

MA2015-1

**MARINE ACCIDENT
INVESTIGATION REPORT**

January 29, 2015



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 JNS-2
IMO number: 8869701
Gross tonnage: 1,500 tons

Vessel type and name: Fishing vessel CHOHO MARU
Fishing vessel registration number: YG3-40947
Gross tonnage: 4.92 tons

Accident type: Collision (contact with fishing gear)
Date and time: At around 11:01 on March 8, 2012
Location: Off the west of Iwaishima, Kaminoseki-cho, Yamaguchi Prefecture
On a true bearing of around 255°, at a distance of 8.4 nautical miles from the
Iwaishima Lighthouse (Approximately 33°44.9'N, 131°49.8'E)

December 18, 2014

Adopted by the Japan Transport Safety Board

Chairman Norihiro Goto

Member Kuniaki Shoji

Member Satoshi Kosuda

Member Toshiyuki Ishikawa

Member Mina Nemoto

SYNOPSIS

< Summary of the Accident (Incident) >

On March 8, 2012, the cargo ship JNS-2 with the master and nine other crewmembers on board was proceeding westward in the Iyo-nada, and the fishing vessel CHOHO MARU with only the skipper on board, and hauling a trawl, was proceeding west-northwestward in the Iyo-nada. At around 11:01, the bow of the JNS-2 collided with the trawl warp of the CHOHO MARU off the west of Iwaishima in Kaminoseki-cho, Yamaguchi Prefecture.

The CHOHO MARU capsized, its wheelhouse was crushed, and the skipper was killed. The JNS-2 sustained scratches to the bow and the starboard side shell plating.

< Probable Causes >

It is somewhat likely that this accident occurred off the west of Iwaishima, while the JNS-2 was proceeding westward and the CHOHO MARU was trawling west-northwestward, because the master of the JNS-2 left the bridge while on watch duty and the CHOHO MARU maintained the same course and speed, and the bow of the JNS-2 collided with the trawl warp of the CHOHO MARU.

It is probable that the master of the JNS-2 left the bridge while on watch duty to go to the toilet due to a stomachache.

1 PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Accident

On March 8, 2012, the cargo ship JNS-2 with the master and nine other crewmembers on board was proceeding westward in the Iyo-nada, and the fishing vessel CHOHO MARU with only the skipper on board, and hauling a trawl, was proceeding west-northwestward in the Iyo-nada. At around 11:01, the bow of the JNS-2 collided with the trawl warp of the CHOHO MARU off the west of Iwaishima in Kaminoseki-cho, Yamaguchi Prefecture.

The CHOHO MARU capsized, its wheelhouse was crushed, and the skipper was killed. The JNS-2 sustained scratches to the bow and the starboard side shell plating.

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 two other marine accident investigators to investigate this accident on March 8, 2012.

1.2.2 Collection of Evidence

March 9–11 and 15, 2012: On-site investigation and interviews

March 13 and 28, 2012: Interviews

1.2.3 Tests and Research by Other Institutes

To help investigate this accident, the JTSA contracted Analysis Center Co., Ltd. for the inspection of flakes of paint collected from the trawl warp of the CHOHO MARU and samples of paint collected from the damaged shell plating of the JNS-2 and contracted Kunitomi Co., Ltd. for the underwater survey of the damage to the bottom of JNS-2.

1.2.4 Comments from Parties Relevant to the Cause

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

1.2.5 Comments from the Flag State

Comments on the draft report were invited from the flag state of the JNS-2.

2 FACTUAL INFORMATION

2.1 Events Leading to the Accident

2.1.1 Ship's Movements Based on the Records of the Automatic Identification System

According to the data record of the Automatic Identification System (AIS)*¹ (hereafter referred to as the “AIS Records”) on JNS-2 (hereafter referred to as “Vessel A”) received by a private company, the movements of the Vessel A between 10:54:45 and 11:02:33 on March 8, 2012 were as follows.

Time (hh:mm:ss)	Speed over ground (SOG) (kn)	Position		Course over ground (COG) (°)*	Heading (°)*
		North latitude (° - ' - ")	East longitude (° - ' - ")		
10:54:45	9.4	33-44-43.4	131-50-57.5	282.1	290
10:55:15	9.4	33-44-44.4	131-50-52.0	281.6	289
10:55:35	9.4	33-44-45.0	131-50-48.5	281.8	290
10:56:15	9.3	33-44-46.3	131-50-41.0	281.9	290
10:56:34	9.3	33-44-46.9	131-50-37.5	282.1	290
10:57:15	9.3	33-44-48.2	131-50-30.1	281.4	289
10:57:45	9.3	33-44-49.1	131-50-24.6	282.0	290
10:58:14	9.3	33-44-50.1	131-50-19.4	282.0	289
10:58:45	9.2	33-44-51.0	131-50-13.8	281.3	290
10:59:45	9.3	33-44-53.0	131-50-02.9	281.5	289
11:00:14	9.2	33-44-53.9	131-49-57.7	281.8	290
11:00:34	9.2	33-44-54.5	131-49-54.1	282.3	290
11:00:54	8.9	33-44-55.2	131-49-50.6	282.2	273
11:01:01	8.6	33-44-55.2	131-49-49.4	274.1	261
11:01:08	8.3	33-44-55.1	131-49-49.3	263.8	254
11:01:27	7.5	33-44-54.1	131-49-45.3	242.2	238
11:01:51	6.3	33-44-52.3	131-49-43.3	223.9	226
11:02:17	5.5	33-44-50.2	131-49-41.6	211.7	220
11:02:33	5.1	33-44-48.9	131-49-40.8	207.3	219

* COG and heading are both based on true bearing.

(See Figure 1: Vessel A’s Track According to AIS Records.)

2.1.2 Events on Vessel A Leading to the Accident According to the Statements of Crewmembers

(1) The following events took place according to the statement of the master of Vessel A (hereafter referred to as “Master A”).

^{*1}The Automatic Identification System (AIS) is a tracking system that automatically transmits and receives vessel information such as identification code, type, name, position, course, speed, destination, navigational status and other safety-related information so that vessels can exchange information with other nearby vessels and shore stations including navigational aid facilities.

At around 00:10 on March 8, 2012, Vessel A departed from Fukuyama Port for Ulsan Port, Republic of Korea, loaded with about 2,246 tons of steel coils, with the following persons on board: Master A, the chief officer (nationality: Republic of Indonesia; hereafter referred to as “Chief Officer A”), the second officer (nationality: Republic of Indonesia; hereafter referred to as “Second Officer A”), the boatswain (hereafter referred to as “Boatswain A”), an able seaman (nationality: Republic of Indonesia; hereafter referred to as “Able Seaman A”), the chief engineer (nationality: Republic of Korea; hereafter referred to as “Chief Engineer A”), the first engineer (nationality: Republic of Indonesia; hereafter referred to as “First Engineer A”) and three other crewmembers (nationality: Republic of Indonesia).

At around 01:00, Master A handed over the navigational watch on the bridge to Second Officer A, and went to his cabin to sleep for about six hours. At around 07:40, Master A returned to the bridge and took over the navigational watch from Chief Officer A.

Master A thus resumed navigational watch on the bridge alone, instructing Boatswain A to carry out his deck work as the weather was good. At around 09:20, off the south of Yashima, Kaminoseki-cho, Master A altered the course, setting the autopilot to about 282° (true bearing, hereafter the same) along the Iyo-nada recommended route. He then sailed full ahead at about 9.5 kn (speed over ground, hereafter the same).

During the watch, Master A used binoculars and radar while changing its range scale between 3 M and 6 M as necessary.

At around 10:35, Master A had a stomachache and left the bridge for the toilet after confirming on the radar screen (set to 6 M range) that there were no vessels in the area.

At around 11:00, Master A returned to the bridge. He saw the CHOHO MARU (hereafter referred to as “Vessel B”) about 70 m on the starboard bow, and noticed that Vessel B was hauling fishing gear. Master A turned the rudder hard to port and stopped the engine. Nevertheless, Master A saw Vessel B being pulled toward Vessel A’s starboard side shell plating and was convinced that Vessel A’s bow had caught the fishing gear of Vessel B.

When Vessel A stopped, Master A saw Vessel B in front on the starboard side, capsized listing to starboard.

As Master A spotted a person on the sea surface, he ordered Chief Officer A to lower a rescue boat and informed the Hiroshima Coast Guard Office over the VHF radiotelephone that they were rescuing a fishing vessel and its crew.

(2) The following events took place according to the statement of Boatswain A.

On the day of the accident, Boatswain A woke up at around 06:30. At around 08:00, he started cleaning the accommodation space with other crewmembers. At around 10:00, they took a break. At around 10:30, they resumed cleaning of the

accommodation space. After a while, the engine stopped. Just as he was wondering what had happened, Boatswain A heard the warning siren and left the accommodation space.

Boatswain A saw the orange bottom of the capsized Vessel B on the starboard side, at about 100 m and 20° aft of the beam.

- (3) The following events took place according to the statements of Chief Officer A, Second Officer A and Chief Engineer A.

After handing over the navigational watch on the bridge to Master A, Chief Officer A left the bridge and took a rest. At around 11:00, Chief Officer A was awakened by the yelling of Able Seaman A. When Chief Officer A left the accommodation space wondering why the engine was not running, Able Seaman A reported to him that he had seen the capsized Vessel B.

About one or two minutes later, when Chief Officer A was searching for Vessel B on the afterdeck, he heard the warning siren and saw the capsized Vessel B at about 50 m away from the deck, but no one could be seen around Vessel B.

Second Officer A was in the mess room when he noticed that the engine had suddenly stopped and then he heard the warning siren. When Able Seaman A reported that their vessel had collided with Vessel B and that Vessel B could be seen on the starboard stern, Second Officer A went to the stern and saw the capsized Vessel B.

While on duty in the engine control room, Chief Engineer A noticed that Vessel A was slowing down and then he heard the warning siren. Chief Engineer A called First Engineer A and had First Officer A inspect the engine room. Although no problems were found, Chief Engineer A stayed in the engine control room for a while because the engine had stopped.

2.1.3 Events on Vessel B Leading to the Accident According to the Statements of Eyewitnesses

- (1) The following events took place according to the statement of the skipper (hereafter referred to as “Skipper C”) of a fishing vessel (hereafter referred to as “Vessel C”) operating near Vessel B.

Vessel B with only the skipper (hereafter referred to as “Skipper B”) on board departed from the Ozu fishing port in Tabuse-cho, Yamaguchi Prefecture, before Vessel C departed, for trawl fishing using a Type 3 hand trawl (dredge net).

Vessel C with only Skipper C on board left the Ozu fishing port at around 05:04. After proceeding southwestward in the sea area west of Iwaishima, Vessel C arrived in the area north of the Iyo-nada recommended route at around 06:45 and started trawl fishing.

When Skipper C was preparing for the 4th hauling session, with Vessel C positioned about 2 M south of the No. 2 light buoy of the Iyo-nada route facing its bow to the

northwest, Skipper C noticed that Vessel B on the starboard bow had started hauling. About two minutes later, at around 10:13, Vessel C started hauling at around 3.8–4.0 kn in parallel with Vessel B, sailing northwestward about 200–300 m behind Vessel B on its port side.

After the accident, Skipper C realized that the course was about 302° from the track on the GPS plotter.

Skipper C turned on the GPS plotter and set the radar screen to the 1.5 M range. Skipper C thought that Vessel C would avoid Vessel B when it started hauling up the net, and he kept monitoring the fixed markers on the radar to maintain sufficient clearance from Vessel B. Skipper C continued hauling northwestward while keeping an eye on Vessel B, eventually reaching a point about 300 m from the No. 1 light buoy of the Iyo-nada route on the port side.

Skipper C saw Vessel A sailing westward near the Iyo-nada recommended route on the starboard bow. After a while, Vessel B at about 700–800 m on the starboard bow was hidden by Vessel A. When Skipper C saw Vessel B again, the vessel heavily listed with its bow turning over to starboard and its starboard stern submerging. Skipper C called Vessel B over the fishery radio. When there was no response, Skipper C informed his consorts of the situation.

At around 11:02, Skipper C thought that Vessel B had capsized.

At around 11:03, Skipper C contacted the Coast Guard Office by calling 118 on his mobile phone. When Skipper C set the clutch of the engine to neutral and started winding the trawl warp by the winch drum to go and rescue Vessel B and its crew, he saw an orange-colored LPG carrier (hereafter referred to as “Vessel D”) passing at about 300–500 m on the stern.

After Skipper C finished winding the trawl warp, he sailed for Vessel B.

Vessel B’s trawl warp sank under the water in the accident, but was subsequently found and collected.

- (2) The following events took place according to the statements of the master (hereafter referred to as “Master D”) and the chief officer (hereafter referred to as “Chief Officer D”) of Vessel D.

Vessel D departed from Tokuyama-Kudamatsu Port, Yamaguchi Prefecture, at around 09:20 on March 8. At around 11:00, when Master D handed over the navigational watch on the bridge to Chief Officer D, who had just arrived, he told the officer that the bearing of Vessel A, which was at about 2.5 M on the bow, was clearly changing. Master D then left the bridge.

After the handover of navigational watch on the bridge, Chief Officer D, while sailing off the west of Iwaishima, saw Vessel A and Vessel B sailing in the same direction. Feeling that something was wrong, Chief Officer D watched the vessels through a pair of binoculars. At around 11:01, Chief Officer D watched Vessel A and

Vessel B both sailing at the same speed and in the same direction on the starboard side, then Vessel A suddenly turned to port and at the same time Vessel B slowly started listing.

When Vessel A was at around 30° and 0.5 M on the starboard bow, Chief Officer D saw through the binoculars that Vessel A and Vessel B were not in contact with each other but that Vessel B was only several meters away from the starboard stern of Vessel A.

At around the time when Vessel A's bow was facing south, Chief Officer D saw Vessel B capsize. Chief Officer D then reported this to Master D over the inboard telephone.

Upon receiving the report, Master D went to the bridge where he saw Vessel A at around 0.5 M on the starboard beam and the capsized Vessel B close to the stern of Vessel A. Master D then had Vessel D stopped and he reported to the Coast Guard Office over the maritime telephone that Vessel A had caught the fishing gear of Vessel B and that Vessel B had subsequently capsized.

Master D saw a rescue boat being lowered from Vessel A and three crewmembers of Vessel A on the boat reaching a crewmember of Vessel B. The crewmembers were unable to lift the Vessel B crewmember onto the boat, and the boat returned to Vessel A with the crewmembers holding the Vessel B crewmember on the side of the boat.

Master D checked with the Coast Guard Office as to whether or not they would have to stay at the site of the accident. Upon receiving permission from the office, Vessel D left the site accordingly.

The accident occurred at around 11:01 on March 8, 2012, at approximately 255°, 8.4 M from the Iwaishima Lighthouse. (See Figure 2: Estimated Tracks.)

2.2 Injuries to Persons

(1) Vessel A

There were no injuries or deaths.

(2) Vessel B

Skipper B was taken to a hospital where he was pronounced dead from drowning.

2.3 Damage to Vessels

2.3.1 Vessel A

According to the diver's report, Vessel A sustained scratches to the bow and the starboard side shell plating as described below.

(1) Bow shell plating

Scraped-off paint and scratches were found on the tip of the bow near the 4 m draught mark. (See Photo 1.)



Photo 1 Scratches on the bow

(2) Starboard forward side shell plating

A scratch line was found on the starboard forward side shell plating (between frames No. 88 and No. 110). (See Photo 2.)

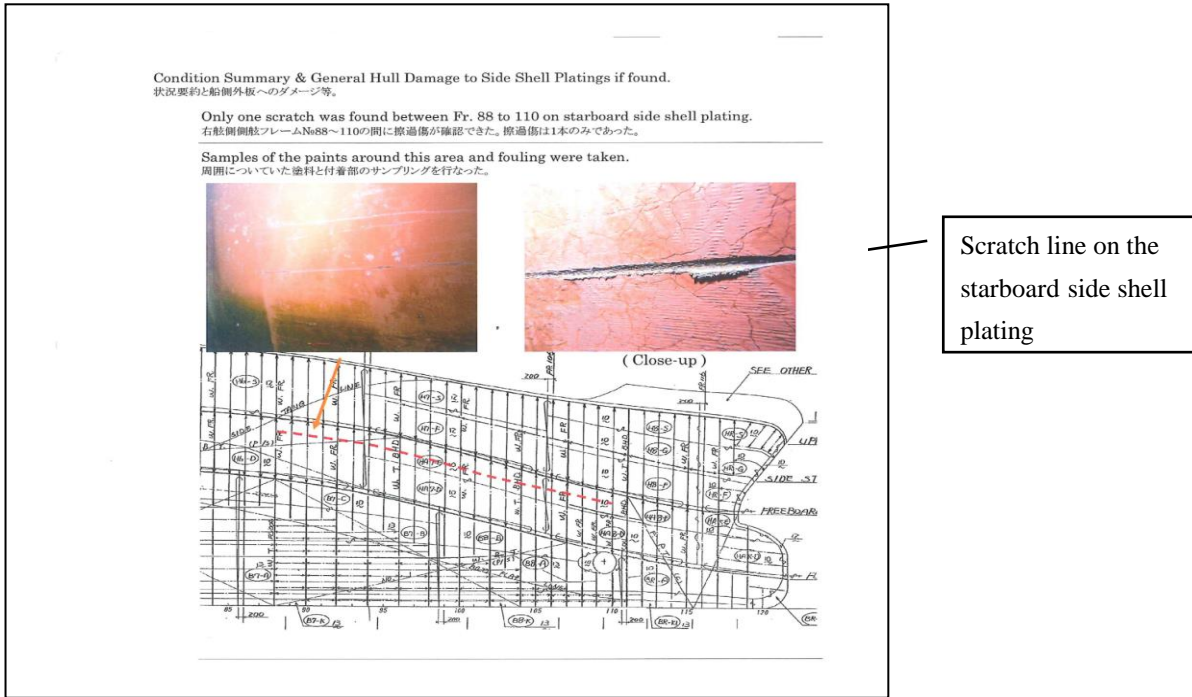


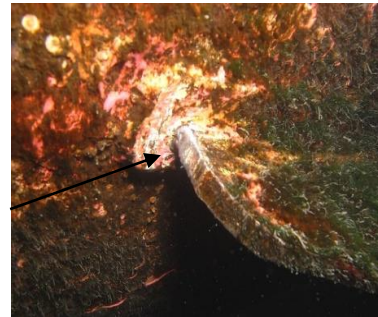
Photo 2 Scratch line on the starboard side shell plating

(3) Bilge keels

Both the starboard and port bilge keels had scratches on the front ends. (See Photo 3-1 and Photo 3-2.)



Scratches on the front end of the starboard bilge keel



Scratches on the front end of the port bilge keel

Photo 3-1 Front end of starboard bilge keel

Photo 3-2 Front end of port bilge keel

2.3.2 Vessel B

(1) Hull and shape (See Photo 4.)

The wheelhouse was found to be crushed. An hourglass-shaped shape that had been exhibited to indicate a vessel engaged in fishing operation was found deformed into a cylindrical shape.

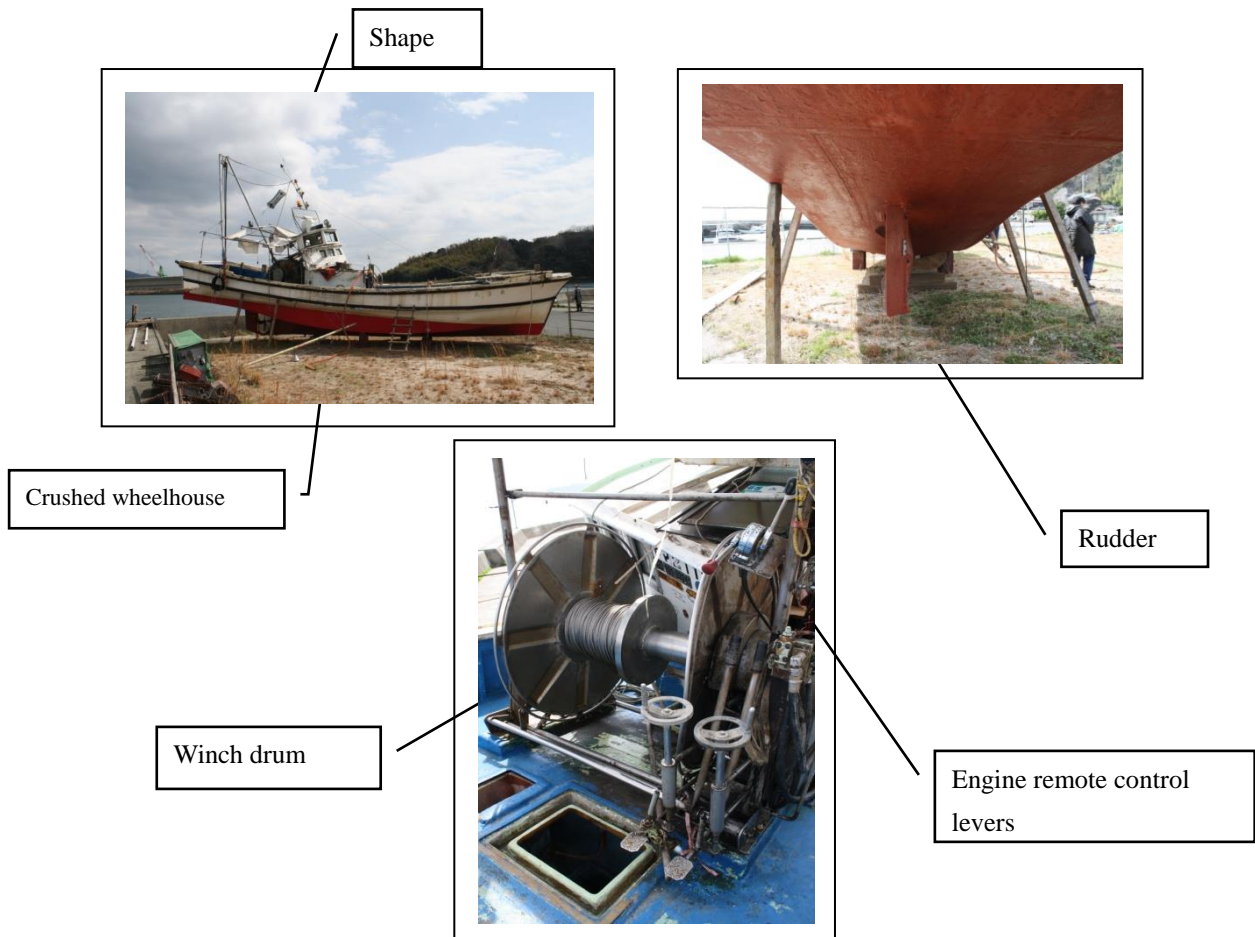


Photo 4 Salvaged Vessel B

(2) Rudder

The rudder was found turned about 18° to port.

(3) Winch drum, engine remote control levers, etc.

The right flange of the winch drum was found bent outward.

Among the engine remote control levers located on the starboard side of the winch drum, the throttle lever was in the minimum position while the clutch lever was in the astern position.

The clutch for the hydraulic pump of the winch drum was in the disengaged position.

(4) Trawl warp

Flakes of what appeared to be red paint were found adhering to the trawl warp over a length of about 20 m starting at about 82 m from the stern end. The trawl warp also had a kink at about 95 m from the stern end.

2.4 Crew Information

(1) Gender, Age, and Certificate of Competence

Master A: Male, 65 years old

Nationality: Republic of Korea

Certificate: Second Class Deck Officer Certificate (issued by the Republic of Korea)

Date of issue: April 14, 2009 (valid until April 13, 2014)

Boatswain A: Male, 48 years old

Nationality: Republic of Indonesia

Skipper B: Male, 80 years old

Certificates: First Class Boat's Operator and Personal Water Craft Operator with passenger service license

Date of issue: October 16, 1975

Date of revalidation: May 19, 2010 (valid until May 15, 2016)

(2) Major Seagoing Experience

1) Master A

The statement of Master A indicates the following.

He had served as a master for a total of 17–18 years, and had extensive experience maneuvering vessels of a similar size to Vessel A. He had served as the master of Vessel A since November 1, 2011.

He had sailed in the Seto Naikai (Inland Sea of Japan) three to four times per month.

2) Skipper B

Information on his health condition and other details at the time of the accident was not available.

2.5 Vessel Information

2.5.1 Particulars of Vessels

(1) Vessel A

IMO number:	8869701
Port of registry:	Jeju (Republic of Korea)
Owner:	SHL MARITIME CO., LTD (hereafter referred to as “Company A”) (Republic of Korea)
Management company:	Company A
Classification Society:	Korean Register of Shipping (Republic of Korea)
Gross tonnage:	1,500 tons
L×B×D:	76.00 × 11.80 × 7.15 m
Hull material:	Steel
Engine:	One diesel
Output:	1,324 kW
Propulsion:	Single 4-blade fixed-pitch propeller
Date of built:	February 23, 1993

(2) Vessel B

Fishing vessel registration number:	YG3-40947
Base port:	Tabuse-cho, Yamaguchi Prefecture
Owner:	Privately owned
Gross tonnage:	4.92 tons
L×B×D:	11.21 × 2.32 × 0.83 m
Hull material:	FRP
Engine:	One diesel
Output:	48 kW (indicated in the Power-Driven Fishing Vessel Register)
Propulsion:	Single 3-blade fixed-pitch propeller
Date of launch:	December 3, 1977

2.5.2 Loading Conditions

(1) Vessel A

According to the statement of Master A, when Vessel A left Fukuyama Port the draught was about 5.10 m at the bow and about 5.60 m at the stern.

At the on-site investigation (at around 14:30 on March 9), the draught was about 5.20 m at the bow and about 5.30 m at the stern.

(2) Vessel B

The draught and other details of Vessel B were unknown.

2.5.3 Equipment and Instruments

(1) Vessel A

1) Vessel structure

Vessel A was a two-level continuous-deck, aft-bridge cargo vessel. The distance between the steering position on the bridge and the end of the bow was approximately 59 m. There were no structures that could obstruct the lookout view.

2) Navigational equipment

A steering stand was located at the center of the forward part of the wheelhouse. Two radars were located on the port side and the engine remote control panel was located on the starboard side of the steering stand. A magnetic compass was located forward of the steering stand. A gyrocompass was integrated in the steering stand.

In the aft part of the wheelhouse, a chart table and a GPS receiver were located on the port side and the radio equipment was located on the starboard side.

3) Maneuverability

The maneuverability table for Vessel A indicates the following.

a. Engine and speed

Engine status	Full ahead	Half ahead	Slow ahead	Dead slow ahead
RPM	310	270	240	230
Speed (kn)	11	10	8	6

b. Tactical diameter

To port: About 232 m

To starboard: About 284 m

4) Others

According to the statement of Chief Officer A, although the full ahead speed of Vessel A when it was in ballast was about 11 kn, the speed was about 9.8 kn at the time of the accident as Vessel A was fully laden. There were no problems or failures with the hull, the engine or the instruments.

(2) Vessel B

1) Vessel structure

Two storage spaces and two fish holds were located in the bow section, in that order. The wheelhouse was located in the aft of the midship section while a derrick was provided on the afterdeck. Also provided on the afterdeck was a winch drum for trawling, which was divided into left and right halves by a center disc and was equipped with a flange on both sides.

2) Navigational equipment

In the wheelhouse, the following equipment was arranged from the port to starboard side: Steering system, radar, GPS plotter, and engine control panel.

2.6 Ship Maneuvering

2.6.1 Navigational Watch on the Bridge on Vessel A

According to the statement of Chief Officer A, Vessel A's watchkeeping arrangements were as follows: 04:00 to 08:00 by Chief Officer A; 08:00 to 00:00 by Master A; and 00:00 to 04:00 by Second Officer A. Master A occasionally kept watch with Boatswain A during night hours.

According to the statement of Boatswain A, while out at sea he occasionally became involved in deck work when the weather was good and kept watch on the bridge as a lookout when it was rainy.

According to the statement of Chief Engineer A, he thought that Master A was keeping watch on the bridge alone because he had instructed Boatswain A to do deck work.

2.6.2 Watchkeeping on Vessel A

- (1) The statement of Master A indicates the following.

Master A used to keep watch on the bridge with Boatswain A when the weather was bad.

He stayed alert whenever navigating in the Seto Naikai as fishing vessels were difficult to see.

He would check the course of any fishing vessel with a derrick and would navigate at least about 100 m away from its stern in order to avoid catching the trawl as that type of fishing vessel was typically hauling a trawl behind it.

- (2) The statement of Chief Officer A indicates the following.

He had previous experience in sensing danger when approached by a fishing vessel and avoiding the vessel using the daytime signal light or altering the course. He had never operated the engine and would blow the whistle whenever necessary.

- (3) According to the statement of Skipper C, he did not hear a whistle or see a daytime signal light prior to the accident.

2.6.3 Ship Maneuvering on Vessel B at the Time of the Accident

The statements of the masters (hereafter referred to as "Skipper E" and "Skipper F") of consorts indicate the following.

- (1) According to Skipper E, the indications for the clutch and throttle levers of the engine remote control on Vessel B were opposite from the actual condition, and the clutch lever was in the reverse position and the throttle lever was in H position.
- (2) According to Skipper F, to haul a trawl northwestward in the wind and tide at that time, he had to direct the bow upwind and set the rudder about 15° to port.
- (3) The clutch for the hydraulic pump of the winch drum on Vessel B that was salvaged

following the accident was in the hauling position and not in the retrieving position.

2.6.4 Fishing Operations

The statements of Skipper C, the master of a consort and the person in charge at the Yamaguchi Prefecture Fisheries Cooperative Association indicate the following.

The annual season for trawl fishing using a Type 3 hand trawl (dredge net) ran from early November to mid April.

In trawl fishing, a trawl warp about 9 mm in diameter and about 400 m long was wound on the right side of a winch drum on the quarter deck. When performing trawling, an iron frame with claws called “mangai” and a tunnel net was fitted at the end of the single trawl warp and draws out the trawl warp by about 350 m from the stern. The trawl warp was submerged under water at about 5 to 7 m from the stern and was kept taut while hauling.

A shape indicating “a vessel engaged in fishing operation” was always exhibited on the fishing vessel when performing trawling.

One trawling session normally took about one hour. At the time of the accident, there were seven consorts who were continuously communicating with each other over the fishery radio.

The operating area was between Himeshima in Himeshima-mura, Oita Prefecture, and Iwaishima, with a water depth of about 50 m, and operations were performed crossing the Iyo-nada recommended route.

2.7 Weather and Sea Conditions

2.7.1 Weather Observation Data

(1) Observations recorded around the time of the accident by the Kudamatsu Regional Meteorological Observation Station located about 16 M north of the site of the accident are as follows:

At 10:00: Wind direction: WSW, wind velocity: 0.4 m/s

At 11:00: Wind direction: SW, wind velocity: 1.4 m/s

(2) According to the seawater temperature information based on earth observation satellite images posted on the website of the Hydrographic and Oceanographic Department of the 6th Regional Coast Guard Headquarters, the water temperature around the site of the accident in the Seto Naikai in March 2012 was below 10°C.

(3) According to the estimated tidal current in the coastal areas of the Seto Naikai posted on the website of the Hydrographic and Oceanographic Department of the 6th Regional Coast Guard Headquarters, the current direction and velocity around the site and time of the accident was 1.0 to 2.0 kn southeast.

2.7.2 Observations by Crew

According to the statements of Master A and Master D, the weather and sea conditions around the site and time of the accident were as follows.

(1) Master A

It was cloudy. Neither the tide nor the wind had a noticeable impact on navigation. Visibility was around 3–4 M. Wave height was around 0.5 m.

(2) Master D

The weather was fine, with a northwesterly wind. Visibility was around 4–5 M. Wave height was around 0.5 m.

2.8 Safety Management of Vessel A

The statement of the person in charge from Company A indicates the following.

Vessel A's primary service routes were between ports in Japan and those in the Republic of Korea, carrying steel coils and sheet iron from Fukuyama Port and Mizushima Port in Kurashiki, Okayama Prefecture, to Ulsan Port and Masan Port, and returning to Japan in ballast.

As Company A has established a safety management system that meets the requirements of the ISM Code^{*2}, the Korean Register of Shipping issued a Document of Compliance to the company. In addition, Vessel A received a Safety Management Certificate from the Korean Register of Shipping.

Company A gathers information on ports and Seto Naikai routes and provides this information to the vessels under its management.

Company A provides safety management education to the crew of Vessel A on the occasion of its calls, around four times per month, to Korean ports.

(1) Document of Compliance

Issued by: Korean Register of Shipping

Date of issue: April 27, 2007

Valid until: April 26, 2012

(2) Safety Management Certificate

Issued by: Korean Register of Shipping

Date of issue: June 21, 2011

Valid until: June 20, 2016

2.9 Analysis of Paint Samples for Components

The identification test performed by Analysis Center Co., Ltd. on the paint samples that

^{*2}The ISM Code (International Management Code for the Safe Operation of Ships and for Pollution Prevention) was adopted by the International Maritime Organization (IMO) on November 4, 1993 to provide an international standard for the safe management and operation of ships and for pollution prevention to protect the marine environment. The code was incorporated in the annex to SOLAS in 1974 and, following the amendments to SOLAS in 1994, came into effect on July 1, 1998. The code applies to all passenger ships and other vessels with a gross tonnage of 500 or more that engage in international voyage.

were found adhering to Vessel A’s hull and of the flakes of paint that were found adhering to Vessel B’s trawl warp (hereafter referred to as “the Wire”) led to the following conclusions.

Infrared spectroscopy is a method based on a material’s absorption of infrared rays. The infrared ray absorption characteristic, or IR spectrum, is specific to each component. The IR spectrum can be visualized as a graph. By comparing the waveforms of the graphs, it can be determined whether or not the materials being compared are identical.

Using this technique, the IR spectra of the paint samples were compared. The comparison showed that the IR spectral shape of the “red material adhering to the Wire” positively matched that of the primary red layer of the “starboard side shell plating paint – near the damaged part.” This means that the “red material adhering to the Wire” and the primary red layer of the “starboard side shell plating paint – near the damaged part” are of the same type of material, as shown in Table 1.

On the other hand, the IR spectral shape of the “reddish brown material adhering to the Wire” did not match any of Vessel A’s paint samples. This means that the “reddish brown material adhering to the Wire” is different from any of the “bow hull bottom paint – near the damage” and “starboard side shell plating paint – near the damaged part.”

Table 1 Results of identification test

<i>Material adhering to the Wire</i>		<i>Reddish brown material</i>	<i>Red material</i>
<i>Vessel A’s paint</i>			
<i>Bow hull bottom paint – near the damage</i>	<i>Brown layer</i>	<i>Different</i>	<i>Different</i>
<i>Starboard side shell plating paint – near the damaged part</i>	<i>Brown layer</i>	<i>Different</i>	<i>Different</i>
	<i>Primary red layer</i>	<i>Different</i>	<i>Identical</i>
	<i>Pale red layer</i>	<i>Different</i>	<i>Different</i>
	<i>Secondary red layer</i>	<i>Different</i>	<i>Different</i>

2.10 Rescue Operation

The statements of Chief Officer A, Second Officer A and Chief Engineer A indicate the following.

At around 11:20, acting on the order from Master A, Chief Officer A lowered a rescue boat on the port side and had Second Officer A, First Engineer A and Able Seaman A ride on the boat.

In the area around the capsized Vessel B, Vessel D and three or four other fishing vessels were searching for Skipper B.

Through a pair of binoculars, Chief Officer A spotted a person who was not moving and just

floating, about 20 m from Vessel B. Over a transceiver, Chief Officer A guided the rescue boat to rescue the person (Skipper B).

About an hour after Vessel A's engine was stopped, Skipper B was brought onto Vessel A. Skipper B was then transferred to a patrol boat, which had joined the rescue operation, and was taken to Tokuyama-Kudamatsu Port.

Skipper B was wearing a green jumper and glasses, but was not wearing a life jacket.

Vessel A stayed drifting near the site of the accident until around 16:00, after which it entered Tokuyama-Kudamatsu Port at around 19:55 and anchored there.

2.11 Information on the Area

According to the Japan-Marine Accident Risk and Safety Information System^{*3} offered on the Japan Transport Safety Board website, in the area (where this accident occurred) near Iyo-nada between Iwaishima and Himeshima, the Iyo-nada recommended route meets the Heigun Channel and then connects to the Suo-nada recommended route. The area is also an operations area for trawl fishing. Between 1989 and 2011, a total of 66 collision accidents occurred in this area, including 25 that involved foreign vessels.

3 ANALYSIS

3.1 Situation of the Accident Occurrence

3.1.1 Course of Events

Considering the descriptions in 2.1, 2.3.2 (3), 2.6.3 and 2.6.4, it is probable that the course of events leading up to the occurrence of the accident was as follows.

(1) Vessel A

- 1) At around 09:20 on March 8, 2012, off the south of Yashima, Vessel A altered the course, setting the autopilot to about 282°, and sailed full ahead at about 9.3–9.5 kn.
- 2) At around 10:35, Master A had a stomachache and left the bridge for the toilet after confirming on the radar screen that there were no vessels in the area.
- 3) When Master A returned to the bridge and saw Vessel B about 70 m on the starboard bow, he turned the rudder hard to port and stopped the engine. However, at around 11:01, Vessel A collided with the fishing gear of Vessel B off the west of Iwaishima.

(2) Vessel B

- 1) On March 8 at around 05:04, Vessel B with only Skipper B on board departed from the Ozu fishing port for fishing grounds off the west of Iwaishima.

^{*3}The Japan-Marine Accident Risk and Safety Information System is a web-based service provided by the Japan Transport Safety Board, offering information on marine accidents and navigation safety on a world map. URL: <http://jtsb.mlit.go.jp/hazardmap/>

- 2) At around 10:11, south of the No. 2 light buoy of the Iyo-nada route, Vessel B exhibited a shape indicating “a vessel engaged in fishing operations” and started trawling at around 3.8–4.0 kn sailing west-northwestward.
- 3) While Vessel B was trawling west-northwestward, its fishing gear collided with the bow of Vessel A and Vessel B capsized.

3.1.2 Date, Time and Location of the Accident

Considering the descriptions in 2.1.1 and 2.1.3, it is probable that the accident occurred at around 11:01 on March 8, 2012, approximately 255° and 8.4 M from the Iwaishima Lighthouse.

3.1.3 Injuries to Persons

The descriptions in 2.2 and 2.10 indicate the following.

- (1) There were no injuries or deaths on Vessel A.
- (2) Skipper B died by drowning.

It is probable that Skipper B was not wearing a life jacket.

3.1.4 Damage to Vessels

As described in 2.3 and 2.9, it is probable that Vessel A suffered scratches to the bow, the starboard side shell plating and the front ends of the bilge keels, while Vessel B capsized and its wheelhouse was crushed.

3.2 Causal Factors of the Accident

3.2.1 Crew and Vessel

(1) Crew

The descriptions in 2.1.2, 2.2 and 2.4 indicate the following.

- 1) Master A held a legal and valid certificate of competence.
- 2) Skipper B held a legal and valid certificate for boat's operator.

As Skipper B was killed in the accident, his health condition at the time could not be ascertained.

(2) Vessel

The descriptions in 2.1.3 and 2.5.3 indicate the following.

- 1) It is probable that at the time of the accident, Vessel A had no problems or failures with its hull, the engine or the equipment.

There were no structures on the deck that would have obstructed the lookout view.

- 2) It is somewhat likely that at the time of the accident, Vessel B had no problems or failures with its hull or the engine.

3.2.2 Weather and Sea Conditions

Based on the descriptions in 2.7, it is probable that at the time of the accident, the weather was fine with a northwesterly wind, the wave height was around 0.5 m or lower, visibility was around 4 to 5 M, and there was a southeastward current of 1.0 to 2.0 kn.

3.2.3 Watchkeeping and Lookout

The descriptions in 2.1.2, 2.3.2, 2.6.1 and 2.6.2 indicate the following.

(1) Vessel A

- 1) It is probable that Master A was on the bridge watch duty alone, that at around 09:20 off the south of Yashima, he altered the course, setting the autopilot to about 282° along the Iyo-nada recommended route, and that he then sailed full ahead, keeping a lookout using binoculars while changing the radar range scale between 3 M and 6 M as necessary.
- 2) It is probable that Master A did not keep a lookout because he left the bridge for the toilet due to a stomachache at around 10:35 after confirming on the radar screen that there were no vessels in the area.
- 3) It is probable that at around 11:00, Master A returned to the bridge, saw Vessel B about 70 m on the starboard bow, then turned the rudder hard to port and stopped the engine.

(2) Vessel B

- 1) It is probable that Skipper B was engaged in fishing operations while maneuvering Vessel B.
- 2) It is probable that at around 10:11, south of the No. 2 light buoy of the Iyo-nada route, Skipper B started trawling at around 3.8–4.0 kn sailing west-northwestward. It is somewhat likely that Vessel B continued sailing while maintaining the same course and speed until the collision.
- 3) As described in 2) above, it is somewhat likely that Vessel B continued sailing while maintaining the same course and speed until the collision. It was not possible, however, to determine the exact course of events leading to the accident because Skipper B was killed in the accident.

3.2.4 Occurrence of the Accident

The descriptions in 2.1, 2.3, 2.5.2, 2.6.3, 2.6.4 and 3.1.1 indicate the following.

(1) Vessel A

- 1) It is probable that Master A was on the bridge watch duty alone; that at around 09:20 on March 8, off the south of Yashima, he altered the course, setting the autopilot to about 282° along the Iyo-nada recommended route; and that he then sailed full ahead at about 9.3–9.5 kn.
- 2) It is probable that at around 10:35, Master A had a stomachache and left the

bridge for the toilet after confirming on the radar screen that there were no vessels in the area.

- 3) It is probable that at around 11:00, Master A returned to the bridge, saw Vessel B around 70 m on the starboard bow, then turned the rudder hard to port and stopped the engine.
 - 4) It is probable that Master A made the maneuvers as described in 3) above, but that, as he had earlier left the bridge while on watch duty, Vessel A's bow nonetheless collided with the trawl warp extending from the stern of Vessel B.
- (2) Vessel B
- 1) It is probable that Skipper B, the only person on board Vessel B, was engaged in fishing operations while maneuvering the vessel.
 - 2) It is probable that at around 10:11, south of the No. 2 light buoy of the Iyo-nada course, Skipper B started trawling at around 3.8–4.0 kn sailing west-northwestward. It is somewhat likely that Vessel B continued sailing while maintaining the same course and speed until the collision.
 - 3) It is probable that Vessel B's trawl warp collided with Vessel A because Vessel B kept trawling while maintaining the same course and speed until the collision.

4 CONCLUSIONS

It is somewhat likely that this accident occurred off the west of Iwaishima while Vessel A was proceeding westward and Vessel B was trawling west-northwestward, because Master A left the bridge while on watch duty and Vessel B maintained the same course and speed, and the bow of Vessel A collided with the trawl warp of Vessel B.

It is probable that Master A left the bridge while on watch duty to go to the toilet due to a stomachache.

5 SAFETY ACTIONS

It is somewhat likely that this accident occurred off the west of Iwaishima while Vessel A was proceeding westward and Vessel B was trawling west-northwestward, because Master A left the bridge while on watch duty and Vessel B maintained the same course and speed, and the bow of Vessel A collided with the trawl warp of Vessel B.

It is probable that Master A left the bridge while on watch duty to go to the toilet due to a stomachache.

In the area (where this accident occurred) near Iyo-nada between Iwaishima and Himeshima, the Iyo-nada recommended route meets the Heigun Channel and then connects to the Suo-nada

recommended route. The area is also an operations area for trawl fishing. According to the Japan-Marine Accident Risk and Safety Information System by the Japan Transport Safety Board, the total number of collision accidents in this area between 1989 and 2011 was 66, among which 25 involved foreign vessels.

Therefore, the following actions are required to help prevent similar accidents.

- (1) While underway, the bridge must not be left unattended in any circumstances, and the bridge watch must be maintained keeping a proper lookout at all times.

The skipper of a fishing vessel must keep a proper lookout and take such action as will best aid to avoid collisions by observing the stipulations in Article 17 of the Act on Preventing Collision at Sea.

- (2) Any person alone onboard a fishing vessel must, as much as possible, wear a life jacket at all times including when the vessel is not engaged in fishing operations.
- (3) The crew of any vessel navigating in the area of this accident must grasp the area's traffic conditions including by accessing the Japan-Marine Accident Risk and Safety Information System website, and take appropriate collision avoidance measures such as providing instructions to those responsible for navigational watch on the bridge.

Figure 1 Vessel A's Track According to AIS Records

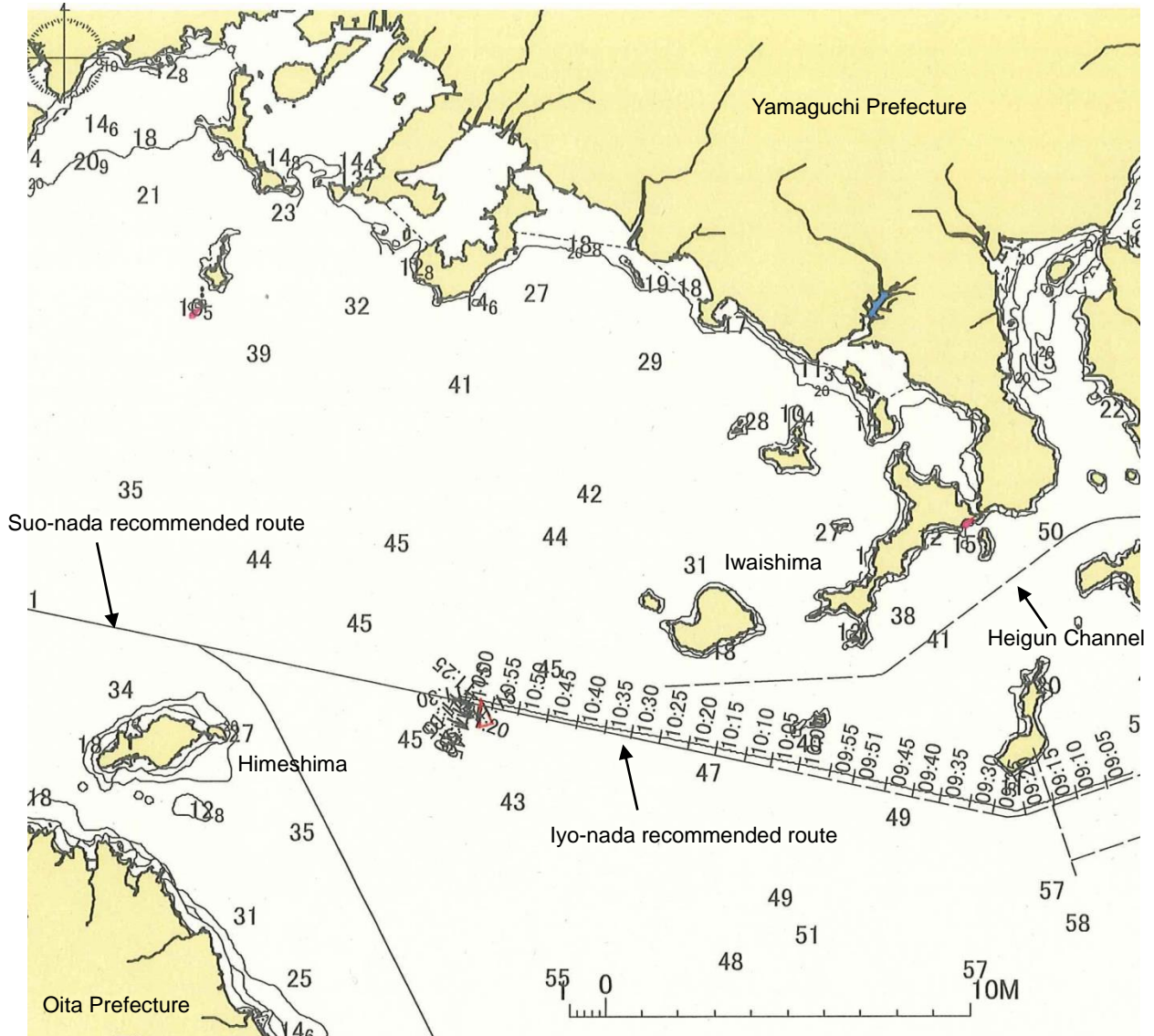


Figure 2 Estimated Tracks

