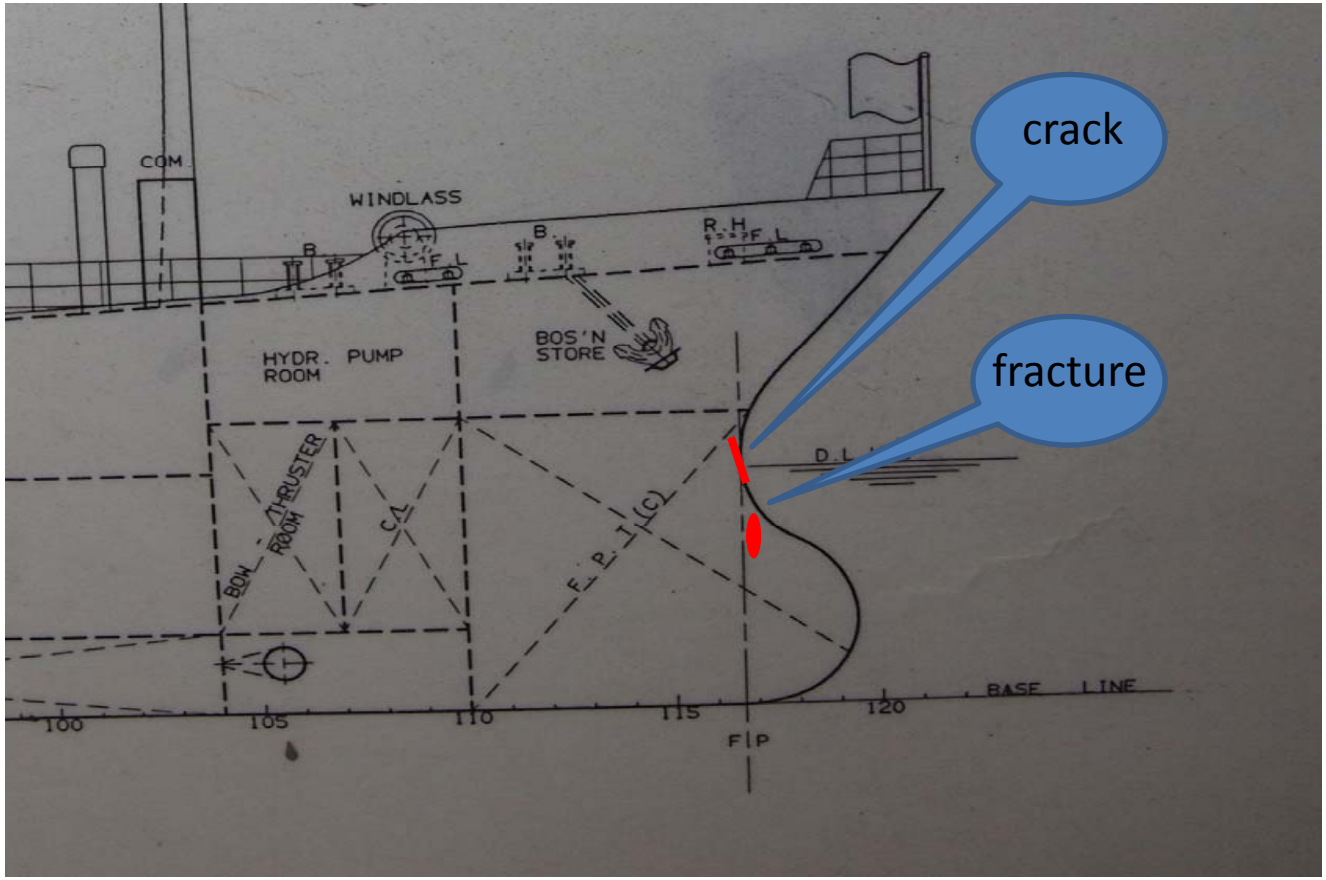

Figure 4: Damage to Vessel B

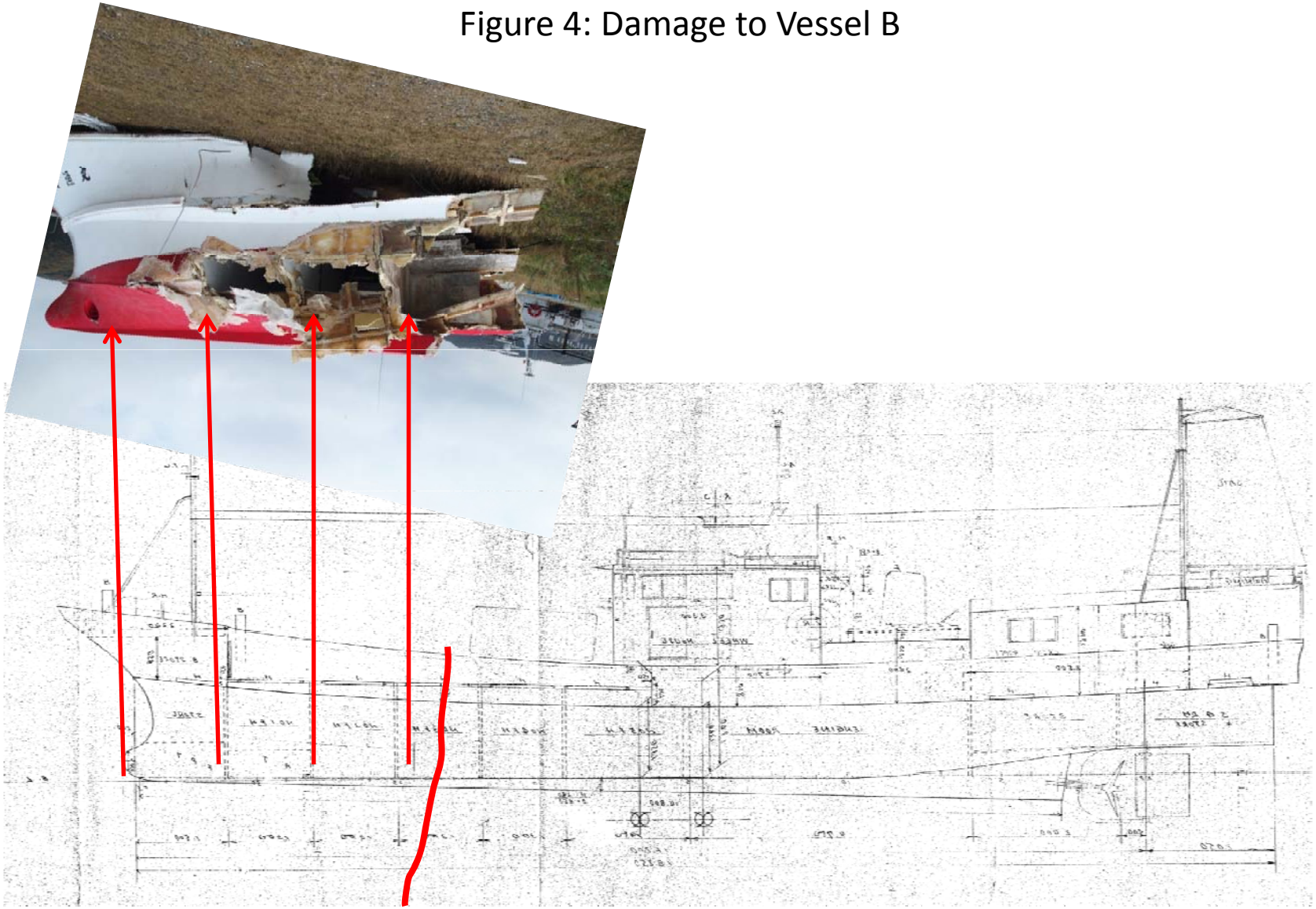

Figure 5: Estimated Navigation Route 1

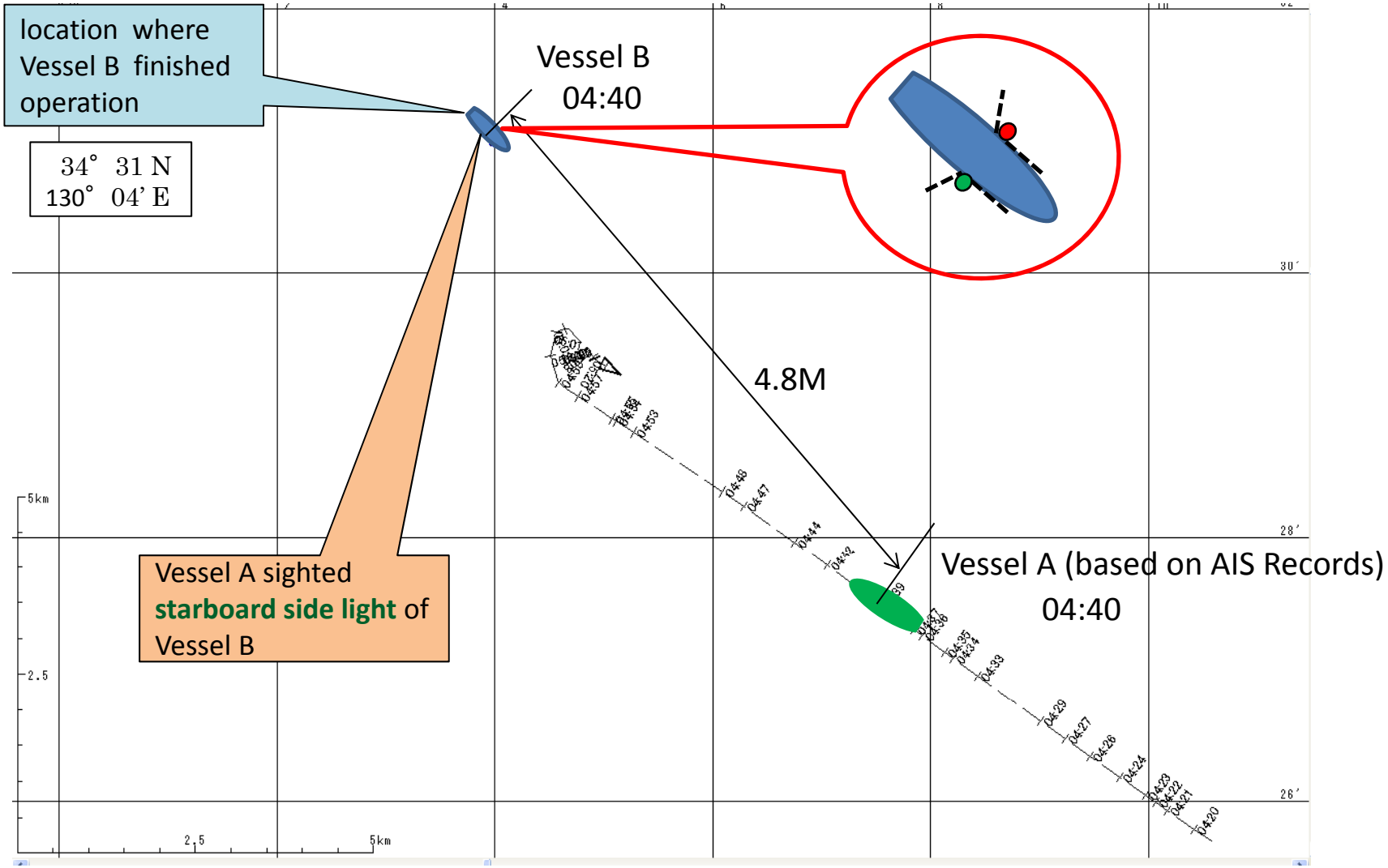

Figure 6: Estimated Navigation Route 2

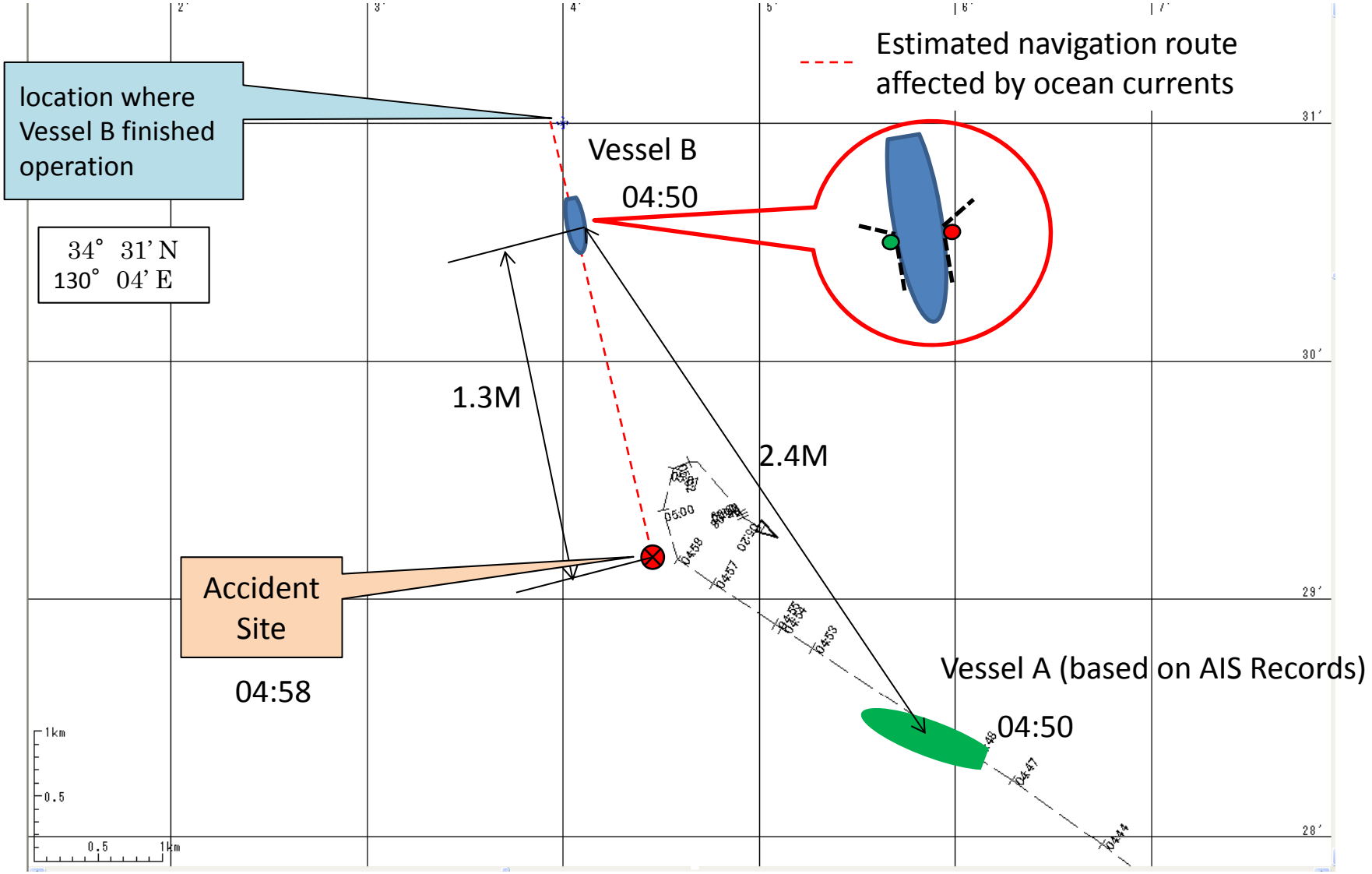

Figure 7: Movement of Vessel B by Manual Steering

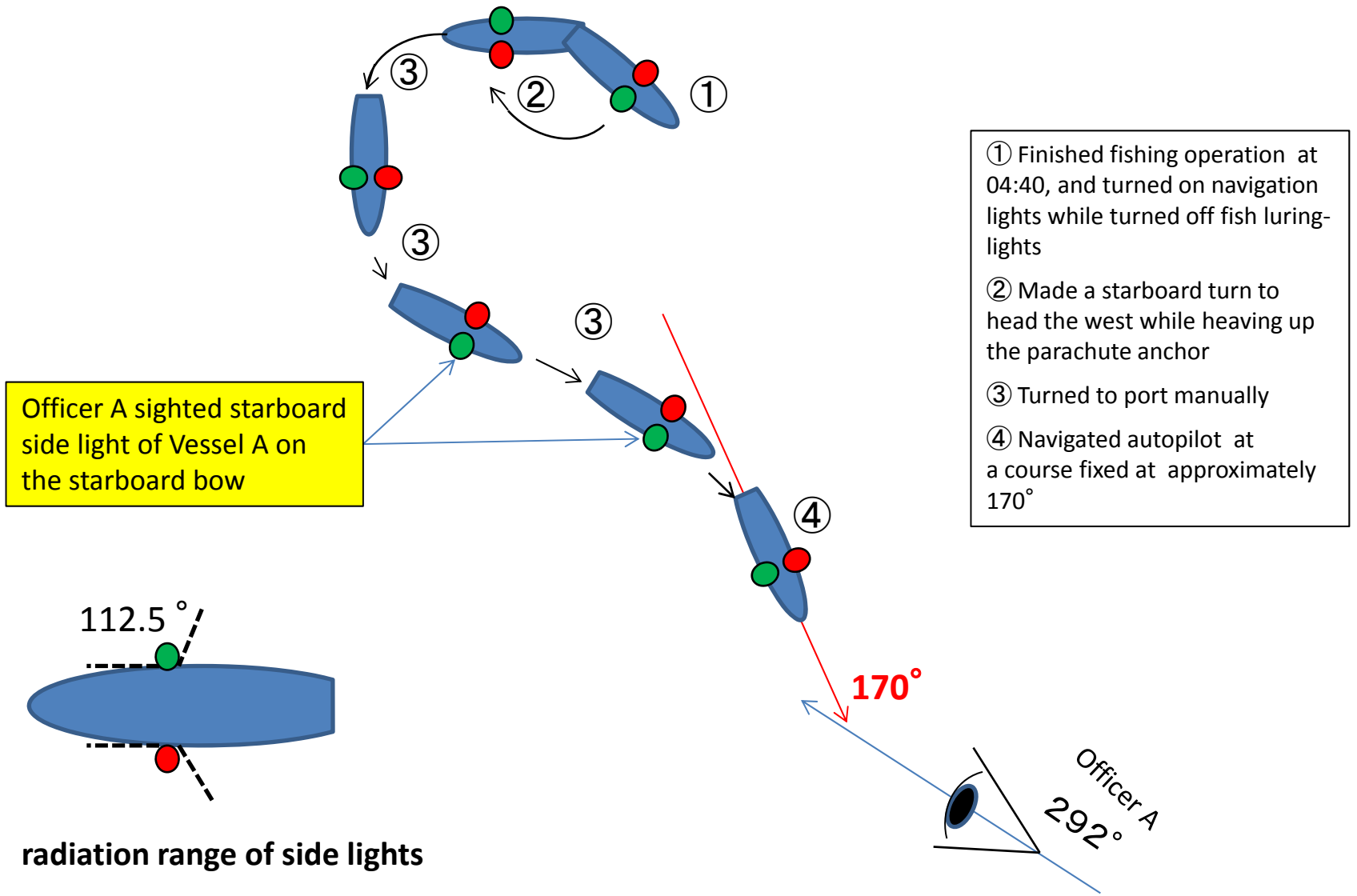

Figure 8: Analysis of Watch-Keeping Arrangement and Maneuvering of Vessels

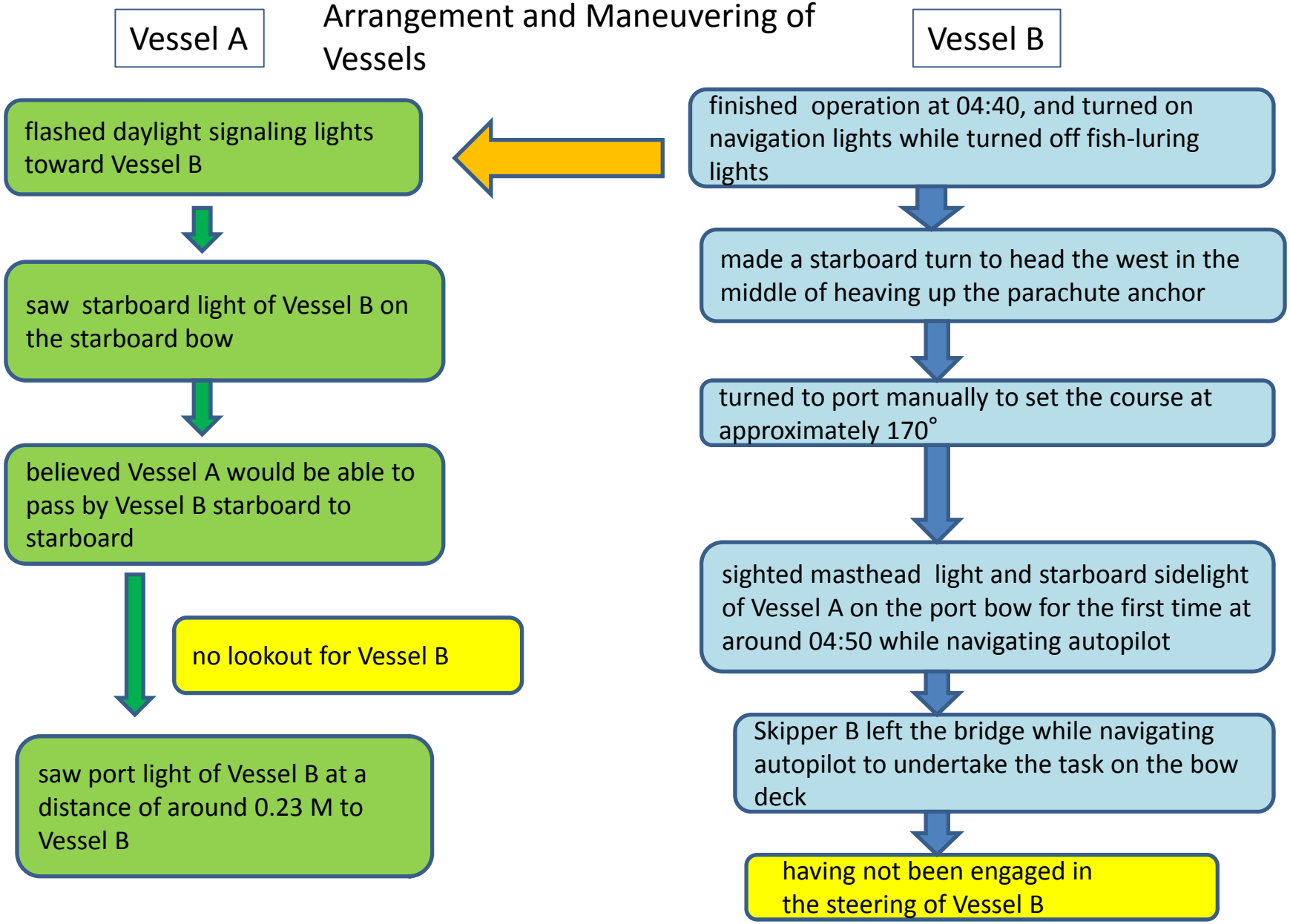

Figure 9: Crew Positioning of Vessel B when the Collision Occurred

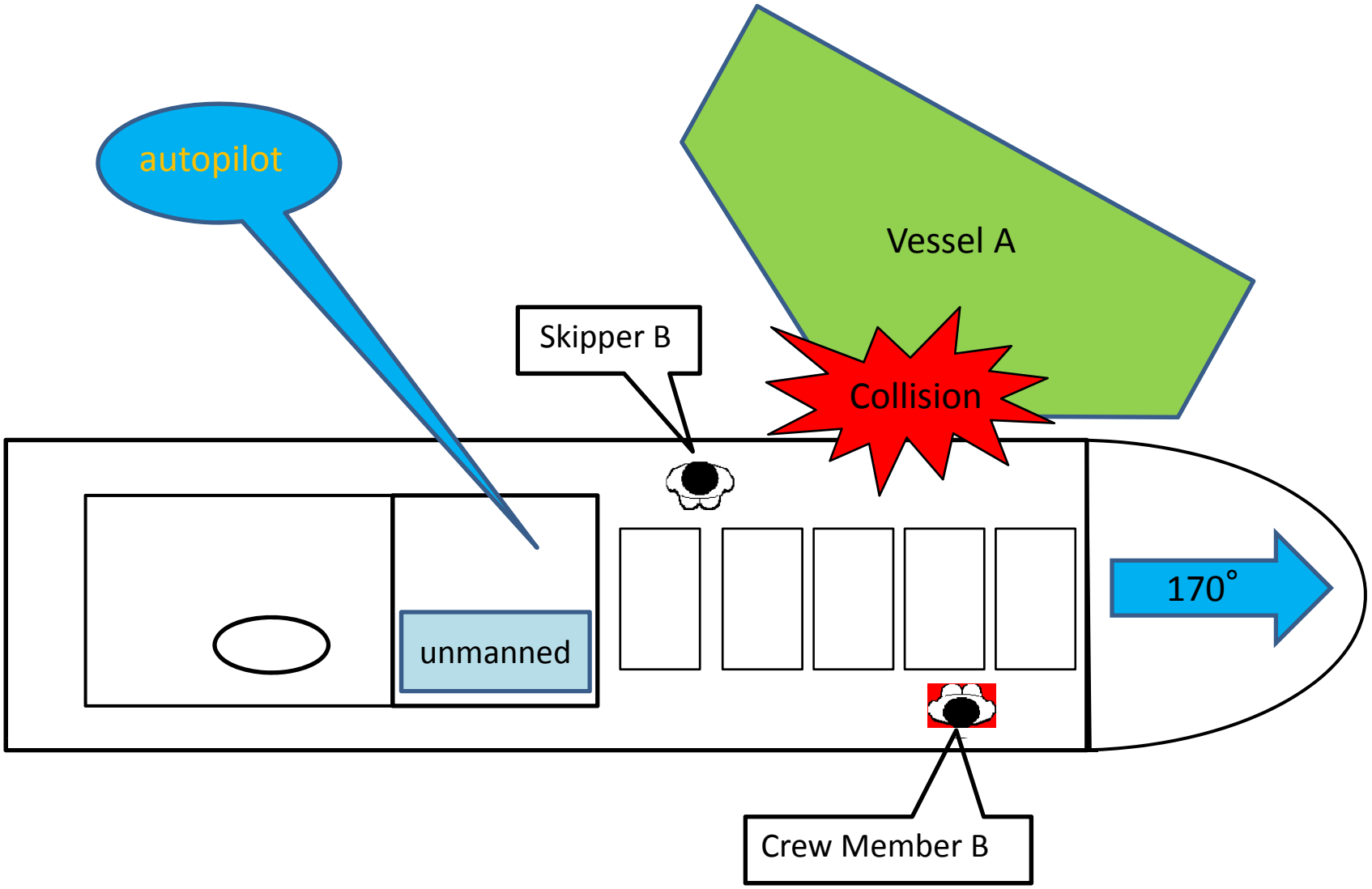

Photo 1: Time and Location Displayed on the Screen of the GPS Receiver of Vessel A

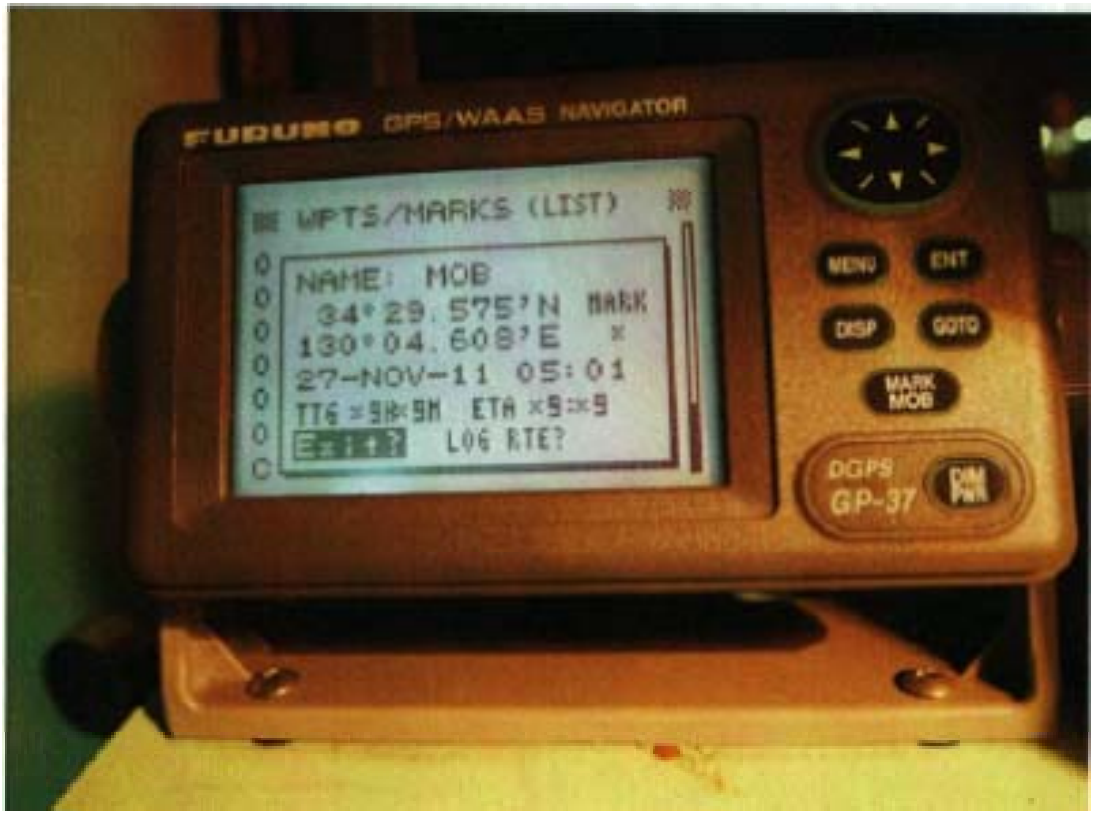

Photo 2: Vessel A

Photo 3: Vessel B

Photo 4: Situation of the Drifting Bow Section of Vessel B