

MA2014-5

**MARINE ACCIDENT
INVESTIGATION REPORT**

May 30, 2014



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: Container ship KOTA DUTA

IMO number: 9483487

Gross tonnage: 6,245 tons

Vessel type and name: Cargo ship TANYA KARPINSKAYA

IMO number: 7504433

Gross tonnage: 2,163 tons

Accident type: Collision

Date and time: 16:22, February 7, 2012 (local time, UTC+9 hours)

Location: Port of Niigata Higashi Ku, Niigata City, Niigata Prefecture
Vicinity of 180° true, 4,900m from Port of Niigata Higashi Ku
West Breakwater Lighthouse
(approximately 37° 58.5' N, 139° 13.9'E)

May 8, 2014

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 >

Container ship KOTA DUTA was leaving West Wharf No.3 Quay in Port of Niigata Higashi Ku, Niigata City, Niigata Prefecture with a master and 24 crew members onboard, while cargo ship TANYA KARPINSKAYA was navigating toward the South Wharf within the same section after leaving the Central Wharf East Quay within the same section with a master and 16 crew members onboard (Although there were 18 crew members total, one of the crew members was driving to the South Wharf with the personnel in charge of the ship's agent for handling lines), when KOTA DUTA's bow and TANYA KARPINSKAYA's forward starboard side collided at approximately 16:22 on February 7, 2012, where the passages crossed.

Although TANYA KARPINSKAYA foundered, all of the crew members were rescued. KOTA DUTA suffered damage to the bow, but there were no casualties.

<Probable Causes >

It is probable that this accident occurred because the vessels collided with each other due to the facts that the master of KOTA DUTA and the master of TANYA KARPINSKAYA agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after the master of KOTA DUTA put the helm hard to port and the master of TANYA KARPINSKAYA put the helm to port at 15° in an attempt to execute the agreement, and that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while KOTA DUTA was proceeding northeast after leaving the West Wharf No.3 Quay and while TANYA KARPINSKAYA was proceeding south-southeast from the Central Wharf East Quay toward the South Wharf in Port of Niigata Higashi Ku.

It is probable that the reason the master of KOTA DUTA agreed to the conduct of vessel for both vessels to turn to port to pass on the starboard side via VHF was that the master of KOTA DUTA was convinced that TANYA KARPINSKAYA was going to pass on the starboard side due to the facts that the master of TANYA KARPINSKAYA re-confirmed to pass on the starboard side, that TANYA KARPINSKAYA was strongly stating "starboard to starboard" via VHF, that he felt that the report by the former master of KOTA DUTA had a strong tone, saying "starboard to starboard," and that the former master of KOTA DUTA, who was on

board to hand over the master position, and the master of TANYA KARPINSKAYA were stating “starboard to starboard.”

It is probable that the reason the master of TANYA KARPINSKAYA agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF was that the master of TANYA KARPINSKAYA offered the conduct of vessel to pass on the starboard side due to the facts that there was not enough distance and time to judge the conduct of vessel when they were called by KOTA DUTA via VHF to inquire about TANYA KARPINSKAYA’s name in Russian, that it was easy for TANYA KARPINSKAYA to alter to port due to the large area of waters on the port side of TANYA KARPINSKAYA, and that he believed it would be safer if the two vessels’ courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing KOTA DUTA would turn to port.

It is somewhat likely that the fact it took approximately 20 seconds to agree on the conduct of vessel contributed to the occurrence of this accident due to the facts that the master of KOTA DUTA and the master of TANYA KARPINSKAYA took approximately 20 seconds to agree on the conduct of vessel, that the vessels had approached each other to the distance of approximately 600m, and that they had no time to take actions to avoid collision when the vessels further approached each other in the situation that was different from the agreed conduct of vessel in which they could not recognize any change in the other vessel’s heading when they tried to take actions to execute this agreement.

<Recommendations >

○ Safety recommendation

1 Safety Recommendations for PACIFIC INTERNATIONAL LINES LIMITED

It is probable that this accident occurred because KOTA DUTA and TANYA KARPINSKAYA collided with each other due to the facts that the master of KOTA DUTA and the master of TANYA KARPINSKAYA agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after the master of KOTA DUTA put the helm hard to port and the master of TANYA KARPINSKAYA put the helm to port at 15° in an attempt to execute the agreement, and that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while KOTA DUTA was proceeding northeast after leaving the West Wharf No.3 Quay and while TANYA KARPINSKAYA was proceeding south-southeast from the Central Wharf East

Quay toward the South Wharf in Port of Niigata Higashi Ku.

It is probable that the master of KOTA DUTA agreed to the conduct of vessel, believed that TANYA KARPINSKAYA would execute the contents agreed to via VHF despite the difference between the anticipated actions of TANYA KARPINSKAYA according to the master of KOTA DUTA and the actual actions, and continued to approach in the situation in which he could not recognize any change in the heading due to the fact that he was convinced that TANYA KARPINSKAYA was going to pass on the starboard side due to the facts that TANYA KARPINSKAYA re-confirmed to pass on the starboard side, that TANYA KARPINSKAYA was strongly stating “starboard to starboard” via VHF, that he felt that the report by the former master of KOTA DUTA had a strong tone, saying “starboard to starboard,” and that the former master of KOTA DUTA, who was on board to hand over the master position, and the master of TANYA KARPINSKAYA were stating “starboard to starboard.”

It is probable that the former of KOTA DUTA did not tell the master of KOTA DUTA that it would be safer for KOTA DUTA to stop without changing the course and observe the movements of TANYA KARPINSKAYA in order to avoid collision with TANYA KARPINSKAYA due to the fact that PACIFIC INTERNATIONAL LINES LIMITED had not specified supernumeraries as members of the bridge team.

Third officer of KOTA DUTA set the radar range scale to 0.5M at the time of departure stand-by and changed the range scale to 0.75M when he recognized the image of TANYA KARPINSKAYA on the edge of the 0.5M radar display during navigation. However, it is probable that he could have reported the information of TANYA KARPINSKAYA to the master before the master of KOTA DUTA recognized the said vessel if he had correctly understood BRM contents and items necessary to ensure safety navigation, such as detecting information on nearby vessels underway as early as possible by changing to a long distance range scale.

Due to this, the Japan Transport Safety Board recommends PACIFIC INTERNATIONAL LINES LIMITED to take the following measures to ensure safety during navigation in view of the results of this accident investigation.

- (1) Consider that supernumeraries are part of the bridge team if they are practically involved in maneuvering.
- (2) Instruct crew members of vessels belonging to PACIFIC INTERNATIONAL LINES LIMITED and vessels under their management to conduct BRM education and training by learning from this accident case so that those on watch on the bridge can collect safety-related information on radar and other equipment and proactively provide it to the person conning the vessel.

- (3) Instruct officers of vessels belonging to PACIFIC INTERNATIONAL LINES LIMITED and vessels under their management to prepare for departure and keep look-out while correctly understanding items necessary to ensure safety navigation, such as detecting information on nearby vessels underway as early as possible by changing the radar range scale and conduct education by learning from this accident case when visiting the vessels.
- (4) Have masters of vessels belonging to PACIFIC INTERNATIONAL LINES LIMITED and vessels under their management re-acknowledge the following risks of using VHF by using this accident case and promote awareness by establishing items to reconfirm the risks of using VHF in a checklist to be used to navigate in narrow channels and congested waters.
 - (i) It is possible that two vessels approach each other and have no time to take actions to avoid collision in case the agreement is not executed if those persons conning the two vessels take time to agree on the conduct of vessel and the vessels navigate in the original course at the original speed during that time.
 - (ii) It is possible that those persons conning the vessels would believe that the other vessel would execute the contents to which they had agreed via VHF even if there is a difference between the anticipated actions of the other vessel according to the person conning the vessel and the actual actions after agreeing on the conduct of vessel and lose the opportunity to take actions to avoid collision.

2 Safety Recommendations for EAST WAY LLC

It is probable that this accident occurred because KOTA DUTA and TANYA KARPINSKAYA collided with each other due to the facts that the master of KOTA DUTA and the master of TANYA KARPINSKAYA agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after the master of KOTA DUTA put the helm hard to port and the master of TANYA KARPINSKAYA put the helm to port at 15° in an attempt to execute the agreement, that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while KOTA DUTA was proceeding northeast after leaving the West Wharf No.3 Quay and while TANYA KARPINSKAYA was proceeding south-southeast from the Central Wharf East Quay toward the South Wharf in Port of Niigata Higashi Ku.

It is probable that the master of TANYA KARPINSKAYA offered the conduct of vessel to

pass on the starboard side due to the facts that it was easy for TANYA KARPINSKAYA to alter to port due to the large area of waters on the port side of TANYA KARPINSKAYA when they were called by KOTA DUTA via VHF to inquire about TANYA KARPINSKAYA's name in Russian, that he believed it would be safer if the two vessels' courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing KOTA DUTA would alter to port, believed that KOTA DUTA would execute the contents agreed via VHF despite the fact that there was a difference between the anticipated actions of KOTA DUTA according to the master of TANYA KARPINSKAYA and the actual actions due to the agreement of the conduct of vessel made between the two vessels, and continued to approach the other vessel in the situation in which he could not recognize any change in the heading.

It is somewhat likely that the master of TANYA KARPINSKAYA could have learned the existence and movements of KOTA DUTA 2-3 minutes before sighting it and taken measures to avoid the situation in which the two vessels approached each other where the passages crossed by decelerating and other means if the master or chief officer of TANYA KARPINSKAYA had carefully observed the radar display and commenced systematic analysis.

Due to this, the Board recommends EAST WAY LLC. to take the following measures to ensure safety while underway in view of the results of this accident investigation

- (1) Instruct masters and deck officers of vessels belonging to EAST WAY LLC. and vessels under their management to carefully observe radar displays while underway to commence systematic analysis and conduct education by learning from this accident case when visiting the vessels.
- (2) Notify masters and deck officers of vessels belonging to EAST WAY LLC. and vessels under their management to recognize the following risks of using VHF by learning from this accident case. In addition, if they have checklists used to navigate in narrow channels and congested waters, promote awareness by establishing items to reconfirm the risks of using VHF.
 - (i) It is possible that two vessels approach each other and have no time to take actions to avoid collision in case the agreement is not executed if those persons conning the two vessels take time to agree on the conduct of vessel and the vessels underway in the original course at the original speed during that time.
 - (ii) It is possible that those persons conning the vessels would believe that the other vessel would execute the contents to which they had agreed via VHF even if there is a difference between the anticipated actions of the other vessel according to the person conning the vessel and the actual actions after agreeing on the conduct of vessel and lose the opportunity to take actions to avoid collision.

Main abbreviations used in this report are as follows:

AIS	: Automatic Identification System
ARPA	: Automatic Radar Plotting Aids
BRM	: Bridge Resource Management
ECDIS	: Electronic Chart Display and Information System
GPS	: Global Positioning System
IMO	: International Maritime Organization
ISM	: International Safety Management
SMS	: Safety Management System
SOLAS	: International Convention for the Safety of Life at Sea
STCW	: International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
VDR	: Voyage Data Recorder
VHF	: Very High Frequency

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1 PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Accident

Container ship KOTA DUTA was leaving West Wharf No.3 Quay in Port of Niigata Higashi Ku, Niigata City, Niigata Prefecture with a master and 24 crew members onboard, while cargo ship TANYA KARPINSKAYA was navigating toward the South Wharf within the same section after leaving the Central Wharf East Quay within the same section with a master and 16 crew members onboard (Although there were 18 crew members total, one of the crew members was driving to the South Wharf with the personnel in charge of the ship's agent for handling lines), when KOTA DUTA's bow and TANYA KARPINSKAYA's forward starboard side collided at approximately 16:22 on February 7, 2012, where the passages crossed.

Although TANYA KARPINSKAYA foundered, all of the crew members were rescued. KOTA DUTA suffered damage to the bow, but there were no casualties.

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 February 7, 2012.

1.2.2 Collection of Evidence

On-site investigation and interviews on February 8 and 21, 2012

Interviews on February 9 to 11, 25 and 26, March 2, December 4 and 6, 2012

Collections of written replies to questionnaire on March 12, 15 and 21 to 23, 2012

On-site investigation and interviews on May 3, 2012

Interviews and collections of written replies to questionnaire on December 5, 2012

1.2.3 Opinions of Parties Relevant to the Cause

Opinions on the draft report were invited from parties relevant to the cause.

1.2.4 Comments from Flag State

Comments on the draft report were invited from the flag State of KOTA DUTA and the flag State of TANYA KARPINSKAYA.

2 FACTUAL INFORMATION

2.1 Events Leading to the Accident

2.1.1 Progress of Navigation of KOTA DUTA according to the Records of Voyage Data Recorder

According to the audio recording of the voyage data recorder*¹ (hereinafter referred to as “VDR”) of KOTA DUTA (hereinafter referred to as “Vessel A” with the exception of Chapter 6 below), the progress of navigation of KOTA DUTA was as follows. In addition, repetitions of wheel orders by the master of Vessel A (hereinafter referred to as “Master A” with the exception of Chapter 6 below) will be omitted. Voices by Master A, master (hereinafter referred to as “Master B” with the exception of Chapter 6 below) of TANYA KARPINSKAYA (hereinafter referred to as “Vessel B” with the exception of Chapter 6 below), and Vessel A’s former master (hereinafter referred to as “Ex-master A” with the exception of Chapter 6 below) are recorded. English translation for the conversations in Russian is recorded in Italics.

Time	Master A	Ex-master A	Master B
16:13:21	Very good, hard starboard.		
16:15:32	Dead slow ahead.		
16:16:24	Starboard 20.		
16:16:35	Starboard 10.		
16:16:46	Midships.		
16:17:54	Port 5.		
16:18:21		A small ship is coming.	
16:18:27	She is moving very slower ...		
16:18:37		...This is Russian vessel.	
16:18:43		Yes, this is Russian vessel.	
16:18:51	Slow ahead.		
16:19:00	Midships.		

*¹ "VDR: Voyage Data Recorder" refers to a device which records not only voyage data on navigation, such as position, course (heading and course over the ground), speed over the ground, and radar information, etc., but also VHF radio telephone communications as well as sound from the bridge, etc. within capsules that can be retrieved.

16:19:24		Tanya Karpinskaya	
16:19:25	Tanya was ..., why she was coming here.		
16:19:33		<i>Tatiana Karpinskaya, Kota Duta.</i>	
16:19:35			<i>Kota Duta, Karpinskaya. We'll turn a little to port; let's pass starboard to starboard. We are going to the Lumber wharf (South wharf).</i>
16:19:44		<i>Do you want to pass starboard to starboard? Wait!</i>	
16:19:47			<i>Yes, we are going to the Lumber wharf. Pass starboard to starboard! Turn now, and we will turn port.</i>
16:19:48		She wants to starboard to starboard, she wants.	
16:19:51	Starboard to starboard?		
16:19:52		Yes, she makes to port, so you attention.	
16:19:56	OK...		
16:19:58		OK, you make, <i>Turn to port and we will pass starboard to starboard.</i>	
16:19:59	Hard port		
16:20:03			<i>Yes, we are turning to port.</i>
16:20:05		<i>OK, we will turn to port and pass starboard to</i>	

		<i>starboard.</i>	
16:20:09		She wants to starboard to starboard...	
16:20:18	Dead slow ahead.		
16:20:24		Very fast.	
16:20:26		Cannot, cannot, can damage.	
16:20:28			<i>Have you started turning?</i>
16:20:30	Midships.		
		Midships.	
16:20:32	You tell him that port to port.		
16:20:35		<i>Port to port! We can only pass port to port! It's impossible to pass starboard to starboard.</i>	
16:20:38			<i>We have already begun turning to port so we will pull hard to port and turn to port.. You turn to port, too. Let's pass starboard-to-starboard; it's too late (to change).</i>
16:20:42	Bow, full to port ...		
16:20:44		Yah	
16:20:45	Stop engine.		
16:20:47		Bow, full to port.	
16:20:48	Bow, full to port, yes.		
16:20:54	Stop engine, already? (Master A received a report "No working, sir.")		

	immediately after this from someone other than Ex-master A)		
16:20:54			<i>I am stopping and reversing.</i>
16:20:59		She is moving to astern.	
16:21:04		Full astern, full astern.	
16:21:07	Full astern.		
16:21:12			<i>I am stopping and reversing.</i>
16:21:13		Full astern.	
16:21:15	Astern? Working astern?		
16:21:19		Wow, wow.	
16:21:26	Full astern.		
16:21:31			<i>Kota Duta! I am reversing; you turn hard to starboard.</i>
16:21:37		Wow.	
16:21:59	How engine still no working?		
16:22:02	Why?		
16:22:10		Stop engine and start running.	
16:22:24	I know.		
16:22:44			Niigata Coast Guard radio, Niigata Coast Guard radio, motor vessel, Tanya Karpinskaya. I need a help, I need a ... assistance. ...help ... now, container vessel, I need a ...assistance, sir.

2.1.2 Events Leading to the Accident according to the statements of Crews and others

(1) Vessel A

According to the statements of Master A, Ex-master A, Chief Officer (hereinafter referred to as “Chief Officer A”), Second Officer (hereinafter referred to as “Second Officer A”), Third Officer (hereinafter referred to as “Third Officer A”), Helmsman (hereinafter referred to as “Helmsman A”), and an apprentice officer, it was as follows.

(i) Before entering Port of Niigata Higashi Ku

Vessel A anchored off the southern coast of Sado Island, Niigata Prefecture on February 6, 2012, with Master A and 24 crew members onboard in order to adjust the time to enter Port of Niigata Higashi Ku. Vessel A heaved up anchors at approximately 06:30 on February 7 and headed to Port of Niigata Higashi Ku. After entering Port of Niigata Higashi Ku, Vessel A stopped the engine and proceeded at the speed of approximately 2-4 kn (speed over the ground. The same hereinafter.) while underway in the dredged passage (hereinafter referred to as “the Dredged Passage” with the Central Wharf East Quay on the port side. Master A and Ex-master A sighted a Russian vessel, which was berthed port side alongside the Central Wharf East Quay, with used cars on the deck.

Ex-master A was replaced the master position with Master A after leaving Port of Shanghai in the People's Republic of China on February 2 according to the instructions by the management company PACIFIC INTERNATIONAL LINES LIMITED (hereinafter referred to as “Company A”) of Vessel A. However, he continued to board the vessel as a supernumerary in order to hand over the master position and observed the ship maneuvering skills of Master A entering or leaving ports without tug assistance.

Vessel A berthed starboard side alongside at West Wharf No.3 Quay at approximately 08:18 and conducted cargo-loading.

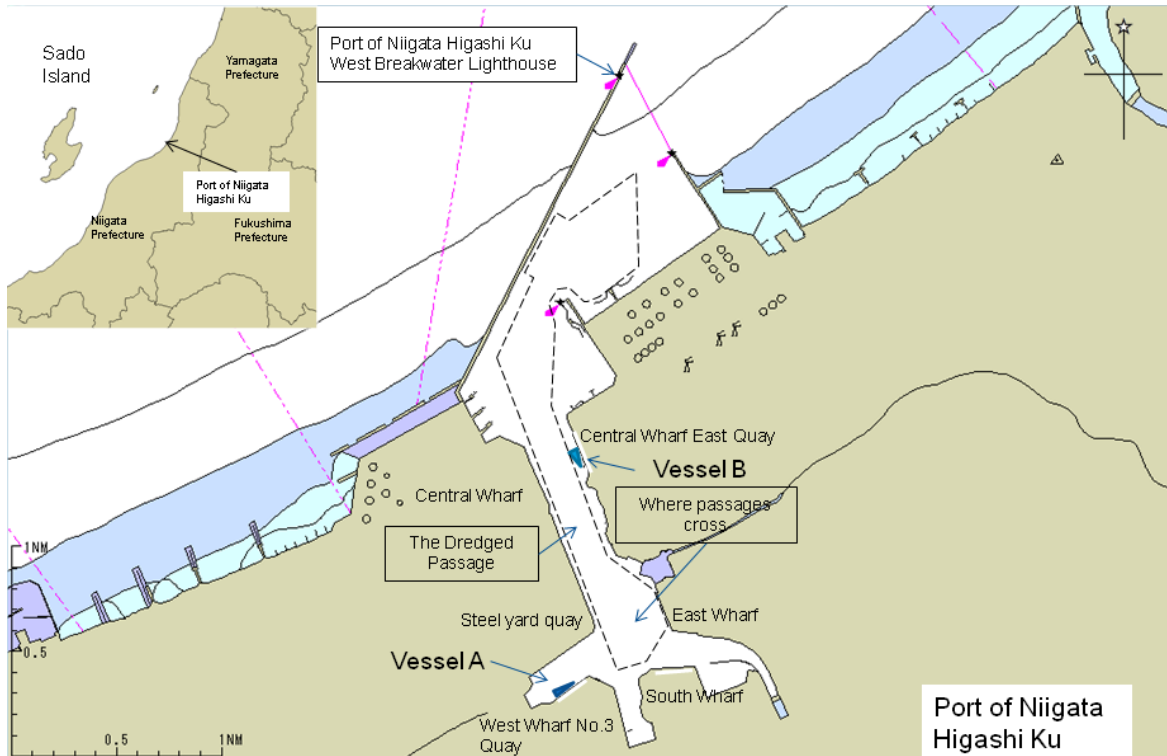


Figure 2.1-1 Port of Niigata Higashi Ku

(ii) Progress of the Events from Departure Stand-by to When Vessel B was Noticed

Third Officer A and a radio operator operated all of the navigation equipment and steering gear such as radars according to the SMS (safety management system) manual at approximately 15:00 on 7th and tested the steam horn and other apparatus.

Vessel A completed cargo-loading at approximately 16:00. The fore draught was approximately 5.25m and aft draught approximately 5.95m, and the vessel was almost half-loaded.

Master A assigned Third Officer A to engine remote control board operation and look-out, and Helmsman A to steering. In addition, he assigned an apprentice officer to the bridge, Chief Officer A and two ordinary seamen to the bow station, and Second Officer A and others to the stern station.



Photo 2.1-1 Situation of Vessel A

Vessel A conducted the operation tests for the bow thruster and the engine while mooring after storing the gangway and stand-by to let go anchor in case of emergency.

After Vessel A let go all mooring lines at approximately 16:12, Master A ordered Third Officer A, who was assigned at the engine remote control board on the bridge, to put engine dead slow ahead and to put the bow thruster full port, and Helmsman A to put the helm hard to starboard on the starboard side wing. Vessel A left the port for Port of Tomakomai, Tomakomai City, Hokkaido. Ex-master A observed the maneuvering manner of Master A.

Master A ordered starboard 20, starboard ten, midships, and then port after Vessel A's departure.

Master A recognized an image of another ship in the Dredged Passage on the display of the radar display on the starboard side on the bridge (hereinafter referred to as "Radar A") and learned that the ship was proceeding southeast toward the back of the port because its echo trail*² was extending in the northwest direction. Since the structures on the steel yard quay on the port side of Vessel A blocked the view, he was unable to sight the vessel.

Although Radar A had been equipped with the automatic tracking system

*² "Echo trail" refers to displaying of trails of other vessels in different colors than the radar image when observing the movements of other vessels.

called “Automatic Identification System”^{*3}(hereinafter referred to as “AIS”), the system was not stood-by to function at the time of the departure. Therefore, Master A manually started the system in order to acquire information regarding the vessel with the echo trail.



Photo 2.1-2 View of the Dredged Passage from the port wing of Vessel A

Master A learned that the vessel proceeding southeast in the Dredged Passage was the Russian vessel that was berthed port side alongside the Central Wharf East Quay when Vessel A was entering the port with binoculars when they passed behind the structures. Approximately at the same time, Ex-master A also recognized Vessel B and reported that it was the Russian vessel to Master A.

Master A recognized Vessel B, which was slowly proceeding southeast on the sea side of the work ship that was berthed in the vicinity of the area of water where the Dredged Passage width expanded.

The bow of Vessel B was facing the South Wharf; hence, Master A believed that both vessels would come close where the passages crossed and that in order to safely pass each other, either Vessel A had to pass Vessel B on the port side after passing in front of Vessel B or Vessel A had to turn to port to pass Vessel B on the starboard side. Master A believed that Vessel B would turn to starboard and safely pass Vessel A with two to three cables (approximately 370-550m) in distance and

^{*3} "AIS: Automatic Identification System" refers to the device that enables vessels to automatically send and receive information regarding vessels' identification codes, types, names, positions, courses, speed, destinations, and navigation status, etc. in order to exchange information between vessels and navigation aid facilities of land stations.

thought to pass on the port side of the other.

Vessel B which had Vessel A on her own starboard was approaching Vessel A; accordingly, Ex-master A believed that Vessel B should take actions to prevent collision, and then was observing the movements of Vessel B.

Third Officer A heard Master A and Ex-master A discussing Vessel B after sighting Vessel B and saw Vessel B on the edge of the radar display when he looked at the radar image of Vessel B on the radar on the engine remote control board on the starboard side (hereinafter referred to as "Radar B"). Therefore, he changed the range scale of Radar B from 0.5M to 0.75M.



Photo 2.1-3 Inside of the bridge on Vessel A

Third Officer A recognized by means of Radar A that Vessel B was navigating at approximately 45° on the port side of the bow approximately 0.5M away. Since Master A was observing Vessel B on Radar A and that Master A was discussing the movements of Vessel B with Ex-master A, he did not report about Vessel B to Master A because he believed that Master A knew about the movements of Vessel B.

Master A ordered to put the engine slow ahead, and then ordered to put the helm midships in order to enter the position to see Vessel B on the port side by passing in front of Vessel B.

Master A ordered Third Officer A to change the engine motion; therefore, Third Officer A moved to the vicinity of the engine remote control board.

Vessel B was a give-way vessel which was approaching Vessel A; therefore, Master A requested Ex-master A, who was on the port side of the bridge, to call

Vessel B via the international VHF radio installations (hereinafter referred to as “VHF”) to inquire about the intention of Vessel B in order to learn what actions Vessel B was going to take. Master A requested the inquiry to Ex-master A, since he did not want to waste time by communicating by himself.

(iii) Course of the Events from the Communication Using VHF to Collision

After being requested to inquire about the intention of Vessel B by Master A, Ex-master A made an inquiry that he wanted to know their intention via VHF in English. He was surprised to hear Vessel B’s reply in Russian. Ex-master A believed that Vessel B’s crew member replied in Russian because he cannot hold conversations in English well and communicated in Russian via VHF.

Ex-master A heard Vessel B saying that she wanted to pass starboard side to starboard side and that she wanted Vessel A to also turn now because she was going turn to port. He reported to Master A in English that Vessel B was requesting starboard side to starboard side and that Vessel B was going to turn to port.

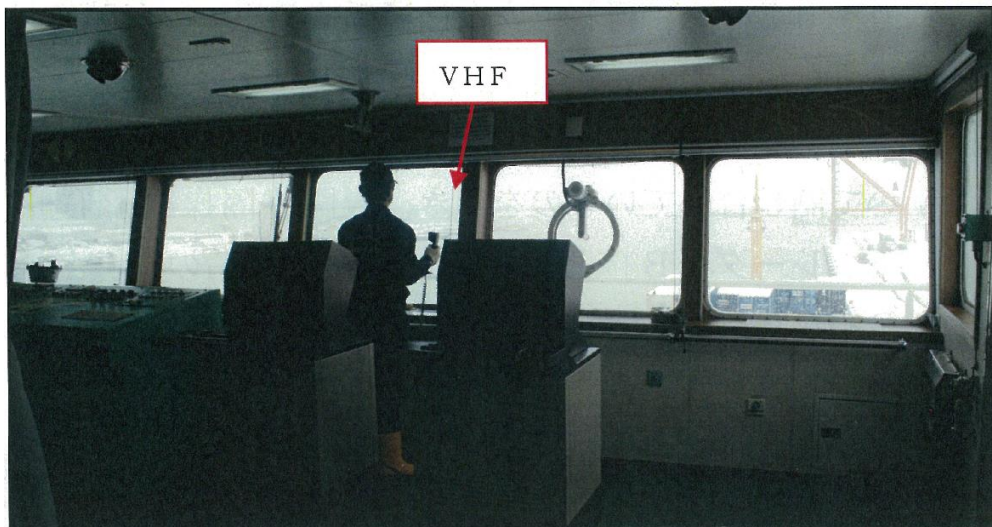


Photo 2.1-4 Situation of VHF usage by Vessel A

Although Master A’s native language is Polish, he had studied Russian and was able to understand from the VHF conversation that Vessel B was offering to pass on the starboard side and to change the course to port.

Master A requested Ex-master A to re-confirm with Vessel B that she was going to turn the rudder to port and pass on the starboard side. Ex-master A re-confirmed the conduct of vessel with Vessel B.

Vessel B strongly stated “starboard to starboard” via VHF, Ex-master A reported “starboard to starboard” to Master A with a strong tone without a doubt,

and Ex-master A, who was on board to hand over the master position, as well as Master B stated “starboard to starboard;” therefore, Master A believed that Vessel B would pass on the starboard side without fail.

Vessel B was a give-way vessel and was a small vessel and that it could easily take actions to avoid collisions by going astern and stopping; accordingly, Ex-master A believed that Vessel B would take give-way actions. However, he was surprised to hear Vessel B offering to pass on the starboard side. Ex-master A believed that it would be safe for Vessel A to stop and observe the movements of Vessel B without changing the course in order to avoid collision with Vessel B.

Ex-master A was specified as a supernumerary on the crew list and he was neither the Master of Vessel A nor the watchstander; therefore, Ex-master A did not communicate his thought to Master A regarding the maneuvering skills.

Master A decided to alter to port and pass Vessel B on the starboard side and agreed to the offer of Vessel B, saying “OK” to Ex-master A. Due to his maneuvering experience a sister vessel KOTA DUNIA, Master A believed that he would be able to safely pass Vessel B if he put the helm hard to port and face Vessel B in opposite directions in the middle of the passage and then ordered to put the helm hard to port.

Ex-master A communicated with Vessel B again that Vessel A would alter the rudder to port to pass on the starboard side.

Master A ordered to put engine dead slow ahead 30-40 seconds after accelerating.

Master A believed that Vessel B would alter the course to port by at least 20-30° because there was room in the area of water on the port side of Vessel B but was unable to recognize the course change by Vessel B.

Ex-master A yelled “cannot, cannot” that they would not be able to avoid collision with Vessel B loudly.

Master A recognized that Vessel B was approaching Vessel A while altering to port and felt the danger of collision. Master A ordered to communicate to pass port side to port side, but Vessel B communicated to pass starboard side to starboard side. There was no time to turn Vessel A to port just by turning the rudder; therefore, he ordered to midships, full astern, and then put the bow thruster full to port in order to turn the bow to port.

Chief Officer A, who was in the bow station, felt the vibration of bow thruster starting. Chief Officer A reported to the bridge that Vessel B was approaching at

close quarters with the transceiver because Vessel B approached to at least 150m on the port side in visual estimation. After this, he felt the danger of collision and had two ordinary seamen evacuate from the port side to the starboard side, assigned the boatswain to windlass, and stood-by anchor for letting go.

Master A recognized that Vessel B proceeded astern by looking at the water current on the propeller of Vessel B, which appeared on the sea surface, and ordered Third Officer A full astern again because Vessel A had not started the engine motion of astern.

Although Chief Officer A stood by anchor for letting go, he could not think of the method to stop the headway by anchoring.

Master A sighted Vessel A's bow and Vessel B's front starboard side collide with each other.

Chief Officer A sighted Vessel A's bow and Vessel B's forward starboard side colliding with each other and then sighted the containers loaded near the bow on the port side of Vessel A contacting with the derrick of Vessel B when Vessel A was proceeding astern. After the collision, Master A recognized that Vessel A proceeded in the position to push Vessel B, that both vessels came apart after Vessel A started to go astern, and that Vessel B's bow was listing to starboard while sinking. Master A ordered the crew members to sound the general alarm, to stand-by launching the life boat, and to check damage and report.

Master A informed the Coast Guard Office regarding the accident via VHF. Vessel A anchored in the vicinity of the collision site and waited for instructions by the Coast Guard Office.

(2) Vessel B

According to the statements of Master B, Chief Officer ("hereinafter referred to as "Chief Officer B"), and Second Officer (hereinafter referred to as "Second Officer B"), it was as follows.

(i) Before Entering Port of Niigata Higashi Ku

On January 22, 2012, Vessel B left Port of Petropavlovsk-Kamchatsky in the Russian Federation for Port of Niigata Higashi Ku, boarded by Master B and 17 crew members with approximately 246 tons of iron scraps in No 1 cargo hold, approximately 550 tons of iron scraps in No 2 cargo hold, approximately 500 tons of iron scraps in the third cargo hold, and two used cars on the deck.

Vessel B let go the starboard anchor at approximately 10:30 on February 6 and berthed port side alongside in the Central Wharf East Quay in Port of Niigata

Higashi Ku.

(ii) Course of the Events from Departure Stand-by to First Sighted of Ship A – When Vessel A was Noticed

On February 7, personnel in charge of the Vessel B’s agent (hereinafter referred to as “Vessel Agent B”) visited the Vessel B and requested Master B and Chief Officer B that they either gain an offing for Vessel B’s safety or shift her to the South Wharf because another vessel was going to berth in the quay where Vessel B had been berthing for cargo-unloading. Master B sought the orders from the owner: UPECC-7 (hereinafter referred to as “Company B”), and then he was ordered to shift the vessel to the South Wharf. He communicated the fact to the personnel of Vessel Agent B



Photo 2.1-5 Vessel B berthing in the Central Wharf East Quay (before this accident)

Although Master B had decided to leave the Central Wharf at approximately 16:30, he received a report at approximately 15:40 from an engineer that the stand-by engine would be ready at approximately 16:00 and then changed the unberthing time to 16:00. No instruction was given by the personnel of Vessel Agent B regarding flag signal, which is exhibit on the mast, while navigating to the South Wharf; therefore, Vessel B did not raise the signal.

Chief Officer B stood-by to operate equipment such as the radar on the bridge, and Helmsman as radio operator: additional post (hereinafter referred to as “Helmsman B”) stood-by for the steering gear.

Master B looked at the radar display, which had been set to the 1M range scale, at approximately 15:50; however, he could not recognize the image of a vessel underway.

Master B assigned Chief Officer B to engine remote control board operation and look-out, and Helmsman B to steering. He assigned the third officer

(hereinafter referred to as “Third Officer B”), ordinary seaman, and engine rating to the bow station, Second Officer B, forth engineer, and two engine ratings to the stern station, and one ordinary seaman to handle lines at the quay.

Vessel B heaved up the starboard anchor at approximately 16:00 with the fore draught approximately 4.1m and aft draught approximately 4.8m. The ordinary seaman to handle the lines left with the personnel of Vessel Agent B in a car for the South Wharf.

The visibility from Ship B would be blocked by the structures on the steel yard quay if she navigated on the right side of the Dredged Passage and the distance to the South Wharf was close from her. Therefore, Vessel B navigated slightly to the right in the center of the Dredged Passage at the speed of approximately 4-5kn with slow ahead.

Since two vessels were berthed at the South Wharf at approximately 16:09, Master B decided to berth starboard side alongside. He ordered the crew members assigned to the bow station and the stern station to stand by to berth the starboard side alongside with the public address system.

While Vessel B was navigating in the area of waters where work ship was berthing in the vicinity of the quay on the south side of the Central Wharf at approximately 16:19, Master B sighted Vessel A, which was navigating along the eastern edge of the West Wharf coast behind the structures on the steel yard quay and confirmed the radar image. Master B assessed that Vessel A was departing by proceeding north in the Dredged Passage. Third Officer B, who was assigned to the bow station, reported to Master B regarding the departing container ship with a public address system.

(iii) Course of the Events from the Communication via VHF to the Order to Abandon the Ship

When Master B ordered Chief Officer B to inquire the name and distance and other items of Vessel A with AIS, he received a call via VHF from Vessel A, saying “TATYANA KARPINSKAYA, KOTA DUTA.”

Vessel A’s pronunciation of calling the name of Vessel B was Russian; accordingly, Master B replied in Russian.

If it was a wide area of waters, the conduct of vessel of crossing situation would be applied and Vessel B had to give way to Vessel A. However, there was no distance and time to judge the conduct of vessel when Master B noticed Vessel A; therefore, he offered that Vessel B would head to the lumber wharf (South Wharf),

he wanted to pass starboard side to starboard side, and that he wanted them to alter to port now because he was going to alter to port.

It was easy for Vessel B to alter to port because there was wide area of waters on the port side of Vessel B, and he could not anticipate where in the Dredged Passage Vessel A would alter to port while underway to the port entrance. Moreover, he believed it would be safer if both vessels' passages didn't cross to avoid collision. Therefore, Master B offered to pass starboard side to starboard side.

Since Vessel A agreed to Master B's offer to pass starboard side to starboard side toward port, Master B replied that he would alter to port. Vessel A stated that they would pass starboard side to starboard side toward port.

Since it took time for Master B to receive the reply from Vessel A, he believed that the other person via VHF may be chief officer instead of the master and that Vessel A also agreed to the conduct of vessel offered by Master B, considering the current situation.

Vessel B was fully loaded, then Master B believed that the hull would list and it would be dangerous if he altered hard-a-port to port. Therefore, he ordered Helmsman B to turn the rudder to port by 15°. Helmsman B stated to Master B every time the course turned 5° to port.

Master B believed that they could ensure sufficient distance for Vessel A to pass Vessel B on the starboard side after Vessel B started to turn to port, however, he recognized that Vessel A's course was not changing to port. He did not understand why Vessel A was not changing the course to port and was concerned that the two vessels could not pass safely; accordingly, he asked Vessel A whether it started to turn. There was no immediate reply from Vessel A, and then Vessel A stated that they could not pass starboard side to starboard side and that they could only pass port to port side after some time.

Although Master B communicated to Vessel A that they would pass starboard side to starboard side, Vessel A stated that they could only pass port side to port side. He believed that there was no time to alter to starboard just by turning the rudder and that it was impossible to alter the course to starboard because Vessel B was already in the middle of changing the course to port. The bow would alter starboard if Vessel B proceeded full astern after stopping the engine; hence, he ordered Chief Officer B to stop the engine and proceed full astern and communicated to Vessel A that they would stop via VHF.

Master B felt the danger of collision because Vessel A was approaching the

bow of Vessel B while changing the course; therefore, he communicated to Vessel A that she was proceeding full astern and that Vessel A should put the helm hard to starboard. Master B sighted the area between No 1 cargo hold and No 2 cargo hold on the starboard side of Vessel B collided with the bow of Vessel A 20-30 seconds later. Master B could not understand why Vessel A did not turn to port, to which they agreed via VHF.

Upon the collision, Vessel B's hull listed to the port side and then listed to the starboard side by approximately 10°, and Vessel B proceeded while being pushed by Vessel A. Master B recognized that two ventilators, which were approximately 1m in diameter and were installed between the starboard side and the port side, on the starboard side out of the four ventilators on the upper deck between No 1 cargo hold and No 2 cargo hold bent on the port side after contacting the side shell platings of the bow of Vessel A when Vessel B listed to the starboard side. Since iron scraps were loaded, ventilators were open with the fan operating.

Master B ordered Chief Officer B to jettison the cargo(e)s in No 1 cargo hold and No 2 cargo hold in order to reduce list. However, she listed to the starboard side by approximately 45° after Vessel A proceeded astern and detached from Vessel B. Master B judged that the damage was serious and ordered to abandon the ship with public address system.

The date and time this accident occurred was approximately 16:22 on February 7, 2012, and the place it occurred was the vicinity of 180° (true bearing, the same hereinafter), 4,900 m from West Breakwater Lighthouse of Port of Niigata Higashi Ku.

(Refer to Appendix 1: AIS record of Vessel A, Appendix 2: AIS record of Vessel B)

2.2 Injuries to Persons

According to the medical report, two crew members of Vessel B suffered injuries requiring one week recovery during evacuation; one suffered abrasions on the left elbow, the other bruises on the right knee and front chest.

2.3 Damage to Vessels

(1) Vessel A

Fore bulbous bow was dented and suffered abrasion, and the side shell platings on the bow on the port side suffered abrasion. In addition, the side of a container loaded on the deck on the bow port side suffered damage.

(2) Vessel B

According to the information from the Japan Coast Guard, side shell platings for No 1 cargo hold and No 2 cargo hold on the starboard side suffered fractures. Vessel B foundered at approximately 17:02 on February 7, 2012. Vessel B was salvaged and decommissioned on April 30 of the same year.

(Refer to Photos 1-4: Damage to Vessel A (1) - (4), Photo 5: Damage to Vessel B (1) (Conditions of temporary repair of the fracture after being salvaged), Photo 6: Damage to Vessel B (2) (Conditions after being salvaged))

2.4 Crew Information

(1) Gender, Age, and Certificate of Competence

(i) Master A: Male, 65 years old

Nationality: The Republic of Poland

Endorsement attesting the recognition of certificate under STCW regulation I/10: Master (Issued by the Republic of Singapore)

Date of issue: October 27, 2011

(Valid until January 28, 2016)

(ii) Ex-master A: Male, 50 years old

Nationality: Ukraine

Endorsement attesting the recognition of certificate under STCW regulation I/10: Master (Issued by the Republic of Singapore)

Date of issue: October 23, 2009

(Valid until October 3, 2014)

(iii) Chief Officer A: Male, 29 years old

Nationality: People's Republic of China

Endorsement attesting the recognition of certificate under STCW regulation I/10: Chief Officer (Issued by the Republic of Singapore)

Date of issue: September 30, 2010

(Valid until August 3, 2015)

(iv) Third Officer A: Male, 24 years old

Endorsement attesting the recognition of certificate under STCW regulation I/10: Third Officer (Issued by the Republic of Singapore)

Date of issue: November 21, 2011

(Valid until September 23, 2016)

- (v) Master B: Male, 50 years old
 - Nationality: Russian Federation
 - Master certificate (Issued by the Russian Federation)
 - Date of issue: Unknown
 - Date of revalidation: Unknown
- (vi) Chief Officer B: Male, 25 years old
 - Nationality: Russian Federation
 - Certificate unknown

(2) Main Seagoing Experience

(i) Master A

According to the statement of Master A and the written reply to the questionnaire by Company A, it was as follows:

Master A has approximately 44 years of experience working on vessels and approximately eight years of experience as a master. After being employed by Company A in 1998, he boarded on container ships with 8,000 – 20,000gt. After boarding as a chief officer for approximately six years, he was promoted to a master position in 2005.

Master A boarded Vessel A on January 20, 2012.

He was healthy at the time of this accident.

Although Master A had experienced entering and leaving Port of Niigata Higashi Ku with a sister vessel of Vessel A 15-18 times, it was the first time for him to enter in and depart from the port on Vessel A.

(ii) Ex-master A

According to the statement by Ex-master A and the written reply to the questionnaire of Company A, Ex-master A has two years of experience as a master. He boarded Vessel A in December, 2011 as the master and handed over the master position to Master A in February, 2012.

He was healthy at the time of this accident.

(iii) Chief Officer A

According to the statement of Chief Officer A, he was employed by Company A in January, 2003 and boarded Vessel A as the chief officer on June 11, 2011. He was in charge of education and training, and conducted education on BRM with all of the crew members on December 17 of the same year.

(iv) Third Officer A

According to the statement of Third Officer A, he was employed by Company A in 2010 and boarded on container ships as an apprentice officer in training. After that, he boarded Vessel A as the third officer on November 23, 2011.

(v) Master B

According to the statement of Master B, it was as follows.

Master B has approximately four years of experience as a master. After boarding a sister vessel of Vessel B and other ships between 2003 and 2008, he was employed by EAST WAY LLC. (hereinafter referred to as “Company C”) in 2009. He boarded three cargo ships (2,287gt and 2,988gt), including Vessel B as the master and boarded Vessel B as the master on August 25, 2011.

He was healthy at the time of this accident.

Although Master B had berthed in Port of Niigata Higashi Ku Central Wharf many times, he had never berthed in the South Wharf.

(vi) Chief Officer B

According to the statement of Chief Officer B, he has approximately four years of experience working on vessels. After graduating from school in 2007, he boarded Vessel B as the second officer in February, 2008. He was promoted to the Chief Officer position in August, 2011.

He was healthy at the time of this accident.

2.5 Vessel Information

2.5.1 Particulars of Vessel

(1) Vessel A

IMO number: 9483487

Port of registry: Singapore, Republic of Singapore

Owner: Company A (Republic of Singapore)

Management company: Company A

Classification society: Lloyd's Register

Gross tonnage: 6,245 tons

L×B×D: 115.48m×20.81m×9.20m

Hull material: Steel

Engine: 1 diesel engine

Output: 3,310kW

Propulsion: 1 fixed pitch propeller

Type of ship: Container Ship

Year of launch: 2011

(2) Vessel B

IMO number: 7504433

Port of registry: Vladivostok, Russian Federation

Owner: UPEC-7 (Russian Federation)

Management company: Company C (Russian Federation)

Classification society: Russian Maritime Register of Shipping

Gross tonnage: 2.163 tons

Lr×B×D: 88.75m×12.80m×6.70m

Hull material: steel

Engine: 1 diesel engine

Output: 1,530kW

Propulsion: 1 fixed pitch propeller

Type of ship: Cargo Ship

Year of launch: 1975

2.5.2 Hull, Navigational Instruments and Equipment

(1) Vessel A

(i) Bridge

There was one VHF unit near each side in the fore of the wheel house. The steering gear was in the center of the wheel house. On its starboard side, there were two radar units with the echo trail functions and ARPA*⁴ functions which could display AIS targets on radar display and on the engine remote control board display. There was a chart table in the aft port side, and two GPS display units and one AIS display unit were placed on the (chart) table. Above the fore part were internal clock, anemoscope, and anemometer and other instruments.

According to the statement of Master A, the hull and machinery and tools had no defects or malfunction at the time of this accident. However, the reason that the vessel took time to put engine full astern immediately before the collision was unclear. In addition, no whistle was used after he noticed Vessel B and before this

*⁴ “ARPA” stands for “Automatic Radar Plotting Aids”. It automatically has computer process the movement direction and movement amount for radar images of other vessels and has it display over vessels’ courses, speed, time to the closest contact as well as the distance, and future expected positions, etc. The device also warns in case of expected danger of collision with another vessel.

accident.

(ii) Radar Use Situation

According to the statement of Third Officer A, it was as follows.

- a. When they were at departure stand-by, they turned on the power for two radar units, started them in the head up display, displayed echo trail, and set the range scale to 0.5M.
- b. Although the radar came with the AIS automatic tracking system, it was not activating until Master A recognized the radar image of Vessel B.

(iii) Detection Situation of Vessels and other subjects Using Radar

After this accident, we activated Radar A (manufacturer: TOKYO KEIKI INC., model: BR-3200) in the West Wharf No.3 Quay in Port of Niigata Higashi Ku, set the range scale to 1.5M, and detected in the vicinity of Central Wharf East Quay, from which Vessel B departed. The radar image of Central Wharf East Quay was confirmed as well as vessels (gross tonnage not confirmed) which were berthed at the Central Wharf and the Zenno Berth. In addition, Central Wharf East Quay could not be detected when the range scale was set at 0.75M.

Air draft^{*5} at the time of this accident was 36.3m, and the height of the radar scanner from the sea surface was approximately 32m.

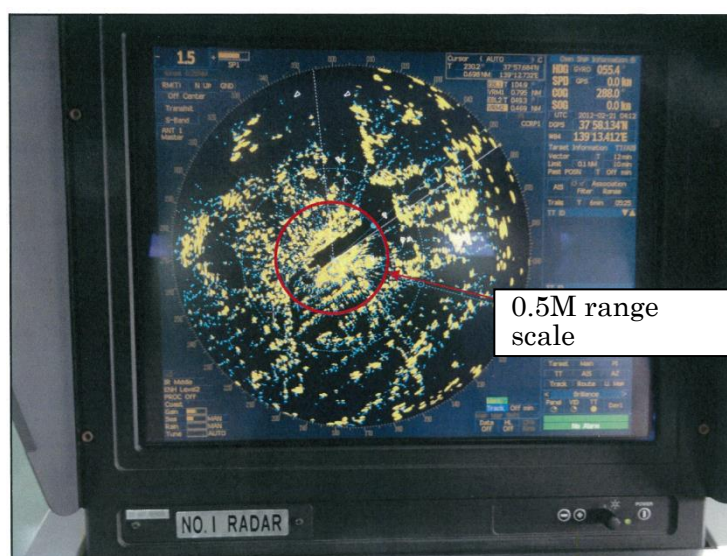


Photo 2.5-1 Radar's detection situation (taken after this accident)

*5 "Air draft" refers to the height from the waterline to the highest point of the vessel.

(iv) Lifesaving appliances

One life boat was installed on each side of the boat deck. According to the statements of Chief Officer A and Second Officer A, they prepared to lower the port side lifeboat (also used as rescue boat) after the collision.

(2) Vessel B

(i) Wheel house

According to the statements of Master B and Chief Officer B, it was as follows.

A microphone for public address and push button for general alarm were installed in the fore of the wheel house.

Steering gear was at the center of the wheel house. The engine remote control board and radar were on its starboard side. A GPS plotter and a radar were installed on its port side. The radar did not come with the ARPA feature. There was VHF close to each radar, and AIS display was installed in the aft of the engine remote control board.

At the time of this accident, Master B conned the vessel on the port side and was communicating with Vessel A via VHF on the port side. Chief Officer B was on the look-out near the microphone toward the fore of the bridge. Helmsman B was manually steering.

At the time of this accident, the hull, engine, and machinery and tools had no defects or malfunction. In addition, no whistle was used after Vessel A was noticed before this accident.

(ii) Radar Use Situation

According to the statements of Master B and Chief Officer B, it was as follows.

- a. Chief Officer B turned on the power for two radar units and set the range scale to 1M when stand-by the departure.
- b. Master B confirmed Vessel A with the radar image at approximately 16:19 and changed the range scale to 0.5M and to 0.25M according to the distance between Vessel A and Vessel B.



Photo 2.5-2 Vessel B radar (after being pulled out)

(iii) Lifesaving appliances

According to the statement of Master B, there were three inflatable liferafts (max. capacity: 10 people) on each side of the aft boat deck and one rescue boat in the aft port side.

2.5.3 Maneuverability

(1) Advances and Transfers

(i) Vessel A

According to the maneuverability chart of Vessel A, the advance^{*6} was approximately 395m and the transfer^{*7} was approximately 238m if the rudder was turned to port at 35° with full ahead.

It took 86 seconds for the bow to accomplish a 90° turn after Vessel A started to turn the rudder.

(ii) Vessel B

According to the statement of Master B, it was as follows.

If Vessel B put the helm hard to port while proceeding full ahead (approximately 10kn), the advance was approximately two cables (approximately 370m). It was approximately 2.8 cables (approximately 520m) if the rudder was steered to port at approximately 15°. If they put the helm hard to port or steered the rudder to port at 15° while proceeding slow ahead (approximately 3-5kn), the

*6 “Advance” refers to the forward distance of the center of gravity from the original position on the original course when the bow has accomplished a 90° turn away from the original course.

*7 “Transfer” refers to the traversal distance of the center of gravity from the original course when the bow has accomplished a 90° turn away from the original course.

advance value would be smaller than that of full ahead.

(2) Shortest Stopping Distance and other functions

(i) Vessel A

a. According to the maneuverability chart of Vessel A, it was as follows

As for the crash stopping momentum performance of Vessel A with the fore draught bow 3.20m and aft draught 5.20m, the distance required for the speed to reduce to 0.9kn when full astern was put in the full ahead (speed: 13.3kn) condition was 1,400m, and the time required was 7 minutes 19 seconds. In addition, speed in the loaded condition was as follows.

	Speed in the loaded condition (kn)
Navigation full ahead	13.0
Harbour full ahead	11.7
Half ahead	9.5
Slow ahead	8.0
Dead slow ahead	6.9

b According to the statement of Ex-master A, Vessel A's propeller turns counter-clockwise. Therefore, the bow turns to port if starting the engine motion of astern.

(ii) Vessel B

According to the statement of Master B, it was as follows.

a The shortest stopping distance in case of full astern while proceeding slow ahead was approximately 150m.

b Vessel B's propeller turns clockwise, so the bow turns to starboard if starting the engine motion of astern.

2.5.4 View from the Bridge

(1) Vessel A

When the bow direction was viewed from the bridge, there was a blind sector in the bow direction due to the containers loaded on the forward deck. However, there was no structure producing a blind sector on the port side.

(2) Vessel B

According to the statement of Master B, the mast and the derrick post on the

forward deck produced a blind sector in the front, but there was no impact on the look-out for Vessel A from the blind sector.

2.6 Weather and Sea Conditions

2.6.1 Weather Observations

The Observed Values of the Niigata Airport Branch of the Niigata Local Meteorological Observatory located approximately 12km west-southwest of the accident occurrence place were as follows.

16:00 Wind direction: South-southeast, Wind speed: 3.4m/s, Temperature: 3.5 °C ,
Precipitation: 0mm

16:30 Wind direction: South, Wind speed: 3.2m/s, Temperature: 3.7°C, Precipitation:
0mm

In addition, the sunset in Port of Niigata at the time of this accident was at 17:13.

2.6.2 Observation by Crew

- (1) According to the logbook of Vessel A, the weather was cloudy with occasional rain, the wind direction was southwest, wind force was 2-3, and visibility was 6 (4km – 10km) at approximately 16:00.
- (2) According to the statement of Master B, the visibility was good while underway.

2.6.3 Sea Conditions

The tide in Port of Niigata at the time of this accident was starting to fall.

2.7 Information on the Area of Waters of the Accident

2.7.1 Port of Niigata Higashi Ku and Surrounding Area of Waters

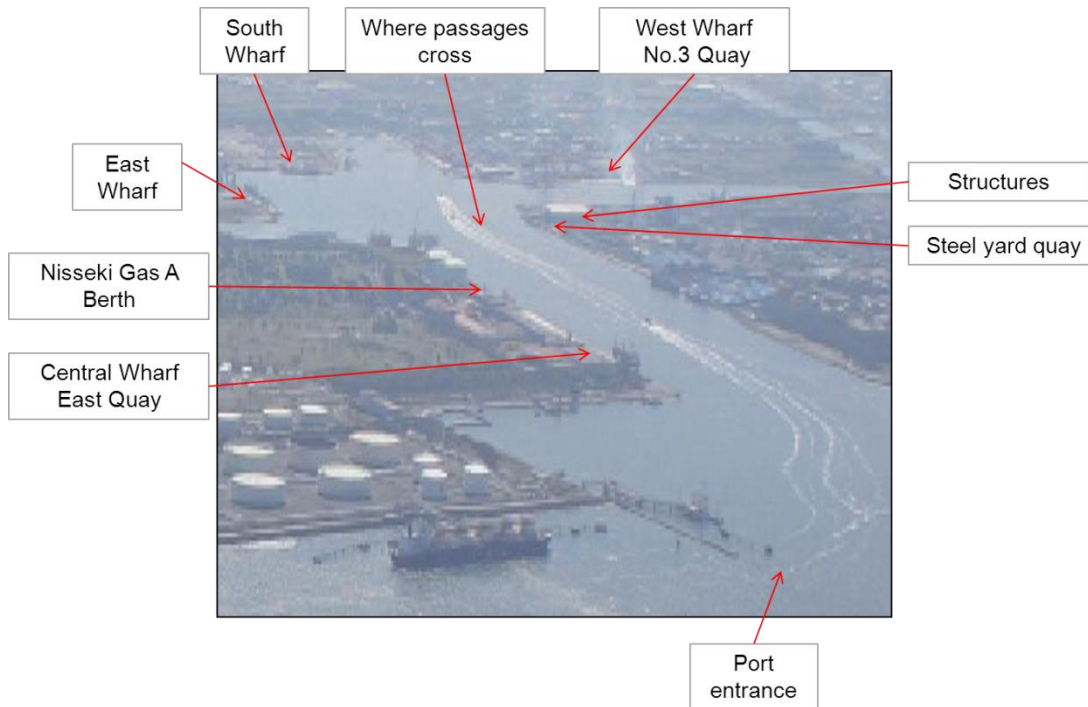


Photo 2.7-1 Port of Niigata Higashi Ku (Source: Sailing Directions for Northwest Coast of Honshu issued by the Japan Coast Guard (Issued in February, 2007))

According to the chart W1155B (Port of Niigata Higashi Ku) issued by the Japan Coast Guard, the 14m Dredged Passage extends south-southeast from the Central Wharf East Quay to the vicinity of the South Wharf. The width of the Dredged Passage is approximately 280m in the vicinity of the Central Wharf East Quay, which gradually expands in the vicinity of approximately 1,000m in front of the South Wharf. It is approximately 560m in the area of waters where the East Wharf, South Wharf, and West Wharf cross.

West Wharf No.3 Quay is located in the southwest area of the Higashi Ku and the water depth in front of the quay is approximately 12m. The distance from the southwest end of the quay to the 14m deep Dredged Passage is approximately 700m, and the width to the opposite shore is approximately 250m. There is a steel yard quay where the passage along the coast of West Wharf No.3 Quay and the Dredged Passage cross, and the structures are on the quay.

In addition, Port of Niigata Higashi Ku is not designated as a compulsory pilotage area.

2.7.2 Information on the View in the Vicinity of the Accident Site

According to the statements of Master A and Master B, they were not able to sight the

other vessel at the time of departure because the structures in the steel yard quay were blocking the view.

2.7.3 Information on the Surrounding Vessels

According to the statements of Master A and Master B, it was as follows.

- (1) Only Vessel A and Vessel B were underway in the Dredged Passage in the Higashi Ku.
- (2) In the area of waters where the width of the Dredged Passage expanded, there was one working ship anchored near the southern quay of the Central Wharf East Quay, one vessel was berthed at the Central Wharf East Quay, one vessel was berthed at the Central Wharf, and two vessels were berthed at the South Wharf.

2.8 Information on Conduct of Vessel

2.8.1 Conduct of Vessel

According to the Act on Preventing Collision at Sea, it was as follows.

Article 38

In constructing and complying with these Rules, due regard shall be had by vessels to all dangers of navigation and collision with other vessels and to any special circumstances, including the limitations of the vessels involved, involving immediate danger.

2. Vessels may depart from these Rules in order to avoid immediate danger in special circumstances involving immediate danger, which was mentioned in the previous clause.

Article 39

Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect of any precaution which may be required to operate in an appropriate method, display lights or shapes, or signal or by the ordinary practice of seamen, or by the special circumstances of the case.

2.8.2 Conduct of Vessel Utilized by Pilots

According to the statement of a pilot in the Japan Federation of Pilots' Associations Niigata Pilot Branch, if a vessel clearing the port after departing from the West Wharf and a vessel proceeding south to the South Wharf are in a crossing situation where the passages cross, one of the vessels stop, wait for the other vessel to pass, and resume clearing the port or to the South Wharf.

2.8.3 Signal Display

According to Article 11 of the Ordinance for the Enforcement of the Act on Port Regulations, vessels are required to raise the signal flag stipulated by the Commandant Japan Coast Guard in the notification in the front or other easily visible places in order to display the course while underway within Port of Niigata.

According to Appendix 8: Port of Niigata on signals (Notification 35 by the Japan Coast Guard on March 17, 1995) to display courses while underway in the port mentioned Article 11 of the Ordinance for the Enforcement of the Act on Port Regulations, vessels are required to display 2-E*⁸ when navigating to the mooring facility on the east side of the Higashi Ku.

According to the statement of Master B, Vessel B did not raise the flag signaling.

2.9 Information Collection on Vessels Entering/Leaving the Port with Radar

(1) Vessel A

According to 2.1 and the written reply to the questionnaire by Company A, it was as follows.

(i) The Departure Checklist in the manual used by Third Officer A upon leaving the port contained these items: “are radar, ARPA, ECDIS (if fitted), AIS in order? Are AIS data updated?”. The checklist was marked with red markings, indicating that these items have been confirmed.

(ii) According to the Safety Management Procedure Manual, it was as follows.

(excerpt)

Chapter 15. Instructions to the Master and the Navigation Officer

(M) Radar.

(Omitted)

Whenever a radar is in use, the officer of the watch shall select an appropriate range scale, observe the display carefully and plot effectively.

The officer of the watch shall ensure that range scales employed are changed at sufficiently frequent intervals so that echoes are detected as early as possible and that small or poor echoes do not escape detection.

The officer of the watch shall ensure that plotting or systematic analysis is commended in ample time, remembering that sufficient time can be made available by reducing speed if necessary.

*⁸ “Display 2-E” refers to navigating to the mooring facility on the east side of the Higashi Ku.

(2) Vessel B

We were unable to acquire the departure check list and safety management manual of Vessel B.

(3) Act on Preventing Collision at Sea

According to Article 7 of the Act on Preventing Collision at Sea, it was as follows.

Article 7: Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists.

(b) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

(4) STCW Convention (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers in 1978)

According to the 1995 amendment to 1978 STCW Convention, it was as follows.

Annex

Chapter 8: Standards Regarding Watchkeeping

A-VIII/2: Watchkeeping arrangements and principles to be observed

Part 3: Watchkeeping at sea

Part 3-1: Principles to be observed in keeping a navigational watch

Performing the navigational watch

38: The officer in charge of the navigational watch shall ensure that range scales employed are changed at sufficiently frequent intervals so that echoes are detected as early as possible. It shall be borne in mind that small or poor echoes may escape detection.

39: Whenever radar is in use, the officer in charge of the navigational watch shall select an appropriate range scale and observe the display carefully, and shall ensure that plotting or systematic analysis is commenced in ample time.

2.10 Information on Vessels Entering/Leaving Port of Niigata Higashi Ku

According to the statements of the personnel in charge of Vessel A's vessel agent (hereinafter referred to as "Vessel Agent A") and personnel in charge of Vessel Agent B, it was as follows.

- (1) In Port of Niigata Higashi Ku, three vessel agents conducted vessel agent businesses for cargo ships and container ships. Each vessel agent was providing vessels with information on vessels entering/leaving the port which was acquired from such as the

Coast Guard Office and port office to vessels who had concluded vessel agent contracts, upon applying for port entry/departure. Personnel in charge of each agent were providing information on vessels' port entry/departure changes to the personnel in charge of container ships in the vessel agent regarding container ships and to the personnel in charge of cargo ships in the vessel agent regarding cargo ships.

- (2) Personnel in charge of Vessel Agent A had not acquired information on Vessel B at the time of this accident; therefore, they had not communicated Vessel B's information to Vessel A. Personnel in charge of Vessel Agent A normally provided information on port entry/departure times for vessels and container ships with pilots on board to vessels that had concluded contracts with Vessel Agent A in Port of Niigata Higashi Ku.
- (3) Personnel in charge of Vessel Agent B had not acquired information of Vessel A at the time of this accident. When Vessel B was ready to depart, personnel in charge of Vessel Agent B had telephoned to Vessel Agent A regarding Vessel B's departure. However, it was not clear whether or not the other person on line was in charge of cargo ships.

2.11 VHF Communication Information

2.11.1 Situation of VHF Usage

(1) Vessel A

According to the statement of Master A, Master A would normally communicate with approaching vessels via VHF himself. Vessel A and Vessel B were close when he recognized Vessel B and it would take time for him to inquire the intention of Vessel B via VHF; therefore, he requested Ex-master A to make the communication.

(2) Vessel B

According to the statement of Master B, Master B would communicate with approaching vessels via VHF. Although Master B would sometimes request Chief Officer B to communicate via VHF when he recognized approaching foreign vessels at the time of port entry/departure and other cases, he would mostly did so himself in English.

2.11.2 Language Used for VHF Communication

According to the written reply to the questionnaire by the Russian audio translator, it was as follows.

People whose native language is Russian pronounce the name of Vessel B "TATYANA KARPINSKAYA." Two people who communicated via VHF pronounced the vessel name "TATYANA KARPINSKAYA," and it sounds as if their native language is

Russian.

2.11.3 Company Policy

(1) Company A

- (i) According to “3. Measures to prevent recurrence of the same kind of incident” in the “SAFETY BULLETIN” notified to all vessels managed by Company A in March, 2011, it was as follows. (excerpt)

1-3 (omitted)

4. Use of VHF in collision avoidance – VHF communication is one of the contributing factors in collisions at sea so called “VHF assisted collisions”. VHF shall not be used for collision avoidance communication. Use of VHF communication can lead to agreeing to an action that does not comply with the Collision Regulations. Valuable time can also be lost trying to establish contact on VHF and discussing on avoiding action instead of taking action in accordance with the COLREG.

- (ii) According to the “Navigation In Narrow Channel Checklist” or “Navigation In Congested Waters Checklist” prepared by Company A on January 8, 2008, it was as follows. (excerpt)

1-10 (omitted)

11 Listening watch on VHF maintained on appropriate channels

12 (omitted)

(2) Company C

No reply was acquired from Company C to questions on the use of VHF.

2.11.4 Flag State Policy

(1) Republic of Singapore

According to the “CAUTION ON THE USE OF VHF RADIO IN COLLISION AVOIDANCE,” which was issued to owners and management companies of Singapore vessels and others by the Maritime and Port Authority of Singapore on July 4, 2005, it was as follows. (excerpt)

1. Many investigations worldwide have revealed that VHF communication is one of the contributing factors in collisions at sea. In many of the so called “VHF assisted” collisions, the “VHF communication” between the bridges had created misunderstanding among the officers which led to close quarter situations and collisions. We are of the view that compliance with the International Regulations for

Preventing Collisions at Sea will be more effective to avert a collision rather than the use of VHF communications, based on scanty and unclear information, to avoid a close quarter situation. A recently concluded investigation showed that both the vessels were using VHF communication to agree on a collision avoidance action which led to the collision later.

2. "VHF assisted" collisions, contacts or near misses are not uncommon occurrences at sea. IMO has taken a serious view of this trend.

3. Based on our findings and experience in similar occurrences, we believe that such incidents are avoidable. We wish to reinforce this learning among all the masters and navigators serving on Singapore ships through this circular. We take this opportunity to reiterate the following possible dangers involved in the use of VHF communication as a means to avoid collision. The factors to be considered are as follows:

a. (omitted)

b. Uncertainty over the interpretation of messages received due to language difficulties and an imprecise or ambiguously expressed message;

c. Loss of valuable time in trying to establish contact on VHF radio instead of taking concrete action in accordance with the Collisions Regulations; and

d. The danger of agreeing to a course of action that does not comply with the Collision Regulations resulting in a situation that the action was intended to avoid.

4 and 5. (omitted)

(2) Russian Federation

No reply was acquired from the authorities of the Russian Federation to the question on whether or not cautions on the usage of VHF to prevent collisions were notified to owners and management companies, etc. of vessels registered in the Russian Federation.

2.11.5 IMO Guidelines

In the A.954 (23) "PROPER USE OF VHF CHANNELS AT SEA", which was resolved on February 26, 2004, IMO stipulated VHF communication technique, VHF communication procedures, and standard messages. However, it did not stipulate the usage of VHF communication as a means to avoid collisions.

2.12 BRM Information

2.12.1 Education and Training

(1) Vessel A

In the SAFETY VIDEO TRAINING PLAN posted on the bridge, it said that all of the crew members received internal training on bridge procedures, BRIDGE PROCEDURES AND BRIDGE RESOURCE MANAGEMENT PART1 - VOYAGE PLANNING and BRIDGE PROCEDURES AND BRIDGE RESOURCE MANAGEMENT PART2 - BRIDGE WATCHKEEPING on December 17, 2011. Subscription of Chief Officer A, who is in charge of education, was on the plan.

According to the statement of Chief Officer A, crew members watched the above two videos on BRM during navigational watch and the master asked them questions on the contents of the video to confirm the degree of understanding.

According to the statement of Third Officer A, they learned that persons on the bridge duty are to make safety-related reports to the master from the educational videos.

(2) Vessel B

According to the statement of Chief Officer B, Vessel B had not conducted education or training on BRM.

2.12.2 Members of the Bridge Team on Vessel A

(1) According to the statements by Master A and Ex-master A and the written reply to the questionnaire by the designated person in Company A, there were five members in the bridge team, including Master, Chief Officer, officer of the watch, look-out personnel, and helmsman. This did not include Ex-master A who was specified as a supernumerary on the crew member list.

(2) According to the statement of Master A, Third Officer A and deck apprentice were on the watch at the time of this accident. However, no information on Vessel B was provided to Master A from them.

2.12.3 Vessel A's Educational Video

According to the BRIDGE PROCEDURES AND BRIDGE RESOURCE MANAGEMENT PART2 BRIDGE WATCHKEEPING used by Vessel A as an education material, it was as follows. (excerpt)

The other vessel may navigate without following the conduct of vessel. Officer of the watch should remain on the bridge to support the master's maneuvering even after the

master starts to con the vessel. Teamwork on the bridge is important, and teamwork becomes extremely important in situations in which vessel traffic is difficult. Officer of the watch must provide sufficient support to the master. He must not only do what was ordered by the master but also reconfirm the actions taken by the master.

2.12.4 STCW Convention

According to the 1995 amendment to 1978 STCW Convention, it was as follows.

Annex

Chapter 8: Standards Regarding Watchkeeping

A-VIII/2: Watchkeeping arrangements and principles to be observed

Part 3: Watchkeeping at sea

Part 3-1: Principles to be observed in keeping a navigational watch

Performing the navigational watch

42 The officer in charge of the navigational watch shall give watchkeeping personnel all appropriate instructions and information which will ensure the keeping of a safe watch, including a proper look-out.

2.13 Information on Rescue and Damage Reduction Measures

According to the statements of Master B, Chief Officer B, and Second Officer B, it was as follows.

2.13.1 Course of the Events of Rescue

Second Officer B entered into the vessel with Third Officer B, and then guided four crew members to the deck after Master B ordered to abandon the ship on the public address system.

Vessel B's bow was submerged, and she had listed to the extent that they were unable to stand without holding onto something.

While Master B was requesting tugboat support from the Coast Guard Office via VHF, crew members were trying to return to the accommodation space to pick up documents. However, Master B believed that it would be dangerous to return to the accommodation space due to the fast foundering speed; therefore, he stopped the crew members and put them on the inflatable liferafts.

The assembly station in training was the boat deck, but crew members mustered on the quarter deck because the quarter deck was highest from the sea surface and entrances to the engine room and living quarters were on the quarter deck.

Master B, Chief Officer B, Helmsman B, and electrician set up the three inflatable

liferafts installed on the starboard side of the boat deck. Although two inflatable liferafts were set up, the other one was not useable because it was in between hull structures.

Master B divided the crew members into two groups, including the group with Chief Officer B and electrician and the group with Master B and Helmsman B, and then put the crew members on the inflatable liferafts.

In order to check the safety of crew members assigned to the bow station and whether or not there were more crew members left on the sea surface, Master B rowed and went around the port side of Vessel B.

Master B confirmed that all crew members were safe, and then left Vessel B by rowing the inflatable liferaft. By this time, Vessel B had disappeared from the sea surface.

All of the crew members transferred to the tugboat that came to the rescue. Two people who were injured during evacuation were transferred to a hospital on an ambulance after tugboat berthing in the East Wharf.

2.13.2 Vessel B Training

Vessel B conducted emergency training stipulated by Regulation 19-3.2 Chapter III, Consolidated text of the Annex of the International Convention for the Safety of Life at Sea (SOLAS) every month. They conducted abandon ship drill in December, 2011, and January, 2012.

2.13.3 Embarking/disembarking of Vessel B Crew Members

More than half of the Vessel B crew members had continuously boarded Vessel B for more than three years. Those with short boarding periods were Master B (boarded in August, 2011) and Third Officer B (boarded in December of the same year).

2.14 Information on Impact on Environment due to Oil and Other Substances Leak and Its Prevention

According to the Japan Coast Guard, it was as follows.

- (1) After Vessel B foundered, floating oil of approximately 1,700m long and 1.5m wide was recognized in the area of waters surrounding Vessel B. At approximately 10:10 on February 9, 2012, the Japan Coast Guard conducted closing operation for fuel air vent piping and other things on Vessel B to stop the outflow of the oil from Vessel B.
- (2) Floating oil was removed by a Japanese oil pollution removal contractor arranged by Company B.

2.15 Information on Impact on Port Services due to Vessel B Foundering

According to the Japan Coast Guard, it was as follows.

Since Vessel B foundered where the passages crossed in Port of Niigata Higashi Ku, navigation and anchoring of general vessels were prohibited between February 7 and February 10, 2012. Afterwards they limited the area of waters, in which navigation and anchoring was prohibited, to where Vessel B foundered. However, the prohibition was lifted on May 11 of the same year.

2.16 Accident Example Involving VHF Communication

According to the Report on the investigation of the collision between Hyundai Dominion and Sky Hope in the East China Sea, 21 June 2004 (Report No.17/2005) investigated by the Marine Accident Investigation Branch, it was as follows.

Container ship Hyundai Dominion (U.K. registered, 74,373gt) left Port of Kaohsiung, Taiwan, and was navigating to Port of Busan, Korea, with 22 people onboard including the master in the course of 036° at the speed of 22kn while the chief officer and an able seaman were on navigational watch. Cargo ship Sky Hope (Hong Kong registered, 6,899gt) was navigating from Port of Shanghai, People's Republic of China, to Hanshin Port with 18 people on board including the master in the course of 091° at the speed of 15.3kn while the chief officer was the only one on watch. At 07:38, June 2, 2004, two vessels collided with each other in the East China Sea.

Although vessels were in a crossing situation, the officer of the watch on Sky Hope believed the encounter as one where Hyundai Dominion was overtaking his vessel and thought that he should take no immediate avoiding action in accordance with the Act on Preventing Collision at Sea. On the other hand, OOW on Hyundai Dominion considered that they were in a crossing situation and that his vessel was “stand-on vessel.”

Due to the fact that both officers of the watch were conducting VHF communication without taking collision avoidance actions until the vessels were within a range of 0.2M due to the difference between their judgments on the encountering situation, this accident occurred.

Both officers of the watch should have taken swift collision avoidance actions in order to reduce the situation rather than wasting time in VHF communication by the time they realized that there was a difference in the interpretation of their encountering situation and that the other vessel would not compromise even after discussion.

3 ANALYSIS

3.1 Situation of the Accident Occurrence

3.1.1 Course of the Events

According to 2.1, Appendix 1, Appendix 2 and 3.2.2, it was as follows.

(1) Vessel A

- (i) It is probable that Vessel A left the West Wharf No.3 Quay in Port of Niigata Higashi Ku at approximately 16:12:00 on February 7 and proceeded northeast for Port of Tomakomai.
- (ii) It is highly probable that Master A perceived the radar image of another vessel proceeding south-southeast between 16:18:21 and 16:18:27 and recognized that the said radar image was Vessel B at 16:18:37.
- (iii) It is highly probable that Vessel A put the engine on slow ahead and put the helm to midships at 16:18:51 and proceeded with the heading of 057° and speed of 4.5kn at 16:18:57.
- (iv) It is highly probable that Vessel A agreed to the conduct of vessel of passing Vessel B on the starboard side via VHF at 16:19:58.
- (v) It is highly probable that Vessel A put the helm hard to port at 16:19:59.
- (vi) It is highly probable that Vessel A's heading was steady at 052° after the agreement was made on the conduct of vessel and before 16:20:17 and that Vessel A steered the heading to port at 044° by 16:20:38 after this.
- (vii) It is probable that Master A recognized that Vessel B was approaching Vessel A, felt the danger of collision, and ordered to put the bow thruster full to port at 16:20:42, to stop the engine at 16:20:45, and to put engine full astern at 16:21:07.
- (viii) It is probable that Vessel A put the engine astern at approximately 16:22:10.
- (ix) It is probable that Vessel A's bow and Vessel B's forward starboard side collided with each other when Vessel A was turning to port while proceeding.

(2) Vessel B

- (i) It is probable that Vessel B left the Central Wharf East Quay in Port of Niigata Higashi Ku at approximately 16:00 and proceeded south-southeast on the Dredged Passage for the South Wharf in the same section.
- (ii) It is probable that Master B sighted Vessel A behind the structures on the starboard side approximately when Master A sighted Vessel B and believed that Vessel A was proceeding north in the Dredged Passage.
- (iii) It is highly probable that Master B offered the conduct of vessel to pass starboard

side to starboard side via VHF to Vessel A at 16:19:35.

- (iv) It is probable that Vessel B put the helm to port by 15° after agreeing to the conduct of vessel to pass on the starboard side with Vessel A.
- (v) It is highly probable that Vessel B's heading changed from 154° to 153° between the agreement on the conduct of vessel and 16:20:23, and then continued to turn to port after this.
- (vi) It is probable that Master B believed that Vessel A's heading wasn't changing to port, became concerned that the vessels may not be able to pass safely, inquired Vessel A about the maneuvering situation via VHF at 16:20:28, and ordered to stop the engine and to put engine full astern.
- (vii) It is probable that Vessel B's forward starboard side and Vessel A's bow collided with each other when Vessel B was turning to port while proceeding.

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

According to 2.1 and Appendix 2, it is probable that it was as follows.

- (1) Vessel B's turning round angular speed had changed from 0.4 deg/s to 2.3 deg/s between 16:22:03 and 16:22:23, Vessel A's bow and Vessel B's forward starboard side collided with each other during this time and Vessel B's turning round angular speed accelerated due to Vessel A's ahead power.
- (2) According to the above (1), the date and time this accident occurred was approximately 16:22 on February 7, 2012, and the place it occurred was the vicinity of 180° 4,900m from the West Breakwater Lighthouse in Port of Niigata Higashi Ku.

3.1.3 Situation of Injured Personnel

According to 2.2 and 2.13, it is probable that two crew members of Vessel B suffered minor injuries, such as abrasions on elbows, upon evacuating from Vessel B but there were no casualties on Vessel A.

3.1.4 Situation of Damage to the Vessels

According to 2.3, it is probable that it was as follows.

- (1) Vessel A suffered dents and abrasions on the fore bulbous bow and abrasions on the side shell platings on the bow of the port side. In addition, the side of a container loaded on the deck on the bow of the port side suffered damage.
- (2) Vessel B suffered fractures on the side shell platings on the starboard side on No 1 cargo hold and No 2 cargo hold, and foundered at approximately 17:02.

3.2 Causal Factors of the Accident

3.2.1 Situations of the Crew and the Vessels

(1) Crew Member Situation

According to 2.4, it was as follows.

(i) Master A

He possessed a legal and valid certificate of competence. It is probable that he was healthy at the time of this accident.

(ii) Master B

As his certificate of competence was not available, the situation of holding the certificate was not determined. It is probable that he was healthy at the time of this accident.

(2) Situation of the Vessels

According to 2.1.1, 2.5.2, and 3.1.1 it was as follows.

(i) Vessel A

It is probable that the hull and machinery and tools had no defects or malfunction at the time of this accident. We were unable to clarify the causal factors for the fact that engine was set on astern at approximately 16:22:10 despite the fact that Master A ordered full astern at 16:21:07.

(ii) Vessel B

It is probable that the hull, engine, and machinery and tools had no defects or malfunction at the time of this accident.

3.2.2 Analyses of the Situation after Master A Recognized Vessel B's Radar Image and before the two Vessels Agreed on the Conduct of Vessel

According to 2.1, 3.1.1, AIS record of each vessel, and image display recreating this accident by utilizing AIS (hereinafter referred to as "recreated display of this accident"), it was as follows. It should be noted the distance between two vessels indicate the distance between the GPS antenna of each vessel.

(1) Analyses of the Situation When Master A Recognized Vessel B's Radar Image

(i) It is probable that Master A recognized another vessel's radar image between 16:18:21 and 16:18:27 and learned that the said radar image was Vessel B at 16:18:37.

(ii) It is probable that the distance between the two vessels at approximately 16:18:18 was approximately 950m (calculated from the AIS records of 16:18:18 for Vessel A and 16:18:23 for Vessel B) and that the distance between the two vessels at

approximately 16:18:38 was approximately 890m (calculated from the AIS records of 16:18:38 for Vessel A and 16:18:43 for Vessel B) as shown in Figure 3.2-1.

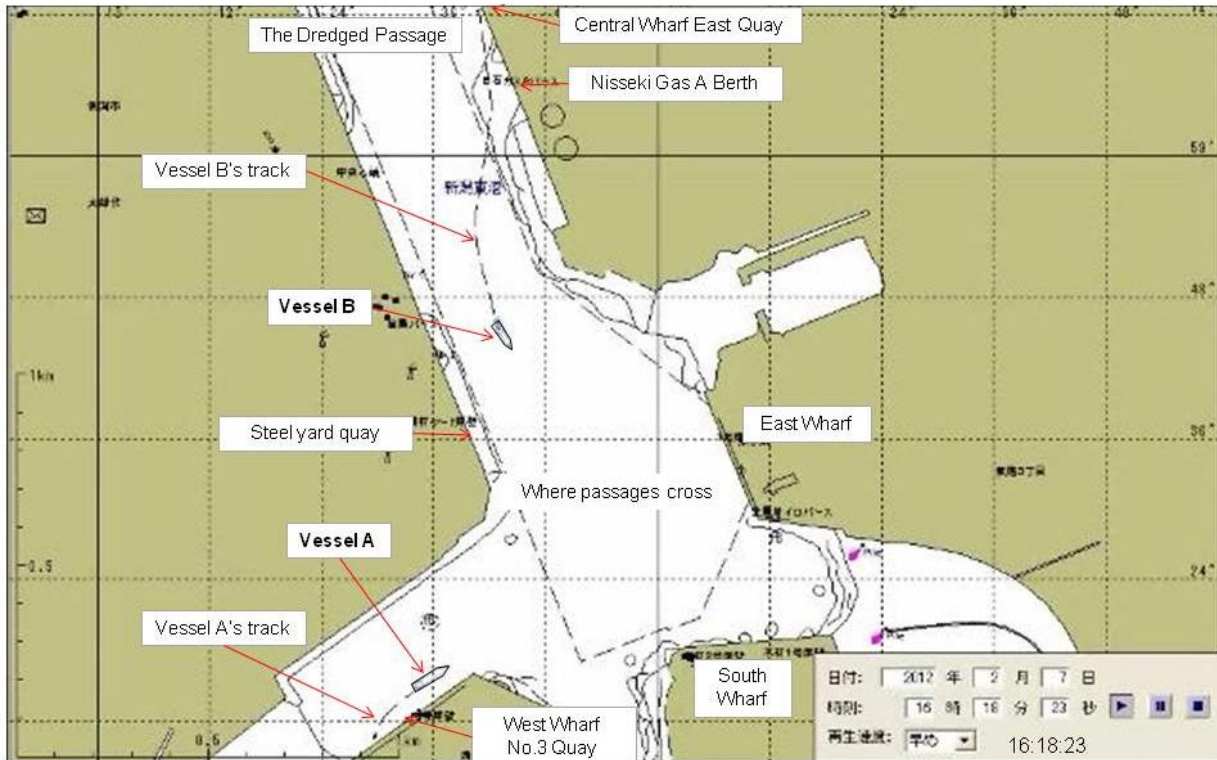


Figure 3.2-1 Situation in which Master A recognized Vessel B's radar image

(2) Analyses of the Situation When Master B Offered the Conduct of Vessel via VHF

- (i) It is probable that the distance between two vessels at 16:19:38, which is close to 16:19:35 when Master B offered the conduct of vessel, was approximately 680m (calculated from the vessel positions in the AIS records of 16:19:38 for Vessel A and 16:19:43 for Vessel B).
- (ii) It is somewhat likely that Vessel A's approximate position was in the vicinity of Vessel B's turning circle when Vessel A steered the rudder and its bow turned by 90° if Vessel A put the helm hard to port in full ahead in the position at 16:19:38 and Vessel B steered the rudder to port at 15° in full ahead as shown in Figure 3.2-2.

Since we were unable to acquire the advance and transfer for the approximate position when Vessel A turned the rudder and its bow turned by 90° at the speed of approximately 5.3kn and that speed has almost no impact on the scale of the turning circle unless it is an extremely slow vessel or a high speed vessel underway in high speed according to the Navigation Handbook (3rd revised edition) (edited by the Navigation Handbook Editing Committee, issued by Kaibundo in 2004), we calculated the approximate position of Vessel A when they steered the rudder and the bow turned by 90° by using the advance and transfer when the rudder was

turned in full ahead. In addition, Figure 3.2-2 was prepared by using the recreated display of this accident at 16:19:38, which is the closest to 16:19:33.

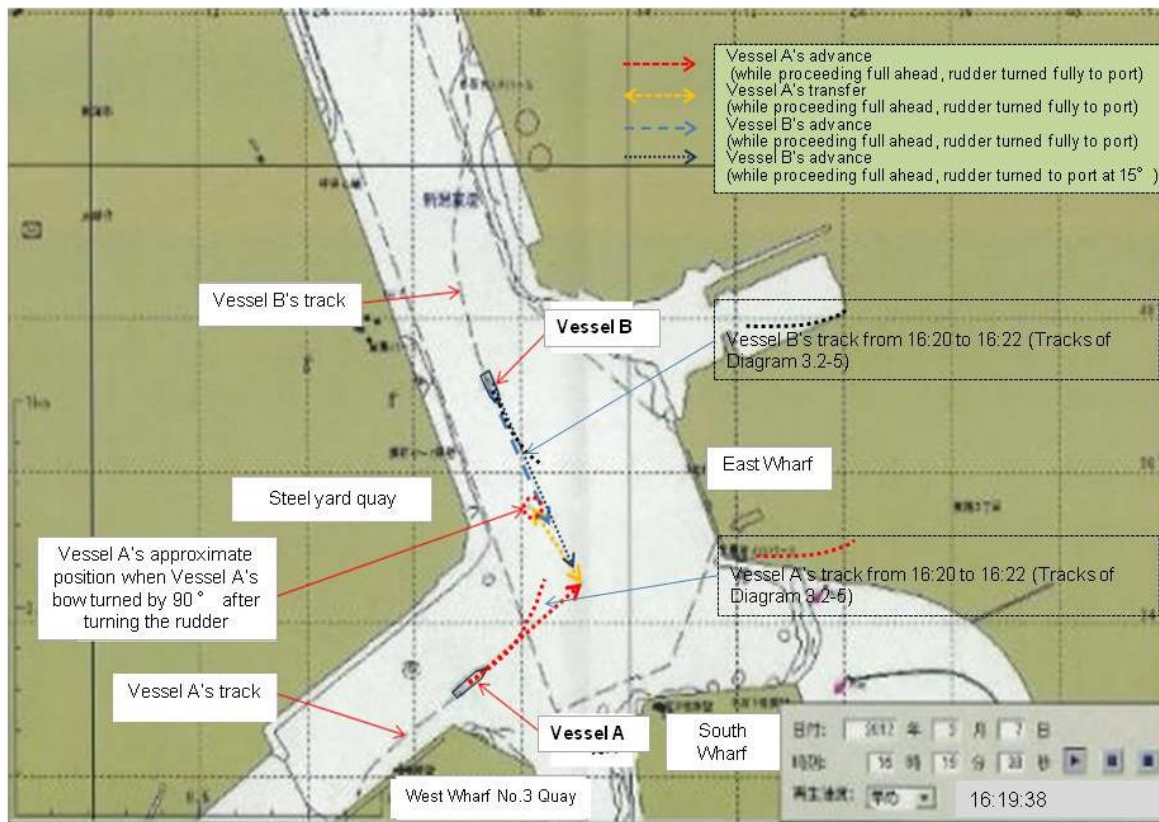


Figure 3.2-2 Situation in which Master B offered the conduct of vessel via VHF

(3) Analyses of the Situation when Master A and Master B Agreed on the Conduct of Vessel

- (i) It is highly probable that the time between Master B offering the conduct of vessel to pass on the starboard side at 16:19:35 and Master A agreeing to Master B's offer and Ex-master A communicating the fact to Vessel B at 16:19:58 via VHF, Vessel A was navigating in the heading of 052 - 053° at the speed of 5.3 – 5.5kn and Vessel B was navigating in the heading of 154° at the speed of 4kn.
- (ii) It is probable that Ex-master A communicated to Vessel B that they were agreeing to the conduct of vessel via VHF at 16:19:58 but the distance between two vessels at 16:19:57 was approximately 600m (calculated from the vessel positions in the AIS records of 16:19:57 for Vessel A and 16:20:03 for Vessel B).
- (iii) It is somewhat likely that Vessel A's approximate position had moved more toward the inside of Vessel B's turning circle than the approximate position in Figure 3.2-2 when Vessel A's bow turned by 90° when Vessel A turned the rudder fully over to port in full ahead in the position at 16:20:03 and Vessel B put the helm to port at

15° in full ahead as shown in Figure 3.2-3.

It is somewhat likely that it took approximately 20 seconds for Master A and Master B to agree on the conduct of vessel and that two vessels approached each other during this time, resulting in lack of time for them to take actions to prevent collision as later described in 3.2.8(4).

In addition, Figure 3.2-3 was prepared by utilizing the recreated display of this accident from 16:20:03, which is the closest to 16:19:58.

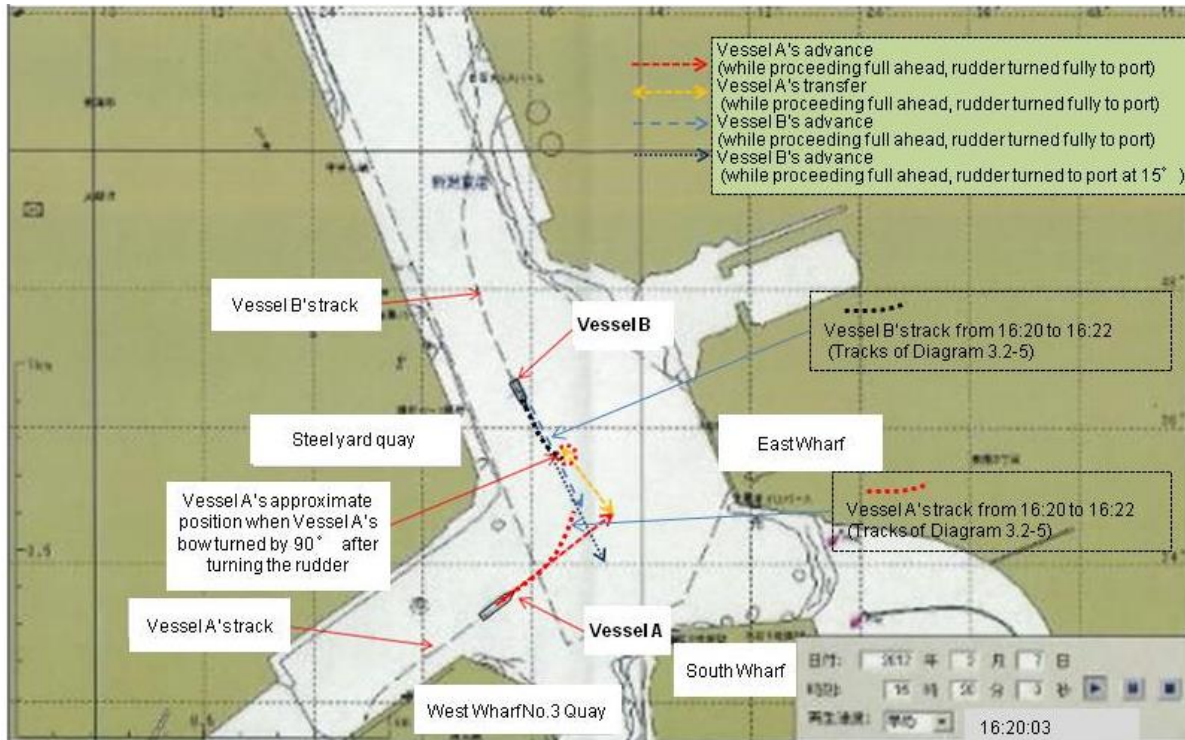


Figure 3.2-3 Situation in which Master A and Master B agreed to the conduct of vessel
(iv) It is somewhat likely that Vessel A would have approached the East Wharf after passing Vessel B on the port side if Vessel A navigated in the course and heading of 16:19:57 and Vessel B navigated in the course and heading of 16:20:03 in the vessel positions of 16:20:03 as shown in Figure 3.2-4.

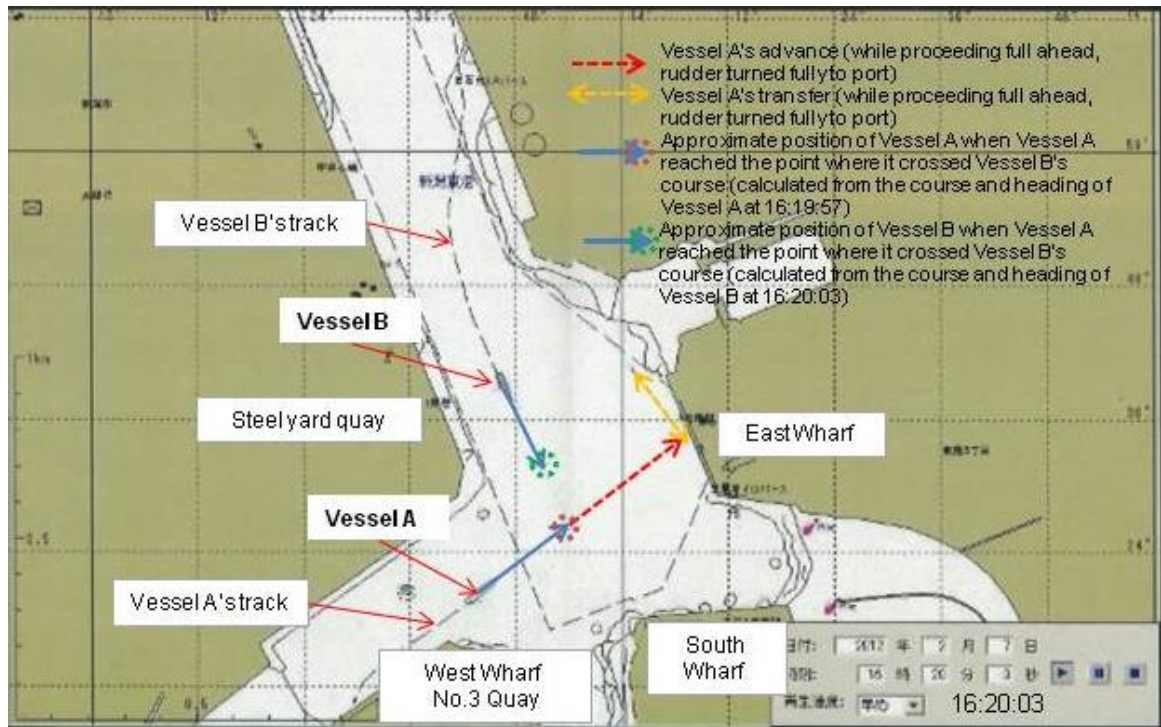


Figure 3.2-4 Approximate position of Vessel B when Vessel A reached the point where it crossed Vessel B's course

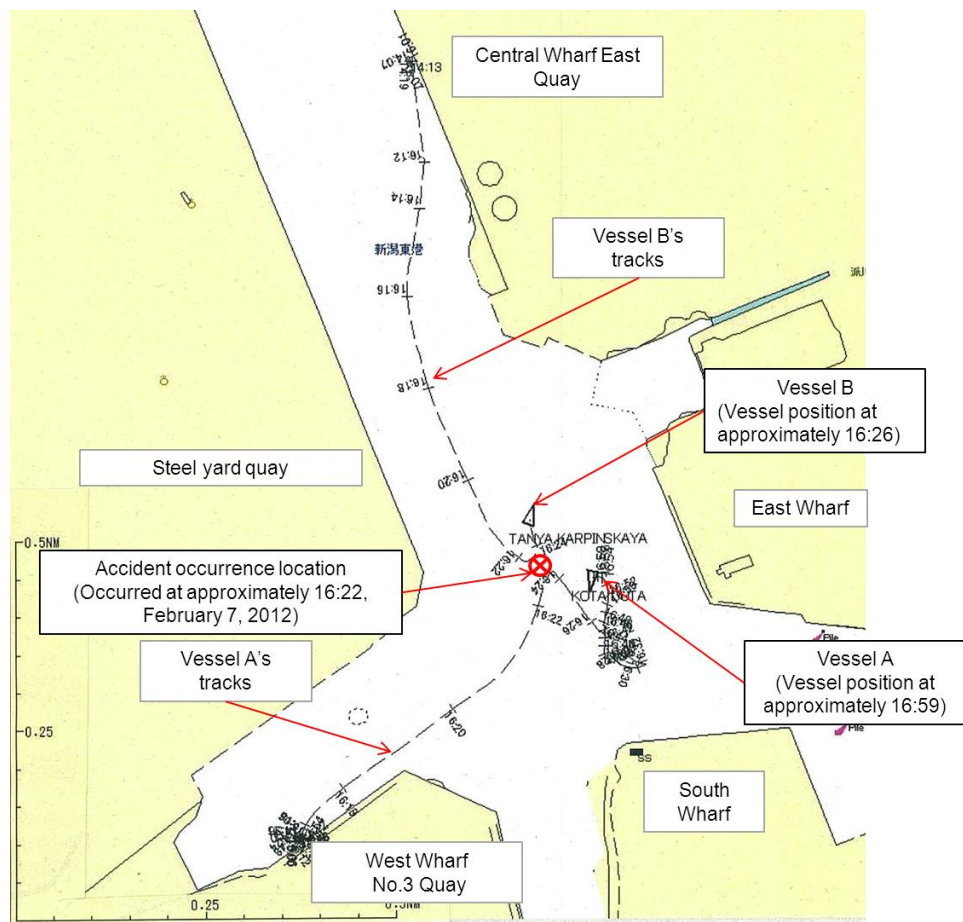


Figure 3.2-5 Tracks of Vessel A and Vessel B (AIS record)

3.2.3 Analyses on the Maneuvering and Look-out

According to 2.1, 3.1.1, and 3.2.2, it was as follows.

(1) Vessel A

- (i) It is probable that Master A recognized a radar image of another vessel proceeding south-southeast in the Dredged Passage with Ex-master A between 16:18:21 and 16:18:27 while Vessel A was navigating along the West Wharf No. 3 Quay coast but was not able to sight the vessel because the structures on the steel yard quay, which was on the port side of Vessel A, blocked the view.
- (ii) It is probable that Master A sighted Vessel B when the said vessel was passing behind structures on the steel yard quay, learned that the radar image was Vessel B, and learned that they were in a situation in which they were approaching Vessel B where the passages crossed.
- (iii) It is probable that Third Officer A sighted Vessel B, saw Vessel B's radar image on the edge of the display on Radar B with the range scale of 0.5M, changed the range scale to 0.75M, and recognized Vessel B's radar image at approximately 45° from the bow on the port side of Vessel A at 0.5M. It is probable that Third Officer did not report the information on Vessel B because he believed that Master A knew the movements of Vessel B due to the fact that Master A was observing Vessel B on Radar A and discussing the movements of Vessel B with Ex-master A.
- (iv) It is probable that Master A expected to pass Vessel B with 2-3 cables (approximately 370 – 550m) where the passages crossed and ordered to proceed slow ahead then to turn the rudder to midships in order to pass Vessel B on the port side.
- (v) It is somewhat likely that Master A believed that Vessel B was the give-way vessel and requested Ex-master A to inquire about the intention of Vessel B via VHF in order to learn what actions Vessel B was going to take in the situation in which they were approaching Vessel A.
- (vi) It is probable that Master A was convinced that Vessel B was going to pass on the starboard side, decided not to pass on the port side, and agreed to the conduct of vessel to pass on the starboard side when the distance between the two vessels were approximately 600m at 16:19:58 due to the facts that Vessel B re-confirmed to pass on the starboard side, that Vessel B was strongly stating "starboard to starboard," that he felt that the report by Ex-master A had a strong tone, saying "starboard to starboard," and that Ex-master A, who was on board to hand over the master position, and Master B stating "starboard to starboard."
- (vii) It is probable that Master A believed that they could safely pass Vessel B if they

put the helm hard to port by facing Vessel B in opposite directions in the middle of the passage from his maneuvering experience of a sister vessel at 16:19:59 and that he ordered hard-a-port in an attempt to execute the agreed conduct of vessel.

It is probable that Master A believed that Vessel B would alter the course to port to at least 20 - 30° at this time.

(viii) It is probable that Master A felt the danger of collision, ordered to put the rudder to midships at 16:20:30, and ordered to communicate “port side to port side” to the other vessel at 16:20:32 due to the facts that the heading of Vessel B, which was attempting to turn to port after the agreement was made on the conduct of vessel and before 16:20:23, was changing from 154° to 153°, that Master A could not recognize its change to port, and that Vessel B approached to Vessel A’s bow on the port side.

It is probable that Master A believed that Vessel B would execute the contents to which they had agreed and continued to execute the contents to which they had agreed despite the facts that he could not recognize the change in Vessel B’s heading for approximately 25 seconds after agreeing on the conduct of vessel and that there was a difference between anticipated actions of Vessel B and actual actions of Vessel B.

(ix) It is probable that Master A ordered to put the bow thruster full to port at 16:20:42 in order to turn the bow to port by using the bow thruster, ordered to stop the engine at 16:20:45, and ordered to put engine full astern at 16:21:07 because there was no time to steer the vessel to port by turning the rudder.

(x) It is probable that Master A recognized that Vessel B put the engine astern by looking at the propeller discharge current*⁹ on the sea surface in the vicinity of Vessel B.

(xi) It is probable that Chief Officer A, who had been assigned to the bow station, felt the bow thruster starting due to the vibration on the deck, reported the fact that Vessel B had approached to approximately 150m in visual estimation in the direction of the bow on the port side to the bridge with the transceiver, felt the danger of collision, and stood-by anchor for letting go.

(2) Vessel B

(i) It is probable that Master B sighted Vessel A, which was navigating along the

*⁹ “propeller discharge current” refers to the flow of water discharged from the propeller due to propeller rotation.

eastern edge of the West Wharf behind structures on the starboard side and observed the movements of Vessel A on the radar while underway in the area of waters where the Dredged Passage width expanded in the southern coast of Nisseki Gas A Berth at approximately 16:19:00.

- (ii) It is probable that Second Officer B, who was in the bow station, recognized Vessel A and reported it to Master B on the public address system.
- (iii) It is probable that Master B believed that Vessel A would turn to port and leave Port of Niigata Higashi Ku by proceeding north in the Dredged Passage and ordered Chief Officer B to find out about the name and distance and other items of Vessel A on AIS.
- (iv) It is probable that Master B offered the conduct of vessel to pass on the starboard side in Russian via VHF at 16:19:35 due to the facts that there was no enough distance and time to judge the conduct of vessel when they were called via VHF to inquire about Vessel B's name in Russian, that it was easy for Vessel B to alter to port due to the large area of waters on the port side of Vessel B, and that he believed it would be safer if the two vessels' courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing Vessel A would turn to port.
- (v) It is probable that Master B tried to execute the agreement after Vessel A agreed on the conduct of vessel at 16:19:58 and ordered Helmsman B to put the helm to port at 15° because he believed that the hull would be listing and it would be dangerous if they put the helm hard to port due to the fact that Vessel B was fully loaded.
- (vi) It is probable that Master B initially believed that they could safely pass Vessel A on the starboard side after Vessel B started to alter to port but inquired about Vessel A's maneuvering situation, asking Vessel A if they had already started to turn via VHF at 16:20:28 due to the facts that that Vessel A's heading remained 052° unchanged after they agreed on the conduct of vessel until 16:20:17, that he could not understand why Vessel A was not changing the heading to port, and that he was concerned that the two vessels may not be able to pass safely.

It is probable that Master B believed that Vessel A would execute the contents to which they had agreed and continued to execute the contents to which they had agreed despite the facts that no change was made to Vessel A's heading for approximately 19 seconds after agreeing on the conduct of vessel and that there was a difference between anticipated actions of Vessel A and actual actions of Vessel A.

- (vii) It is probable that Vessel B's heading was changing from 153° to 146° between 16:20:23 and 16:20:43 that Master B believed that they could not change the course

to starboard just by turning the rudder due to the facts that Vessel A stated that they were not able to pass Vessel B starboard side to starboard side, that they could only pass port side to port side, and that they would pass on the port side via VHF at 16:20:35 and that Master B ordered Chief Officer B to stop the engine and to put engine full astern in order to turn the bow to starboard because the bow would turn to starboard if Vessel B's engine was put to full astern.

3.2.4 Weather and Sea Conditions

According to 2.6, it is probable that the weather was cloudy with occasional rain, the wind direction was southwest with the wind force of 2-3, and visibility was 6 (4km – 10km), while the tide was starting to fall, and the sunset was at 16:17:13 at the time of the occurrence of this accident.

3.2.5 Analyses of the Accident Area

According to 2.1.2, 2.7 and 3.2.2 (1), it was as follows.

- (1) It is probable that only Vessel A and Vessel B were navigating in the passage in the Higashi Ku at the time of the occurrence of the accident.
- (2) It is highly probable that the steel yard quay was located at where the 14m deep Dredged Passage and the passage along the edge of West Wharf No.3 Quay crossed, which resulted in the said quay's structures to block the view, preventing the masters of both vessels from being able to sight the other vessel until the distance between the two vessels was approximately 890m.

3.2.6 Analyses of Detection of the other Vessel with Radar

According to 2.1.2, 2.5.2(1) (iii), 2.5.2(2) (ii), 2.7.1, 2.7.2, 2.9, and 3.2.5, and the combination of radar images and recreated display of this accident, it was as follows.

- (1) It is highly probable that the distance between the two vessels was approximately 1.0M while Vessel A and Vessel B were berthed.
- (2) It is probable that Third Officer A started the radar to stand-by for departure and confirmed the items included in the Departure Checklist in the manual while Vessel A was berthed. It is probable that Third Officer A set the radar range scale to 0.5M at departure stand-by and continued to operate the radar in the same range scale; subsequently, changed the range scale of Radar B to 0.75M because Vessel B's radar image was on the edge of Radar B display when he sighted Vessel B. Therefore, it is probable that Third Officer A did not comply with the rules in the Safety Management

Procedure Manual, which states that “The officer of the watch shall ensure that range scales employed are changed at sufficiently frequent intervals” and that he did not correctly understand the items necessary to ensure safety navigation.

- (3) It is probable that Chief Officer B started the radar and set the range scale to 1M while Vessel B was berthed.
- (4) It is probable that Vessel A could have detected Vessel B before Vessel A departed and learn the movements of Vessel B, which was navigating along the coast of the Nisseki Gas A Berth if the range scale of Radar A was set to 1.5M at the time of departure stand-by while Vessel A was berthed in the West Wharf No.3 Quay in Port of Niigata Higashi Ku, due to the fact that the Central Wharf East Quay, in which Vessel B was berthed, and the Nisseki Gas A Berth in the Higashi Ku could have been detected by Radar A if the range scale of Radar A was set to 1.5M.
- (5) It is probable that Vessel B could have learned the existence and movements of Vessel A 2-3 minutes before sighting Vessel A behind structures at around 16:19:00 if Master B was observing the radar display at approximately 16:16:28, which was when the distance from Vessel A was 0.9M, due to the fact that the radar range scale was set to 1M.
- (6) According to the above (4) and (5), it is somewhat likely that masters of Vessel A and Vessel B could have performed operations such as deceleration and take measures to avoid the situation in which the two vessels approached each other where the passages crossed by detecting the other vessel early if they had followed the contents of “*Navigational watch*” (“*range scales employed are changed at sufficiently frequent intervals so that echoes are detected as early as possible*” and “*select an appropriate range scale and observe the display carefully, and shall ensure that plotting or systematic analysis is commenced*”) mentioned in 38 and 39 of *Part 3-1, Part 3, A-VIII/2*, Chapter 8, Annex of the STCW Convention

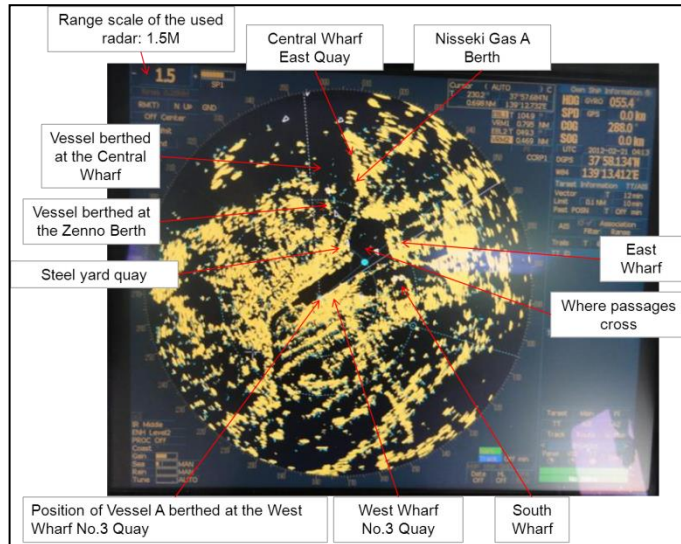


Photo 3.2-1 Vessel A's radar image

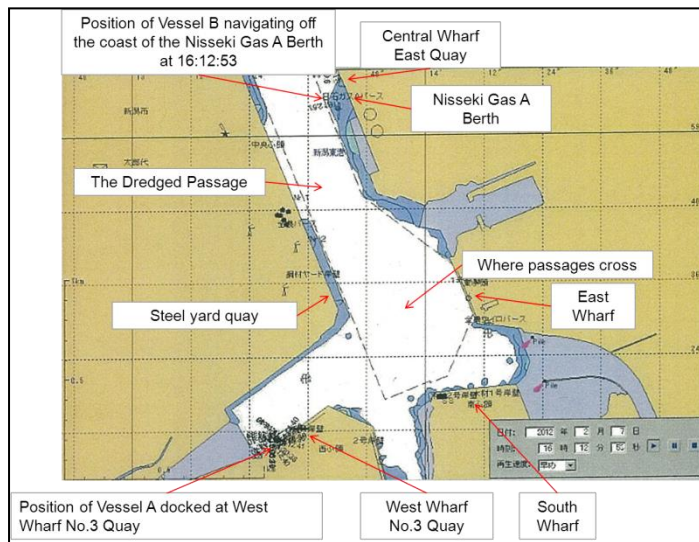


Figure 3.2-6 Recreated image display of this accident at 16:12:53

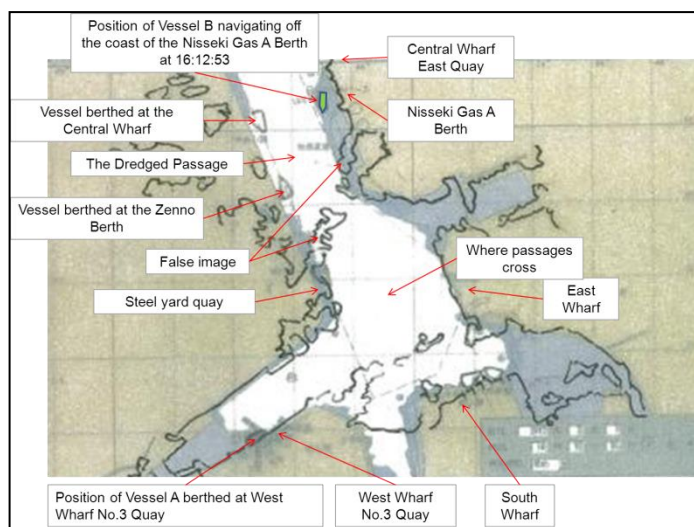


Figure 3.2-7 Combination of radar images and recreated display of this accident utilizing AIS

3.2.7 Analyses on Information Collection on Entering/Leaving Vessels

According to 2.1.2 and 2.10 it was as follows.

- (1) It is probable that personnel in charge of Vessel Agent A and personnel in charge of Vessel Agent B could not provide information regarding the port entry/departure of other vessels to Vessel A and Vessel B due to the fact that they had not acquired information on the port entry/departure of the other vessel, Vessel B or Vessel A.
- (2) It is probable that the masters of two vessels could have taken measures, such as changing the voyage plan in order to avoid the situation in which two vessels approached each other where the passages crossed if they had acquired the information regarding the other vessel's port entry/departure from personnel in charge of their vessel agent.

3.2.8 Analyses on VHF Communication

According to 2.1, 2.4, 2.11, 2.16 and 3.2.2, it was as follows.

- (1) It is probable that Master A was able to understand that Vessel B offered to pass on the starboard side at 16:19:35 because he had learned Russian but was unable to understand that they said that they were slightly going to port and that Ex-master A only communicated to Master A regarding the communication contents with Master B that the other vessel was wanting to pass starboard side to starboard side without reporting that Vessel B was slightly going to port.

It is probable that Master A believed that Vessel B would alter the course to port at least at 20-30° because he had not acquired the information regarding Vessel B turning to port as the above.

- (2) It is probable that Master B believed that putting the helm hard to port to turn to port would cause the hull to be listing and cause danger due to the fact that Vessel B was fully loaded and ordered Helmsman B to steer the rudder to port to 15° but that vessel B did not communicate to Vessel A the intention to turn to port at 15° via VHF.

On the other hand, it is probable that Master A would have believed that it would take time for Vessel B to change the course to port at 20-30° if Vessel B had communicated the fact that they were turning to port at 15° when they offered the conduct of vessel at 16:19:35 because Master B communicated to Vessel A the fact that Vessel B was turning the rudder fully over to port at 16:20:38.

- (3) It is probable that Master B could not understand the reason why Vessel A was not changing the heading to port at 16:20:28 as mentioned in the above 3.2.3(2)(vi) and inquired Vessel A if they had already started to turn via VHF but did not consider that

it took time for Vessel A with 6,245gt to turn to port even if it put the helm hard to port due to the fact that he mainly had experience as a master for cargo ships for 2,000 – 3,000gt. It is also probable that Master B believed that Vessel A would execute the contents to which they agreed at 16:20:28.

- (4) It is somewhat likely that the fact it took approximately 20 seconds to agree on the conduct of vessel contributed to the occurrence of this accident due to the facts that Master A and Master B took approximately 20 seconds to agree on the conduct of vessel, while Vessel A and Vessel B were navigating at the speed of 5.3 – 5.5kn and 4kn during this time without altering the course, that they had approached each other to the distance of approximately 600m, and that they had no time to take actions to avoid collision when the vessels further approached each other in the situation that was different from the agreed conduct of vessel in which they could not recognize any change in the other vessel's heading.
- (5) It is probable that Master A ordered to stop the engine at 16:20:45 and that Master B ordered to stop the engine after communicating to Vessel A via VHF that they were putting the helm hard to port to turn to port at 16:20:38. It is probable that masters of both vessels believed that the other vessel would execute the contents to which they had agreed and continued to approach the other vessel without being able to recognize any change in the other vessel's heading even though there was a difference between anticipated actions of the other vessel and the actual actions of the other vessel due to the fact that they had agreed to pass on the starboard by only changing the course to port via VHF.

It is probable that this accident could have been avoided if both vessels had decelerated or stopped or if Master A and Master B had decided to decelerate or stop both vessels via VHF in order to establish the time or distance for the vessels to approach each other and agreed to the conduct of vessel in which one of the vessels passes the crossing after the other vessel passed.

Although this accident was an accident that occurred in a port, it is probable that it was similar to the collision of the container ship Hyundai Dominion and the cargo ship Sky Hope, which occurred in a wide area of ocean, in the way that actions to avoid collision were delayed due to VHF communication.

- (6) It is probable that Company A notified Vessel A the risks of using VHF, such as leading to agreeing to an action that does not comply with the Regulations on Preventing Collision at Sea and wasting valuable time for discussion, etc., as “safety information” in response to the “CAUTION ON THE USE OF VHF RADIO IN COLLISION

AVOIDANCE,” which was issued by the flag State in March, 2011, but the “Navigation In Narrow Channel/Congested Waters Checklist,” which was prepared by Company A, only mentioned “Listening watch on VHF maintained on appropriate channels.”

It is probable that it is necessary for Company A to call for attention by establishing items that enables crew members to reconfirm the risks of using VHF in the checklists in addition to notifications in documents in order to thoroughly notify the risks of using VHF to crew members.

As the written reply for the questions on the use of VHF from Company C was not available, the attention calling situation to crew members on the use of VHF was not determined.

3.2.9 Analyses on BRM

According to 2.1 and 2.12, it is probable that to be as follows.

(1) Vessel A

- (i) Ex-master A was specified as a supernumerary on the crew member list and was not part of the bridge team. However, due to the fact that he was communicating to Vessel B via VHF in response to the request by Master A after sighting Vessel B and was part of the agreement on the conduct of vessel, he was practically functioning as part of the bridge team.
- (ii) Although Ex-master A believed that it would be safe for Vessel A to stop and observe the movements of Vessel B without changing the course in order to avoid collision with Vessel B, he did not state his opinion to Master A due to the fact that he was not part of the bridge team.
- (iii) Third Officer A was supposed to report information on vessels underway in the vicinity by appropriately using the radar as OOW. However, due to the fact that he set the range scale to 0.5M at the time of departure stand-by and did not change the range scale after this, he was unable to detect Vessel B until Vessel B approached to the distance of less than 0.5M. He was unable to report the information on Vessel B to Master A.
- (iv) Chief Officer A conducted education and training on BRM to Vessel A’s crew members on the vessel in December, 2011, by using video educational materials. Therefore, the crew members had learned that bridge teamwork was important and that members of the bridge team were to provide sufficient support to the master, such as providing safety-related information. However, they were unable to execute the contents of the education or training at the time of this accident as mentioned in

the above (iii).

(2) Vessel B

No education or training was conducted on Vessel B on BRM.

3.2.10 Analyses of the Accident Occurrence

According to 2.1, 3.1.1, and 3.2.2 to 3.2.9, it was as follows.

- (1) It is probable that Vessel A left the West Wharf No.3 Quay in Port of Niigata Higashi Ku at approximately 16:12:00 on February 7 and proceeded northeast for Port of Tomakomai.
- (2) It is highly probable that Master A recognized the radar image of another vessel proceeding south-southeast the Dredged Passage while Vessel A was navigating along the edge of the West Wharf No.3 Quay, sighted it when the vessel passed behind the structures on the steel yard quay, learned that it was Vessel B, and learned that they were in a situation in which they were approaching Vessel B where the passages crossed.
- (3) It is somewhat likely that Master A requested Ex-master A to inquire about the intention of Vessel B via VHF in order to find out what actions Vessel B was going to take after ordering to proceed slow ahead and to turn the rudder to midships in order to pass Vessel B on the port side where the Dredged Passages crossed.
- (4) It is highly probable that Ex-master A called Vessel B's name via VHF at 16:19:33 and was informed that Vessel B would pass on the starboard side.
- (5) It is probable that Master A was convinced that Vessel B was going to pass on the starboard side, decided not to pass on the port side, and agreed to the conduct of vessel to pass on the starboard side when the distance between the two vessels were approximately 600m at 16:19:58 due to the facts that Vessel B re-confirmed to pass on the starboard side, that Vessel B was strongly stating "starboard to starboard," that he felt that the report by Ex-master A had a strong tone, saying "starboard to starboard," and that Ex-master A, who was on board to hand over the master position, and Master B stating "starboard to starboard."
- (6) It is highly probable that Master A ordered hard-a-port in an attempt to execute the conduct of vessel on which they had agreed.
- (7) It is probable that Master A ordered to put the bow thruster full to port at 16:20:42, to stop the engine at 16:20:45, and to put engine full astern at 16:21:07 due to the facts that the heading of Vessel B, which said it was going to port, changed from 154° to 153° after they agreed on the conduct of vessel and before 16:20:23, even though he

believed Vessel B would alter the course to port at least to 20-30°, that he was not able to recognize the change to port, that Vessel B approached Vessel A's bow on the port side, and that he felt the danger of collision.

- (8) It is probable that Vessel A's bow and Vessel B's forward starboard side collided with each other when Vessel A was turning to port with proceeding due to the fact that Vessel A proceeded to approach Vessel B because both vessels agreed to the conduct of vessel for both vessels to turn to port and pass on the starboard side even though Master A was unable to recognize the change in Vessel B's heading and that the situation was not according to the conduct of vessel to which they had agreed.
- (9) It is probable that Vessel B left the Central Wharf East Quay in Port of Niigata Higashi Ku at approximately 16:00:00 and proceeded south-southeast in the Dredged Passage for the South Wharf in the same section.
- (10) It is probable that Master B sighted Vessel A, which was navigating along the eastern edge of the West Wharf behind structures on the steel yard quay while navigating the area of waters where the Dredged Passage width expanded in the southern coast of Nisseki Gas A Berth at and believed that Vessel A was leaving Port of Niigata Higashi Ku by proceeding north in the Dredged Passage.
- (11) It is probable that Master B offered the conduct of vessel to pass on the starboard side in Russian via VHF at 16:19:35 due to the facts that there was no enough distance and time to judge the conduct of vessel when they were called via VHF to inquire about Vessel B's name in Russian, that it was easy for Vessel B to turn to port due to the large area of waters on the port side of Vessel B, and that he believed it would be safer if the two vessels' courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing Vessel A would turn to port.
- (12) It is probable that Master B tried to execute the conduct of vessel to which they had agreed after Vessel A agreed to the conduct of vessel to pass on the starboard side at 16:19:58, believed that the hull would be listing and it would be dangerous if they put the helm hard to port due to the fact that Vessel B was fully loaded, ordered Helmsman B to steer the rudder to port at 15°, but did not communicate Vessel A their intention that Vessel B would turn to port 15° via VHF.
- (13) It is probable that Master B initially believed that they could safely pass Vessel A on the starboard side but inquired about Vessel A's maneuvering situation via VHF at 16:20:28 due to the facts that that Vessel A's heading remained 052° unchanged after they agreed on the conduct of vessel until 16:20:17, that he could not understand why Vessel A was not changing the heading to port, and that he was concerned that the two

vessels may not be able to pass safely. It is probable that Master B did not consider that it took time for Vessel A with 6,245gt to turn to port even if it put the helm hard to port due to the fact that he mainly had experience as a master for cargo ships for 2,000 – 3,000gt.

- (14) It is probable that Master B ordered to stop the engine and to put engine full astern to turn the bow to port due to the fact that Vessel A offered to pass on the port side at 16:20:35.
- (15) It is probable that Vessel B's forward starboard side and Vessel A's bow collided with each other when Vessel B was turning to port with proceeding due to the fact that Vessel B proceeded to approach Vessel A due to the fact that both vessels agreed to the conduct of vessel for both vessels to turn to port and pass on the starboard side even though Master B was unable to recognize the change in Vessel A's heading and that the situation was not according to the conduct of vessel to which they had agreed.
- (16) It is somewhat likely that the fact it took approximately 20 seconds to agree on the conduct of vessel contributed to the occurrence of this accident due to the facts that Master A and Master B took approximately 20 seconds to agree on the conduct of vessel via VHF, that the vessels had approached each other to the distance of approximately 600m, and that they had no time to take actions to avoid collision when the vessels further approached each other in the situation that was different from the agreed conduct of vessel in which they could not recognize any change in the other vessel's heading when they tried to take actions to execute this agreement.

3.3 Analyses on Measures to Reduce Damage

According to 2.13, it is probable that all of the crew members on Vessel B were saved themselves due to the facts that Vessel B conducted the abandon ship drill stipulated by Regulation 19-3.2, Chapter III, Consolidated text of Annex of the International Convention for the Safety of Life at Sea (SOLAS) by utilizing inflatable liferafts in December, 2011, and January, 2012, that more than half of the crew members of her had been continuously on board for over three years, that everyone was familiar with the evacuating method upon evacuation with inflatable liferafts at the time of this accident, besides that there was approximately 40 minutes after the collision and before floundering.

4 CONCLUSIONS

4.1 Findings

(1) Events Leading to the Accident

(i) Vessel A

- a It is highly probable that Master A recognized the radar image of another vessel proceeding south-southeast between 16:18:21 and 16:18:27 and recognized that the said radar image was Vessel B at 16:18:37 while proceeding northeast toward Port of Tomakomai after leaving the West Wharf No.3 Quay in Port of Niigata Higashi Ku. (3.1.1(1)(i) and (ii))*¹⁰
- b It is highly probable that Vessel A agreed to the conduct of vessel of passing Vessel B on the starboard side via VHF at 16:19:58 and Vessel A put the helm hard to port at 16:19:59. (3.1.1(1) (vi) and (v))
- c It is highly probable that Master A recognized that Vessel B was approaching Vessel A, felt the danger of collision, and ordered to put the bow thruster full to port at 16:20:42, to stop the engine at 16:20:45, and to put engine full astern at 16:21:07. (3.1.1(1) (vii))
- d It is probable that Vessel A's bow and Vessel B's forward starboard side collided with each other when Vessel A was turning to port while proceeding. (3.1.1(1) (ix))

(ii) Vessel B

- a While Master B was proceeding south-southeast in the Dredged Passage from the Central Wharf East Quay in the Higashi Ku toward the South Wharf in the same section, it is probable that he sighted Vessel A behind the structures on the starboard side approximately when Master A sighted Vessel B and believed that Vessel A was proceeding north in the Dredged Passage. (3.1.1(2)(i) and (ii))
- b It is highly probable that Master B offered the conduct of vessel to pass on starboard side to starboard side via VHF to Vessel A at 16:19:35. (3.1.1(2) (iii))
- c It is probable that Vessel B put the helm to port at 15° after agreeing to the conduct of vessel to pass on the starboard side with Vessel A. (3.1.1(2) (iv))
- d It is probable that Master B believed that Vessel A's heading wasn't changing to port, became concerned that the vessels may not be able to pass safely, inquired

*¹⁰ Numbers included at the end of the sentence in 4.1 and 4.3 refer to the major section numbers of "3 ANALYSIS" and "5 SAFETY ACTIONS" related to the applicable mentions.

Vessel A about the maneuvering situation via VHF at 16:20:28, and ordered to stop the engine and to put engine full astern. (3.1.1(2) (vi))

e It is probable that Vessel B's forward starboard side and Vessel A's bow collided with each other when Vessel B was turning to port while proceeding. (3.1.1(2) (vii))

(2) Look-out and Maneuvering Situation

(i) Vessel A

a It is somewhat likely that Master A sighted Vessel B and learned that they were in the situation in which they would approach it where the passages crossed, and Master A believed that Vessel B was the give-way vessel and requested Ex-master A to inquire about the intention of Vessel B via VHF in order to learn what actions Vessel B was going to take in the situation in which they were approaching Vessel A. (3.2.3(1) (ii) and (v))

b It is probable that Master A was convinced that Vessel B was going to pass on the starboard side, decided not to pass on the port side, and agreed to the conduct of vessel to pass on the starboard side when the distance between the two vessels were approximately 600m at 16:19:58 due to the facts that Vessel B re-confirmed to pass on the starboard side, that Vessel B was strongly stating "starboard to starboard," that he felt that the report by Ex-master A had a strong tone, saying "starboard to starboard," and that Ex-master A, who was on board to hand over the master position, and Master B stating "starboard to starboard." (3.2.3(1) (vi))

c It is probable that Master A believed that they could safely pass Vessel B if they put the helm hard to port by facing Vessel B in opposite directions in the middle of the passage from his maneuvering experience of a sister vessel at 16:19:59 and that he ordered hard-a-port in an attempt to execute the agreed conduct of vessel. It is probable that Master A believed that Vessel B would alter the course to port to at least 20 - 30° at this time. (3.2.3(1) (vii))

d It is probable that Master A ordered to put the bow thruster full to port at 16:20:42, to stop the engine at 16:20:45, and to put engine full astern at 16:21:07 in order to turn the bow to port by using the bow thruster due to the facts that the heading of Vessel B, which said it was going to port, changed from 154° to 153° after they agreed on the conduct of vessel and before 16:20:23, that he was not able to recognize the change to port, that Vessel B approached Vessel A's bow on the port side, and that he felt the danger of collision. (3.2.3(1) (viii) and (ix))

(ii) Vessel B

- a It is probable that Master B offered the conduct of vessel to pass on the starboard side via VHF at 16:19:35 due to the facts that there was no enough distance and time to judge the conduct of vessel when they were called by Vessel A via VHF after sighting Vessel A, that it was easy for Vessel B to turn to port due to the large area of waters on the port side of Vessel B, and that he believed it would be safer if the two vessels' courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing Vessel A would turn to port. (3.2.3(2) (i) and (iv))
- b It is probable that Master B tried to execute the agreement after Vessel A agreed on the conduct of vessel and ordered Helmsman B to put the helm to port at 15° because he believed that the hull would be listing and it would be dangerous if they put the helm hard to port due to the fact that Vessel B was fully loaded. (3.2.3(2) (v))
- c It is probable that Master B initially believed that they could safely pass Vessel A on the starboard side after Vessel B started to alter to port but inquired about Vessel A's maneuvering situation, asking Vessel A about their situation via VHF at 16:20:28 due to the facts that that Vessel A's heading remained 052° unchanged after they agreed on the conduct of vessel until 16:20:17, that he could not understand why Vessel A was not changing the heading to port, and that he was concerned that the two vessels may not be able to pass safely. (3.2.3(2) (vi))
- d It is probable that Vessel B's heading was changing from 153° to 146° between 16:20:23 and 16:20:43 that Master B believed that they could not change the course to starboard just by steering the rudder due to the facts that Vessel A stated that they were not able to pass Vessel B starboard side to starboard side, that they could only pass port side to port side, and that they would pass on the port side via VHF at 16:20:35 and that Master B ordered Chief Officer B to stop the engine and to proceed full astern in order to turn the bow to starboard due to the fact that the bow would turn to starboard if Vessel B's engine was put to full astern. (3.2.3(2) (vii))

(3) Analyses of the Accident Area

It is highly probable that the masters of the vessels could not sight the other vessel until the distance between the two vessels was approximately 890m due to the fact that structures on the steel yard quay blocked the view while Vessel A and Vessel B were navigating. (3.2.5(2))

(4) Analyses of Detection of the other Vessel with Radar

- (i) It is probable that Third Officer A started the radar to stand-by for departure and confirmed the items included in the Departure Checklist in the manual while Vessel A was berthed. It is probable that Third Officer A set the radar range scale to 0.5M at departure stand-by, continued to operate the radar in the same range scale; subsequently, changed the range scale of Radar B to 0.75M due to the fact that Vessel B's radar image was on the edge of Radar B display when he sighted Vessel B. Therefore, it is probable that Third Officer A did not comply with the rules in the Safety Management Procedure Manual, which states that "The officer of the watch shall ensure that range scales employed are changed at sufficiently frequent intervals" and that he did not correctly understand the items necessary to ensure safety navigation. (3.2.6(2))
- (ii) It is probable that Vessel A could have detected Vessel B before Vessel A departed and learn the movements of Vessel B, which was navigating along the coast of the Nisseki Gas A Berth if the range scale of Radar A was set to 1.5M at the time of departure stand-by while Vessel A was berthed in the West Wharf No.3 Quay in Port of Niigata Higashi Ku, due to the fact that the Central Wharf East Quay, in which Vessel B was berthed, and the Nisseki Gas A Berth in the Higashi Ku could have been detected on Radar A if the range scale by Radar A was set to 1.5M. (3.2.6(4))
- (iii) It is probable that Vessel B could have learned the existence and movements of Vessel A 2-3 minutes before sighting Vessel A behind structures at around 16:19:00 if Master B was observing the radar display at approximately 16:16:28, due to the fact that the radar range scale was set to 1M. (3.2.6(5))
- (iv) It is somewhat likely that masters of Vessel A and Vessel B could have performed operations such as deceleration and take measures to avoid the situation in which the two vessels approached each other where the passages crossed by detecting the other vessel early if they had followed the contents of "*Navigational watch*" mentioned in 38 and 39 of *Part 3-1, Part 3, A-VIII/2*, Chapter 8, Annex of the STCW Convention. (3.2.6(6))

(5) Analyses on Information Collection on Entering/Leaving Vessels

It is probable that the masters of two vessels could have taken measures, such as changing the voyage plan in order to avoid the situation in which two vessels approached each other where the passages crossed if they had acquired the information regarding the other vessel's port entry/departure from personnel in charge of their vessel agent. (3.2.7(2))

(6) Analyses on VHF Communication

- (i) It is probable that Master A believed that Vessel B would alter the course to port at least at 20-30° due to the fact that he had not acquired the information regarding Vessel B turning to port. (3.2.8(1))
- (ii) It is somewhat likely that the fact it took approximately 20 seconds to agree on the conduct of vessel contributed to the occurrence of this accident due to the facts that Master A and Master B took approximately 20 seconds to agree on the conduct of vessel, while Vessel A and Vessel B were navigating at the speed of 5.3 – 5.5kn and 4kn during this time without altering the course, that they had approached each other to the distance of approximately 600m, and that they had no time to take actions to avoid collision when the vessels further approached each other in the situation that was different from the agreed conduct of vessel in which they could not recognize any change in the other vessel's heading. (3.2.8(4))
- (iii) It is probable that Master A ordered to stop the engine at 16:20:45 and that Master B ordered to stop the engine after communicating to Vessel A via VHF that they were putting the helm hard to port to turn to port at 16:20:38. It is probable that masters of both vessels believed that the other vessel would execute the contents to which they had agreed and continued to approach the other vessel without being able to recognize any change in the other vessel's heading even though there was a difference between anticipated actions of the other vessel and the actual actions of the other vessel due to the fact that they had agreed to pass on the starboard by only changing the course to port via VHF.

It is probable that this accident could have been avoided if both vessels had decelerated or stopped or if Master A and Master B had decided to decelerate or stop both vessels via VHF in order to establish the time or distance for the vessels to approach each other and agreed to the method in which one of the vessels passes the crossing after the other vessel passed. (3.2.8(5))

(7) Analyses on BRM

- (i) It is probable that Ex-master A did not state his opinion to Master A due to the facts that Company A specified that supernumeraries are not to be part of the bridge team even though he believed that it would be safe for Vessel A to stop and observe the movements of Vessel B without changing the course in order to avoid collision with Vessel B. (3.2.9(1) (i) and (ii))
- (ii) Third Officer A was supposed to report information on navigating vessels in the vicinity by appropriately using the radar as the OOW. However, due to the fact that

he set the range scale to 0.5M at the time of departure stand-by and did not change the range scale after this, it is probable that he was not able to detect Vessel B until Vessel B approached to the distance of less than 0.5M and was not able to report the information on Vessel B to Master A. (3.2.9(1) (iii))

(iii) Chief Officer A conducted education and training on BRM to Vessel A's crew members on the vessel in December, 2011, by using video educational materials. Therefore, the crew members had learned that bridge teamwork was important and that members of the bridge team were to provide sufficient support to the master, such as providing safety-related information. However, it is probable that they were not able to execute the contents of the education or training at the time of this accident as mentioned in the above (ii). (3.2.9(1) (iv))

(8) Causal Factors for this Accident

(i) It is probable that the vessels collided with each other due to the facts that Master A and Master B agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after Master A put the helm hard to port and Master B put the helm to port at 15° in an attempt to execute the agreement, and that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while Vessel A was proceeding northeast after leaving the West Wharf No.3 Quay and while Vessel B was proceeding south-southeast from the Central Wharf East Quay toward the South Wharf in Port of Niigata Higashi Ku.

(ii) It is probable that Master A was convinced that Vessel B was going to pass on the starboard side, decided not to pass on the port side, and agreed to the conduct of vessel to pass on the starboard side due to the facts that Vessel B re-confirmed to pass on the starboard side, that Vessel B was strongly stating "starboard to starboard," that he felt that the report by Ex-master A had a strong tone, saying "starboard to starboard," and that Ex-master A, who was on board to hand over the master position, and Master B stating "starboard to starboard." (3.2.3(1) (vi))

(iii) It is probable that Master B acquired Vessel A's agreement for the conduct of vessel to pass on the starboard side by offering the conduct of vessel to pass on the starboard side due to the facts that there was no enough distance and time to judge the conduct of vessel when they were called by Vessel A via VHF to inquire about Vessel B's name in Russian, that it was easy for Vessel B to turn to port due to the large area of waters on

the port side of Vessel B, and that he believed it would be safer if the two vessels' courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing Vessel A would turn to port. (3.2.3(2) (iv), and (v))

- (iv) It is somewhat likely that the fact it took approximately 20 seconds to agree on the conduct of vessel contributed to the occurrence of this accident due to the facts that Master A and Master B took approximately 20 seconds to agree on the conduct of vessel, that the vessels had approached each other to the distance of approximately 600m, and that they had no time to take actions to avoid collision when the vessels further approached each other in the situation that was different from the agreed conduct of vessel in which they could not recognize any change in the other vessel's heading when they tried to take actions to execute this agreement. (3.2.10(16))

4.2 Probable Causes

It is probable that this accident occurred because the vessels collided with each other due to the facts that Master A and Master B agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after Master A put the helm hard to port and Master B put the helm to port at 15° in an attempt to execute the agreement, and that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while Vessel A was proceeding northeast after leaving the West Wharf No.3 Quay and while Vessel B was proceeding south-southeast from the Central Wharf East Quay toward the South Wharf in Port of Niigata Higashi Ku.

It is probable that the reason Master A agreed to the conduct of vessel for both vessels to turn to port to pass on the starboard side via VHF was that Master A was convinced that Vessel B was going to pass on the starboard side due to the facts that Vessel B re-confirmed to pass on the starboard side, that Vessel B was strongly stating "starboard to starboard" via VHF, that he felt that the report by Ex-master A had a strong tone, saying "starboard to starboard," and that Ex-master A, who was on board to hand over the master position, and Master B were stating "starboard to starboard."

It is probable that the reason Master B agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF was that Master B offered the conduct of vessel to pass on the starboard side due to the facts that there was no enough distance and time to judge the conduct of vessel when they were called by Vessel A via VHF to inquire

about Vessel B's name in Russian, that it was easy for Vessel B to alter to port due to the large area of waters on the port side of Vessel B, and that he believed it would be safer if the two vessels' courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing Vessel A would turn to port.

It is somewhat likely that the fact it took approximately 20 seconds to agree on the conduct of vessel contributed to the occurrence of this accident due to the facts that Master A and Master B took approximately 20 seconds to agree on the conduct of vessel, that the vessels had approached each other to the distance of approximately 600m, and that they had no time to take actions to avoid collision when the vessels further approached each other in the situation that was different from the agreed conduct of vessel in which they could not recognize any change in the other vessel's heading when they tried to take actions to execute this agreement.

4.3 Other Key Findings

- (1) It is probable that that the masters of the two vessels could have taken measures, such as changing the voyage plan in order to avoid the situation in which the two vessels approached each other where the passages crossed if they had acquired the information regarding the other vessel's port entry/departure, although personnel in charge of the vessel agents for Vessel A and Vessel B had not provided information regarding the port entry/departure of the other vessel due to the fact that they had not acquired information on the port entry/departure for the other vessel, Vessel B or Vessel A. (5.1(2))
- (2) It is probable that Ex-master A did not state his opinion to Master A due to the fact that Company A had specified that supernumeraries are not part of the bridge team despite the fact that the crew members of Vessel A had learned that teamwork was important and that members of the bridge team were to provide sufficient support to the master, such as providing safety-related information through the BRM education and training using video educational materials.

It is probable that Ex-master A would have told Master A that it would be safer for Vessel A to stop without altering the course and then observe the movements of Vessel B in order to avoid collision with Vessel B if Company A had stipulated that supernumeraries are to proactively provide safety-related information to the person conning the vessel as a member of the bridge team if the supernumeraries are practically functioning as part of the bridge team. (5.2 (1) (i))

- (3) It is probable that Third Officer A could not detect Vessel B until Vessel B approached

within 0.5M and could not report Vessel B's information to Master A due to the fact that he did not change the radar range scale despite the facts that Chief Officer A conducted education and training on BRM to Vessel A's crew members onboard the vessel in December, 2011, by using video education materials, and that the crew members had learned that bridge teamwork was important and that members of the bridge team were to provide sufficient support to the master, such as providing safety-related information. Therefore, it is somewhat likely that Master A could have taken measures to avoid the situation in which two vessels approached each other where the passages crossed by decelerating and other means if Third Officer A had correctly understood the BRM contents and consequently reported the movements of Vessel B to Master A at an early stage, although he could not execute the contents of BRM education and training. (5.2 (1) (ii))

- (4) It is probable that Third Officer A did not correctly understand the items necessary to ensure safety navigation, such as detecting nearby navigating vessels as early as possible, due to the fact that he set the range scale to 0.5M at the time of departure stand-by and did not change the range scale until he changed it to 0.75M when the navigating Vessel B's radar image showed on the edge of the radar display while navigating afterwards despite the facts that he confirmed the operation situation of radar, ARPA and other equipment according to the Departure Checklist and that he was supposed to report information on nearby navigating vessels to Master A as the OOW by appropriately using the radar. It is somewhat likely that Third Officer A could have reported Vessel B's information to Master A before Master A recognized Vessel B and that Master A could have detected Vessel B at an early stage and taken measures to avoid the situation in which the two vessels approached each other where the passages crossed by decelerating and other measures. if Third Officer A had understood the above and changed to a long distance range scale. (5.2 (1) (iii))
- (5) Company A had notified Vessel A of the risks of using VHF in response to the "CAUTION ON THE USE OF VHF RADIO IN COLLISION AVOIDANCE," which was issued by the flag State, but these risks were not included in the "Navigation In Narrow Channel/Congested Waters Checklist" prepared by Company A. However, it is somewhat likely that measures, such as agreement on the conduct of vessel would have been taken in a swift manner if such risks had been included. (5.2 (1) (iv))
- (6) Vessel B had set the radar range scale to 1M at the time of departure, and Master B sighted Vessel A, which was navigating along the eastern edge of the West Wharf from behind the buildings on the steel yard quay, and confirmed the radar image. However,

it is somewhat likely that Master B could have learned the existence and movements of Vessel A 2-3 minutes before sighting it and taken measures to avoid the situation in which the two vessels approached each other where the passages crossed by decelerating and other means if Master B or Chief Officer B had carefully observed the radar display and commenced systematic analysis. (5.2 (2) (i))

5 SAFETY ACTIONS

It is probable that this accident occurred because the vessels collided with each other due to the facts that Master A and Master B agreed to the conduct vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after Master A put the helm hard to port and Master B put the helm to port at 15° in an attempt to execute the agreement, and that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while Vessel A was proceeding northeast after leaving the West Wharf No.3 Quay and while Vessel B was proceeding south-southeast from the Central Wharf East Quay toward the South Wharf in Port of Niigata Higashi Ku.

It is somewhat likely that the fact it took approximately 20 seconds to agree on the conduct of vessel contributed to the occurrence of this accident due to the facts that Master A and Master B took approximately 20 seconds to agree on the conduct of vessel, that the vessels had approached each other to the distance of approximately 600m, and that they had no time to take actions to avoid collision when the vessels further approached each other in the situation that was different from the agreed conduct of vessel in which they could not recognize any change in the other vessel's heading when they tried to take actions to execute this agreement.

It is probable that Ex-master A did not state his opinion to Master A due to the fact that Company A had specified that supernumeraries are not part of the bridge team despite the fact that the crew members of Vessel A had learned that teamwork was important and that members of the bridge team were to provide sufficient support to the master, such as providing safety-related information through the BRM education and training using video educational materials. It is probable that Ex-master A would have told Master A that it would be safer for Vessel A to stop without altering the course and then observe the movements of

Vessel B in order to avoid collision with Vessel B if Company A had stipulated that supernumeraries are to proactively provide safety-related information and other matters to the person conning the vessel as a member of the bridge team if the supernumeraries are practically functioning as part of the bridge team.

It is probable that Third Officer A did not correctly understand the items necessary to ensure safety navigation, such as detecting nearby navigating vessels as early as possible, due to the fact that he set the range scale to 0.5M at the time of departure stand-by and did not change the range scale until he changed it to 0.75M when the navigating Vessel B's radar image showed on the edge of the radar display while navigating afterwards despite the facts that he confirmed the operation situation of radar, ARPA, according to the Departure Checklist and that he was supposed to report information on nearby navigating vessels underway to Master A as the officer of the watch by appropriately using the radar. In addition, as previously mentioned, it is probable that Third Officer A could not execute the contents of BRM education and training due to the facts that he could not detect Vessel B until they approached within 0.5M and that he could not report Vessel B's information to Master A. It is somewhat likely that Third Officer A could have reported Vessel B's information to Master A before Master A recognized Vessel B and that Master A could have detected Vessel B at an early stage and taken measures to avoid the situation in which the two vessels approached each other where the passages crossed by decelerating and other means if Third Officer A had correctly understood the BRM contents and items necessary to ensure safety navigation and changed to a long distance range scale.

Company A had notified Vessel A of the risks of using VHF in response to the "CAUTION ON THE USE OF VHF RADIO IN COLLISION AVOIDANCE," which was issued by the flag State, but these risks were not included in the "Navigation In Narrow Channel/Congested Waters Checklist" prepared by Company A. However, it is somewhat likely that measures, such as agreement on the conduct of vessel would have been taken in a swift manner if such risks had been included.

Vessel B had set the radar range scale to 1M at the time of departure, and Master B sighted Vessel A, which was navigating along the eastern edge of the West Wharf from behind the buildings on the steel yard quay, and confirmed the radar image. However, it is somewhat likely that Master B could have learned the existence and movements of Vessel A 2-3 minutes before sighting it and taken measures to avoid the situation in which the two vessels approached each other where the passages crossed by decelerating and other means if Master B or Chief Officer B had carefully observed the radar display and commenced systematic analysis. In addition, it is somewhat likely that measures, such as agreement on the conduct

of vessel would have been taken in a swift manner if Company C had notified Vessel B's crew members to recognize risks of using VHF and promoted awareness by establishing items to re-confirm the risks of using VHF by establishing a checklist to be used to navigate in narrow channels and congested waters.

It is probable that that the masters of the two vessels could have taken measures, such as changing the voyage plan in order to avoid the situation in which the two vessels approached each other where the passages crossed if they had acquired the information regarding the other vessel's port entry/departure, although personnel in charge of the vessel agents for Vessel A and Vessel B had not provided information regarding the port entry/departure of the other vessel due to the fact that they had not acquired information on the port entry/departure for the other vessel, Vessel B or Vessel A.

5.1 Safety Actions Taken

- (1) Company A sent a document including the probable causes of this accident and safety actions against similar accidents to all vessels belonging to the company and vessels under their management.
- (2) On April 24, 2012, vessel agents and other organizations of Port of Niigata Higashi Ku voluntarily established the Conference for the Safety Navigation in the Back of Port of Niigata Higashi Ku in the meeting, in which the Niigata Coast Guard Office and Port of Niigata Office (the East Port District) of the Niigata Area Development Agency participated, and provided the Conference Agreements for the Safety Navigation in the Back of Port of Niigata Higashi Ku and the adjustment procedures of port entry/departure of vessels, regarding information sharing on vessel movements in vessel agents and adjustment method and other matters if the port entry/departure of a container ship and cargo ship falls in the same time period as follows.
a Conference Agreements for the Safety Navigation in the Back of Port of Niigata Higashi Ku (excerpt)

Article 1: The name of the conference shall be "Conference for the Safety Navigation in the Back of Port of Niigata Higashi Ku".

Article 2: This conference aims to contribute to the prevention of accidents, such as collisions, etc., in the anchor grounds and passages toward the back of the port by comprehending the movements of vessels entering and leaving the port and adjusting them in turns in order to promote the safety navigation of vessels entering and leaving the port toward the back of Port of Niigata Higashi Ku.

Article 3: This conference shall conduct the following work in order to achieve the objective of the above article.

(1) Share the information on the movements of vessels utilizing the West Wharf, East Wharf, South Wharf, and Shinnittetsu Berth quay (steel yard quay) within the Higashi Ku.

(2) Adjust the port entry/departure of container ships and cargo ships over 500 tons.

(omitted)

b Adjustment procedure of vessels entering and leaving the port (excerpt)

1 Container ship

(omitted)

2 General cargo ships (over 500gt)

(1) General cargo ship agents shall confirm the list of container ships' port entry/departure and adjust the port entry/departure time to the time period which does not affect the container ships' port entry/departure.

(2) If the port entry/departure coincides with a container ship, make adjustment as follows in principle.

a At the time of the container ship's port departure

- When entering the port, enter the port after the container ship has passed the breakwater.*
- Departure vessel is to leave the port with plenty of time before and after the departure so that the departure does not coincide with a container ship.*

b At the time of the container ships' port entry

- Entry vessel is to enter the port with plenty of time before and after the entry so that the entry does not coincide with a container ship.*
- Departure vessel is to leave the port after the container ship has berthed.*

(omitted)

(3) General cargo ships navigating between quays within the Higashi Ku shall confirm the port entry/departure situation of other vessels and make adjustments to navigate in the time period which does not affect port entry/departure.

5.2 Safety Actions Required

- (1) It is probable that Company A needs to take the following measures.
 - (i) Consider that supernumeraries are part of the bridge team if they are practically involved in maneuvering.
 - (ii) Conduct BRM education and training by using this accident case with crew members of vessels belonging to Company A and vessels under their management so that bridge team members can collect safety-related information on radar and other equipment and proactively provide it to the person conning the vessel.
 - (iii) Instruct deck officers of vessels belonging to Company A and vessels under their management to prepare for departure and keep look-out while correctly understanding items necessary to ensure safety navigation, such as detecting information on nearby navigating vessels as early as possible by changing the radar range scale and conduct education by using this accident case when visiting the vessels.
 - (iv) Have masters of vessels belonging to Company A and vessels under their management re-acknowledge the following risks of using VHF by using this accident case and promote awareness by establishing items to reconfirm the risks of using VHF in a checklist to be used to navigate in narrow channels and congested waters.
 - a It is possible that two vessels approach each other and have no time to take actions to avoid collision in case the agreement is not executed if those conning the two vessels take time to agree on the conduct of vessel and the vessels navigate in the original course at the original speed during that time.
 - b It is possible that those conning the vessels would believe that the other vessel would execute the contents to which they had agreed via VHF even if there is a difference between the anticipated actions of the other vessel according to the person conning the vessel and the actual actions after agreeing on the conduct of vessel and lose the opportunity to take actions to avoid collision.
- (2) It is probable that Company C needs to take the following measures.
 - (i) Instruct masters and officers of vessels belonging to Company C and vessels under their management to carefully observe radar displays while navigating to commence systematic analysis and conduct education by using this accident case when visiting the vessels.
 - (ii) Notify masters and deck officers of vessels belonging to Company C and vessels under their management recognize the following risks of using VHF by using this accident example. In addition, if they have checklists used to navigate in narrow

channels and congested waters, promote awareness by establishing items to reconfirm the risks of using VHF.

a It is possible that two vessels approach each other and have no time to take actions to avoid collision in case the agreement is not executed if those persons conning the two vessels take time to agree on the conduct of vessel and the vessels navigate in the original course at the original speed during that time.

b It is possible that those conning the vessels would believe that the other vessel would execute the contents to which they had agreed via VHF even if there is a difference between the anticipated actions of the other vessel according to the person conning the vessel and the actual actions after agreeing on the conduct of vessel and lose the opportunity to take actions to avoid collision.

(3) Although this accident was a collision between two foreign vessels, we were able to gain the following lessons regarding radar and VHF utilization. It is probable that it is necessary for owners and management companies of vessels, which are registered in Japan, to thoroughly notify the following items to crew members of vessels under their ownership and management in order to effectively utilize these in vessels, which are registered in Japan. Therefore, the Japan Transport Safety Board requests cooperation of the Marine Bureau of the Ministry of Land, Infrastructure, Transport and Tourism and the Japan Coast Guard regarding the above thorough notification.

(i) Prepare for departure stand-by and keep look-out while correctly understanding items necessary to ensure safety navigation, such as detecting information on nearby navigating vessels underway as early as possible by changing the radar range scale at the time of departure and while underway.

(ii) The following risks occur when an agreement is made on the conduct of vessel by using VHF.

a It is possible that two vessels approach each other and have no time to take actions to avoid collision in case the agreement is not executed if those persons conning the two vessels take time to agree on the conduct of vessel and the vessels underway in the original course at the original speed during that time.

b It is possible that those persons conning the vessels would believe that the other vessel would execute the contents to which they had agreed via VHF even if there is a difference between the anticipated actions of the other vessel according to the person conning the vessel and the actual actions after agreeing on the conduct of vessel and lose the opportunity to take actions to avoid collision.

(4) It is probable that the Conference for the Safety Navigation in the Back of Port of

Niigata Higashi Ku needs to continuously and appropriately make adjustments for vessels entering and leaving the port.

Therefore, the Japan Transport Safety Board requests the Conference for the Safety Navigation in the Back of Port of Niigata Higashi Ku to continuously and appropriately make adjustments for vessels entering and leaving the port. In addition, in order to ensure that adjustments for vessels entering and leaving the port, which are conducted by the Conference for the Safety Navigation in the Back of Port of Niigata Higashi Ku, are notified to relevant vessels and to ensure that the said adjustments are conducted continuously and appropriately, the Japan Transport Safety Board also requests cooperation of the Japanese Shipowners' Association, Japan Federation of Coastal Shipping Associations, and Japan Foreign Steamship Association regarding the notification of the said adjustments to vessel operators utilizing the back of Port of Niigata Higashi Ku.

6 SAFETY RECOMMENDATIONS

6.1 Safety Recommendations for PACIFIC INTERNATIONAL LINES LIMITED

It is probable that this accident occurred because KOTA DUTA and TANYA KARPINSKAYA collided with each other due to the facts that the master of KOTA DUTA and the master of TANYA KARPINSKAYA agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after the master of KOTA DUTA put the helm hard to port and the master of TANYA KARPINSKAYA put the helm to port at 15° in an attempt to execute the agreement, and that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while KOTA DUTA was proceeding northeast after leaving the West Wharf No.3 Quay and while TANYA KARPINSKAYA was proceeding south-southeast from the Central Wharf East Quay toward the South Wharf in Port of Niigata Higashi Ku.

It is probable that the master of KOTA DUTA agreed to the conduct of vessel, believed that TANYA KARPINSKAYA would execute the contents agreed to via VHF despite the difference between the anticipated actions of TANYA KARPINSKAYA according to the master of KOTA DUTA and the actual actions, and continued to approach in the situation in which he could not recognize any change in the heading due to the fact that he was convinced that

TANYA KARPINSKAYA was going to pass on the starboard side due to the facts that TANYA KARPINSKAYA re-confirmed to pass on the starboard side, that TANYA KARPINSKAYA was strongly stating “starboard to starboard” via VHF, that he felt that the report by the former master of KOTA DUTA had a strong tone, saying “starboard to starboard,” and that the former master of KOTA DUTA, who was on board to hand over the master position, and the master of TANYA KARPINSKAYA were stating “starboard to starboard.”

It is probable that the former master of KOTA DUTA did not tell the master of KOTA DUTA that it would be safer for KOTA DUTA to stop without changing the course and observe the movements of TANYA KARPINSKAYA in order to avoid collision with TANYA KARPINSKAYA due to the fact that PACIFIC INTERNATIONAL LINES LIMITED had not specified supernumeraries as members of the bridge team.

Third officer of KOTA DUTA set the radar range scale to 0.5M at the time of departure stand-by and changed the range scale to 0.75M when he recognized the image of TANYA KARPINSKAYA on the edge of the 0.5M radar display during navigation. However, it is probable that he could have reported the information of TANYA KARPINSKAYA to the master before the master of KOTA DUTA recognized the said vessel if he had correctly understood BRM contents and items necessary to ensure safety navigation, such as detecting information on nearby vessels underway as early as possible by changing to a long distance range scale.

Due to this, the Japan Transport Safety Board recommends PACIFIC INTERNATIONAL LINES LIMITED to take the following measures to ensure safety during navigation in view of the results of this accident investigation.

- (1) Consider that supernumeraries are part of the bridge team if they are practically involved in maneuvering.
- (2) Instruct crew members of vessels belonging to PACIFIC INTERNATIONAL LINES LIMITED and vessels under their management to conduct BRM education and training by learning from this accident case so that those on watch on the bridge can collect safety-related information on radar and other equipment and proactively provide it to the person conning the vessel.
- (3) Instruct officers of vessels belonging to PACIFIC INTERNATIONAL LINES LIMITED and vessels under their management to prepare for departure and keep look-out while correctly understanding items necessary to ensure safety navigation, such as detecting information on nearby vessels underway as early as possible by changing the radar range scale and conduct education by learning from this accident case when visiting the vessels.

- (4) Have masters of vessels belonging to PACIFIC INTERNATIONAL LINES LIMITED and vessels under their management re-acknowledge the following risks of using VHF by using this accident case and promote awareness by establishing items to reconfirm the risks of using VHF in a checklist to be used to navigate in narrow channels and congested waters.
- (i) It is possible that two vessels approach each other and have no time to take actions to avoid collision in case the agreement is not executed if those persons conning the two vessels take time to agree on the conduct of vessel and the vessels navigate in the original course at the original speed during that time.
- (ii) It is possible that those persons conning the vessels would believe that the other vessel would execute the contents to which they had agreed via VHF even if there is a difference between the anticipated actions of the other vessel according to the person conning the vessel and the actual actions after agreeing on the conduct of vessel and lose the opportunity to take actions to avoid collision.

6.2 Safety Recommendations for EAST WAY LLC

It is probable that this accident occurred because KOTA DUTA and TANYA KARPINSKAYA collided with each other due to the facts that the master of KOTA DUTA and the master of TANYA KARPINSKAYA agreed to the conduct of vessel for both vessels to alter to port to pass on the starboard side via VHF, that the vessels continued to navigate after the master of KOTA DUTA put the helm hard to port and the master of TANYA KARPINSKAYA put the helm to port at 15° in an attempt to execute the agreement, that they kept approaching each other in the situation that was different from the agreed conduct of vessel without being able to recognize any change in the heading when the vessels approached each other in the situation in which their courses would cross where the Dredged Passages crossed while KOTA DUTA was proceeding northeast after leaving the West Wharf No.3 Quay and while TANYA KARPINSKAYA was proceeding south-southeast from the Central Wharf East Quay toward the South Wharf in Port of Niigata Higashi Ku.

It is probable that the master of TANYA KARPINSKAYA offered the conduct of vessel to pass on the starboard side due to the facts that it was easy for TANYA KARPINSKAYA to alter to port due to the large area of waters on the port side of TANYA KARPINSKAYA when they were called by KOTA DUTA via VHF to inquire about TANYA KARPINSKAYA's name in Russian, that he believed it would be safer if the two vessels' courses did not cross in order to avoid collision because he could not anticipate where in the passage crossing KOTA DUTA would alter to port, believed that KOTA DUTA would execute the contents agreed via VHF

despite the fact that there was a difference between the anticipated actions of KOTA DUTA according to the master of TANYA KARPINSKAYA and the actual actions due to the agreement of the conduct of vessel made between the two vessels, and continued to approach the other vessel in the situation in which he could not recognize any change in the heading.

It is somewhat likely that the master of TANYA KARPINSKAYA could have learned the existence and movements of KOTA DUTA 2-3 minutes before sighting it and taken measures to avoid the situation in which the two vessels approached each other where the passages crossed by decelerating and other means if the master or chief officer of TANYA KARPINSKAYA had carefully observed the radar display and commenced systematic analysis.

Due to this, the Board recommends EAST WAY LLC. to take the following measures to ensure safety while underway in view of the results of this accident investigation

- (1) Instruct masters and deck officers of vessels belonging to EAST WAY LLC. and vessels under their management to carefully observe radar displays while underway to commence systematic analysis and conduct education by learning from this accident case when visiting the vessels.
- (2) Notify masters and deck officers of vessels belonging to EAST WAY LLC. and vessels under their management to recognize the following risks of using VHF by learning from this accident case. In addition, if they have checklists used to navigate in narrow channels and congested waters, promote awareness by establishing items to reconfirm the risks of using VHF.
 - (i) It is possible that two vessels approach each other and have no time to take actions to avoid collision in case the agreement is not executed if those persons conning the two vessels take time to agree on the conduct of vessel and the vessels underway in the original course at the original speed during that time.
 - (ii) It is possible that those persons conning the vessels would believe that the other vessel would execute the contents to which they had agreed via VHF even if there is a difference between the anticipated actions of the other vessel according to the person conning the vessel and the actual actions after agreeing on the conduct of vessel and lose the opportunity to take actions to avoid collision.

Appendix 1 AIS record of Vessel A

Time (hh : mm : ss)	Vessel Position		Course Over the Ground (°)	Heading (°)	Speed Over the Ground (kn)
	North Latitude (deg-min-sec)	East Longitude (deg-min-sec)			
16:12:41	37-58-11.0	139-13-29.9	355	056	0
16:16:28	37-58-11.8	139-13-30.3	035	056	0.8
16:16:39	37-58-11.9	139-13-30.4	033	056	1
16:16:57	37-58-12.4	139-13-30.8	036	058	1.7
16:17:17	37-58-13.0	139-13-31.4	044	058	2.2
16:17:38	37-58-13.6	139-13-32.3	049	057	2.7
16:17:57	37-58-14.2	139-13-33.4	050	057	3.2
16:18:08	37-58-14.7	139-13-34.1	050	057	3.5
16:18:18	37-58-15.0	139-13-34.6	051	058	3.7
16:18:38	37-58-15.8	139-13-36.0	053	058	4.1
16:18:57	37-58-16.7	139-13-37.6	055	057	4.5
16:19:17	37-58-17.6	139-13-39.3	056	055	4.9
16:19:38	37-58-18.7	139-13-41.2	054	053	5.3
16:19:57	37-58-19.7	139-13-43.1	053	052	5.5
16:20:17	37-58-20.9	139-13-45.0	052	052	5.8
16:20:38	37-58-22.1	139-13-47.1	055	044	6.1
16:20:55	37-58-23.1	139-13-48.8	053	034	6.3
16:20:57	37-58-23.3	139-13-49.3	052	033	6.3
16:21:05	37-58-23.9	139-13-50.0	047	029	6.3
16:21:15	37-58-24.6	139-13-50.7	042	024	6.2
16:21:17	37-58-24.9	139-13-51.0	040	024	6.1
16:21:25	37-58-25.6	139-13-51.6	037	020	6
16:21:32	37-58-25.9	139-13-51.8	034	018	5.9
16:21:38	37-58-26.6	139-13-52.3	030	015	5.8
16:21:45	37-58-27.3	139-13-52.7	028	011	5.7
16:21:57	37-58-28.3	139-13-53.2	022	006	5.5
16:22:05	37-58-29.0	139-13-53.5	020	003	5.4
16:22:12	37-58-29.3	139-13-53.6	018	001	5.3

16:22:17	37-58-29.9	139-13-53.8	017	000	4.2
16:22:28	37-58-30.3	139-13-53.9	017	357	3.5
16:22:32	37-58-30.5	139-13-54.1	017	356	3.3
16:22:38	37-58-30.8	139-13-54.2	019	354	2.8
16:22:48	37-58-31.1	139-13-54.3	021	350	2.4
16:22:57	37-58-31.4	139-13-54.5	025	347	1.9
16:23:05	37-58-31.6	139-13-54.6	024	346	1.5
16:23:17	37-58-31.7	139-13-54.8	033	343	1
16:23:38	37-58-31.8	139-13-55.0	079	340	0.6
16:24:17	37-58-31.3	139-13-55.7	142	339	1.5
16:24:38	37-58-30.7	139-13-56.2	147	337	2.1
16:24:57	37-58-30.0	139-13-56.8	145	333	2.5
16:25:38	37-58-28.7	139-13-58.0	143	327	2.4

Appendix 2 AIS record of Vessel B

Time (hh : mm : ss)	Vessel Position		Course Over the Ground (°)	Heading (°)	Speed Over the Ground (kn)
	North Latitude (deg-min-sec)	East Longitude (deg-min-sec)			
16:07:06	37-59-12.3	139-13-40.8	339	163	0
16:12:53	37-59-04.3	139-13-42.2	185	185	3.1
16:13:03	37-59-03.8	139-13-42.1	186	185	3.1
16:13:23	37-59-02.8	139-13-41.9	185	185	3.3
16:13:33	37-59-02.2	139-13-41.9	185	185	3.3
16:13:43	37-59-01.7	139-13-41.8	185	186	3.3
16:14:03	37-59-00.6	139-13-41.6	185	189	3.4
16:14:43	37-58-58.3	139-13-41.2	189	189	3.5
16:15:03	37-58-57.1	139-13-40.9	191	186	3.6
16:15:24	37-58-56.0	139-13-40.6	189	178	3.7
16:15:43	37-58-54.8	139-13-40.4	183	173	3.6
16:16:03	37-58-53.6	139-13-40.5	179	168	3.7
16:16:23	37-58-52.4	139-13-40.6	173	164	3.6

16:17:04	37-58-50.0	139-13-41.2	165	160	3.7
16:17:23	37-58-48.9	139-13-41.7	163	159	3.7
16:17:43	37-58-47.7	139-13-42.1	163	159	3.8
16:18:03	37-58-46.4	139-13-42.6	163	156	3.8
16:18:23	37-58-45.2	139-13-43.1	159	154	3.9
16:18:43	37-58-44.0	139-13-43.7	157	154	3.9
16:19:03	37-58-42.8	139-13-44.4	156	154	4
16:19:43	37-58-40.4	139-13-45.7	154	154	4
16:20:03	37-58-39.1	139-13-46.5	154	154	4
16:20:14	37-58-38.5	139-13-46.9	155	154	4.1
16:20:23	37-58-37.9	139-13-47.2	156	153	4.1
16:20:43	37-58-36.7	139-13-47.8	156	146	4.1
16:21:03	37-58-35.5	139-13-48.6	152	135	4.1
16:21:13	37-58-34.9	139-13-49.1	148	128	4.1
16:21:33	37-58-33.8	139-13-50.2	136	117	3.6
16:22:03	37-58-32.9	139-13-51.6	126	104	2.3
16:22:13	37-58-32.7	139-13-51.9	121	085	1.4
16:22:23	37-58-32.6	139-13-52.1	103	062	1
16:22:33	37-58-32.6	139-13-52.3	076	044	1.1
16:22:43	37-58-32.6	139-13-52.6	063	031	1.2
16:23:03	37-58-32.9	139-13-53.0	043	011	1.3
16:23:13	37-58-33.1	139-13-53.2	035	003	1.3
16:23:23	37-58-33.3	139-13-53.3	027	358	1.2
16:23:43	37-58-33.7	139-13-53.5	008	353	0.8
16:23:54	37-58-33.8	139-13-53.5	352	352	0.8
16:24:03	37-58-33.9	139-13-53.4	345	352	0.9
16:24:43	37-58-34.6	139-13-53.0	343	355	1.2
16:25:03	37-58-34.9	139-13-52.9	344	000	1.3
16:25:13	37-58-35.2	139-13-52.8	345	004	1.4
16:25:43	37-58-36.0	139-13-52.7	359	018	1.4

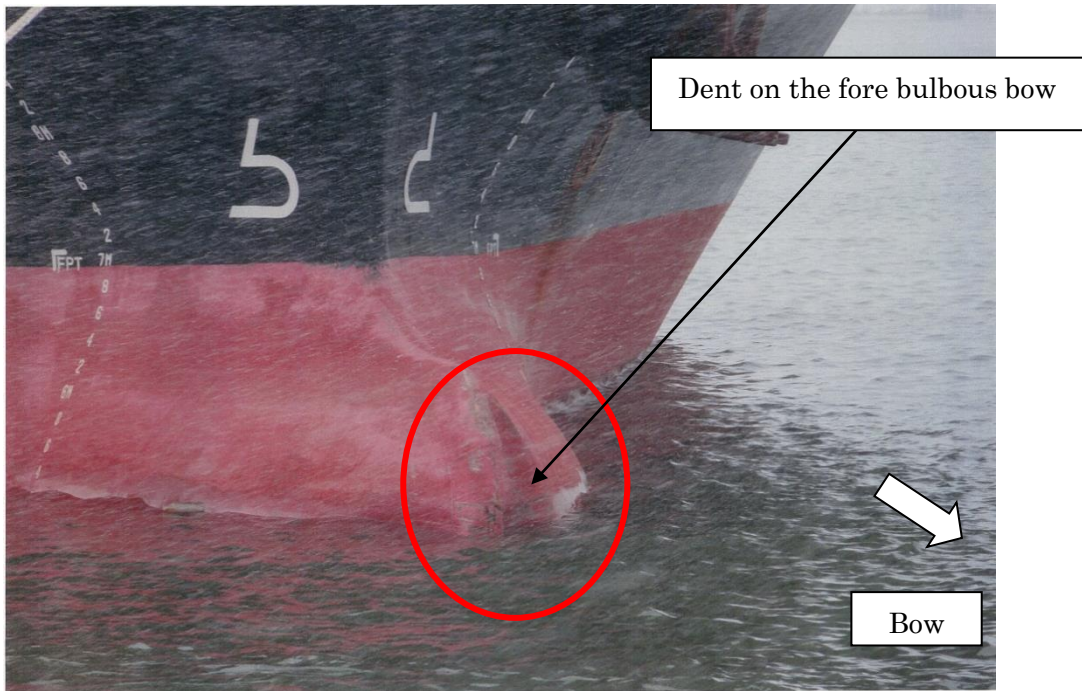


Photo 1 Damage to Vessel A (1)

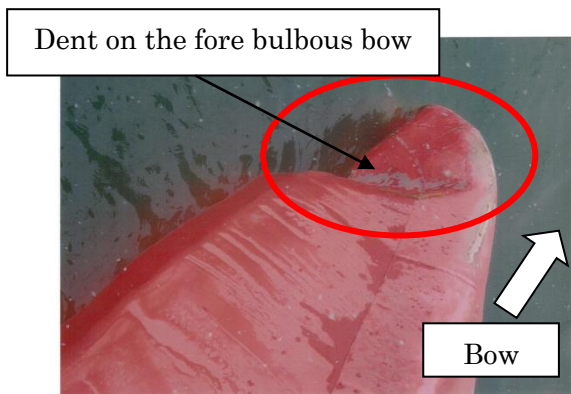


Photo 2 Damage to Vessel A (2)



Photo 3 Damage to Vessel A (3)

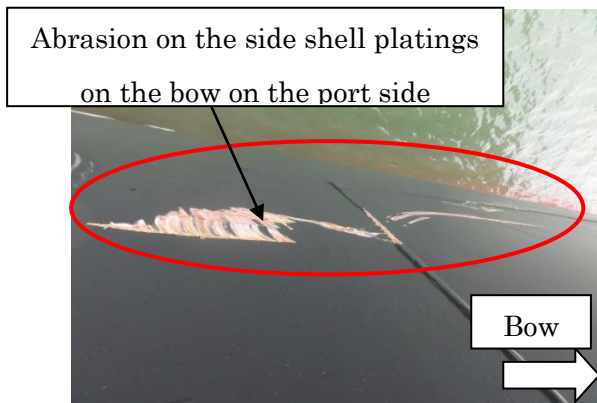


Photo 4 Damage to Vessel A (4)



Photo 5 Damage to Vessel B (1) (Temporary repair of the fracture after being salvaged)



Photo 6 Damage to Vessel B (2) (Conditions after being salvaged)