

MA2014-12

**MARINE ACCIDENT
INVESTIGATION REPORT**

December 18, 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: LNG tanker PUTERI NILAM SATU

IMO number: 9229647

Gross tonnage: 94,446 tons

Vessel type and name: LPG tanker SAKURA HARMONY

IMO number: 9355290

Gross tonnage: 2,997 tons

Accident type: Collision

Date and time: Around 12:19:27, January 10, 2013 (local time, UTC+9 hours)

Location: Off the East of Yokohama District of Keihin Port

Around 320° true bearing, 1,950 m from Kisarazuko Offing Light Beacon
located in Kisarazu City Chiba Prefecture
(approximately 35° 26.0' N, 139° 46.2' E)

November 27, 2014

Adopted by the Japan Transport Safety Board

Chairman Norihiro Goto

Member Kuniaki Shoji

Member Satoshi Kosuda

Member Toshiyuki Ishikawa

Member Mina Nemoto

SYNOPSIS

< Summary of the Accident >

The LNG tanker, PUTERI NILAM SATU, with 31 crew members in addition to the master, under the pilotage of two pilots, was proceeding west-southwest toward the west marine area of Nakanose off the east of Yokohama district of Keihin port, with two escort tugboats preceded. The LPG tanker, SAKURA HARMONY, with 13 crew members in addition to the master, departed through Nakanose Traffic Route and was proceeding north toward a pilot station located in the vicinity of the entry of Tsurumi Passage in Yokohama district of Keihin port. Both tankers collided at around 12:19:27 on January 10, 2013.

PUTERI NILAM SATU received some dents and cracks on its hull around the center of the portside, and SAKURA HARMONY received crushes on its hull of the bow and some dents on the bulbous bow, while there were no casualties among the crew members on both tankers.

< Probable Causes >

It is probable that this accident of the collision of two tankers occurred due to while the LNG tanker, PUTERI NILAM SATU, was proceeding west-southwest under the pilotage of two pilots with the two escort tugboats preceded, and the LPG tanker, SAKURA HARMONY, passed Nakanose Traffic Route and was proceeding north, the pilots of PUTERI NILAM SATU kept navigation by holding the course and speed as they thought that SAKURA HARMONY would pass over the stern of PUTERI NILAM SATU, and the master of SAKURA HARMONY proceeded her so as to approach the bow of PUTERI NILAM SATU.

As to why the two pilots kept the navigation without altering the course and speed, it is probable they were under the assumption that SAKURA HARMONY would pass over the stern of PUTERI NILAM SATU was that they thought SAKURA HARMONY had reduced her speed around the exit of Nakanose Traffic Route because they were reported to by the escort tugboat SHONAN-MARU that the speed of SAKURA HARMONY around the exit of Nakanose Traffic Route was 8.5 knots, which was lower than the general speed limit for vessels like SAKURA HARMONY in Nakanose Traffic Route.

As to why the master of SAKURA HARMONY kept the navigation so as to approach the bow of PUTERI NILAM SATU, it is probable that even though the planned course was 338° after departing through Nakanose Traffic Route, he increased the speed and altered the course between 349° and 006° after departing through Nakanose Traffic Route to avoid a domestic cargo ship and a container ship, and then he kept the course and speed after further altering the course to approximately 000° at around 12:16.

It is probable that the speed of approximately 16 knots of PUTERI NILAM SATU three minutes before the collision is involved with the occurrence of this accident because it was difficult to put an escort tugboat preceded in order to take actions to avoid collision by prompting SAKURA HARMONY to turn right or to take other measures.

1 PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Accident

The LNG tanker, PUTERI NILAM SATU, with 31 crew members in addition to the master, under the pilotage of two pilots, was proceeding west-southwest toward the west marine area of Nakanose off the east of Yokohama district of Keihin port, with two escort tugboats preceded. The LPG tanker, SAKURA HARMONY, with 13 crew members in addition to the master, departed through Nakanose Traffic Route and was proceeding north toward a pilot station located in the vicinity of the entry of Tsurumi Passage in Yokohama district of Keihin port. Both tankers collided at around 12:19:27 on January 10, 2013.

PUTERI NILAM SATU received some dents and cracks on its hull around the center of the portside, and SAKURA HARMONY received crushes on its hull of the bow and some dents on the bulbous bow, while there were no casualties among the crew members on both tankers.

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 four other investigators to investigate this accident on January 10, 2013.

1.2.2 Collection of Evidence

January 11 and 12, 2013: On-site investigation and interviews

January 16, 17, and 18, May 29 and 30, and June 17, 2013: Interviews

January 30, May 21, November 8, and December 9, 2013, and January 29 and 31, 2014: Collection of written replies to the questionnaires

1.2.3 Comments of Parties Relevant to the Cause

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

1.2.4 Comments from Flag/Coastal State

Comments on the draft report were invited from the flag/coastal States of PUTERI NILAM SATU and SAKURA HARMONY.

2 FACTUAL INFORMATION

2.1 Events Leading to the Accident

2.1.1 Navigational Conditions According to the Records of Automatic Identification System

According to the records of the Automatic Identification System*¹ (hereinafter referred to as the “AIS Records”) received by a private information-related company, the navigational conditions of PUTERI NILAM SATU (hereinafter referred to as “Vessel A”) and SAKURA HARMONY (hereinafter referred to as “Vessel B”) during the time between 12:02 to 12:20 on January 10, 2013 were as shown in the table below.

Vessel A

Time (hh:mm:ss)	Latitude (North Latitude) (°.'-")	Longitude (East Longitude) (°.'-")	Heading (°)	Course over ground (°)	Speed over ground (knot (kn))
12:04:56	35-28-10.8	139-50-02.1	228	225.2	14.7
12:10:02	35-27-19.7	139-38-49.1	230	229.8	15.9
12:12:02	35-26-59.3	139-48-18.8	236	232.3	16.1
12:17:02	35-26-18.4	139-46-54.4	240	240.7	15.7
12:19:32	35-26-01.3	139-46-12.2	268	252.7	14.6

(Note) Bow direction and course over ground show true bearing (the same shall apply hereinafter).

*¹ “Automatic Identification System (AIS)” is a device used by ships to be able to automatically transmit/receive the information regarding their call sign, type, name, position, course, speed, destination and navigational statuses to exchange them with other vessels, as well as with shore-based navigational aid facilities, etc.

Vessel B

Time (hh:mm:ss)	Latitude (North Latitude) (°-′-″)	Longitude (East Longitude) (°-′-″)	Heading (°)	Course over ground (°)	Speed over ground (kn)
12:01:56	35-23-19.0	139-45-42.6	022	021.4	8.6
12:09:57	35-24-23.0	139-46-12.5	020	019.4	8.5
12:12:57	35-24-50.2	139-46-15.5	350	349.1	11.0
12:15:57	35-25-25.1	139-46-08.6	000	358.6	11.4
12:17:57	35-25-46.4	139-46-08.4	000	359.8	9.2
12:18:57	35-25-54.5	139-46-08.4	359	001.5	7.2
12:19:26	35-25-57.8	139-46-08.5	351	356.3	6.3
12:19:57	35-25-57.6	139-46-09.5	292	113.1	1.9

The navigational conditions of the escort tugboat^{*2} SHONAN-MARU (hereinafter referred to as “Vessel C”), the escort tugboat URAGA-MARU (hereinafter referred to as “Vessel D”), the domestic cargo ship (hereinafter referred to as “Vessel E”) that was proceeding northeast in the west marine area of Nakanose, and the container ship (hereinafter referred to as “Vessel F”) that was proceeded in parallel to the starboard side of Vessel A, as well as the bearings and other information toward Vessel A and others from Vessel B and those toward Vessel F from Vessel A received by the private information-related company were as shown in Appendix tables 3 to 8.

(See Appendix table 1 AIS-recorded information of Vessel A, Appendix table 2 AIS-recorded information of Vessel B, Appendix table 3 AIS-recorded information of Vessel C, Appendix table 4 AIS-recorded information of Vessel D, Appendix table 5 AIS-recorded information of Vessel E, Appendix table 6 AIS-recorded information of Vessel F, Appendix table 7 Bearings and other information toward Vessels A, E, and F from Vessel B, and Appendix table 8 Bearings and other information toward Vessel F from Vessel A.)

2.1.2 Summary of Voice Communications and Others by VHF Radio

^{*2} “escort ship” refers to a collective name of “patrol ships.” According to the provision of the Maritime Traffic Safety Law, at least one “patrol ship” (a ship to watch the course and sides) shall be arranged for a “vessel with a length of at least 250 m,” a “long-object towing vessel with a towing length of at least 200 m,” and a “dangerous cargo carrying vessel with a length of at least 200 m.”

The following shows the summary of communications with VHF radio (hereinafter referred to as “VHF”) among the master of Vessel A (hereinafter referred to as “Master A”), main pilot (hereinafter referred to as “Pilot A₁”), copilot (hereinafter referred to as “Pilot A₂”), Vessels B, C, the pilot of Vessel F (hereinafter referred to as “Pilot F”), and Tokyo MARTIS, according to the voices recorded in the Voyage Data Recorder*³ (hereinafter referred to as “VDR”) equipped in Vessel A and the voices recorded in the image recorders equipped in Vessels C and D. (English conversations are shown in *italic*.) (See Photo 2.1-1.)

Time (hh:mm:ss)	Vessel A	Vessels B, C, and F, and Tokyo MARTIS
12:01:17 to 12:01:44	Pilot A ₁ : Hello, hello, we are Pilots A ₁ and A ₂ . This is LNG tanker Vessel A with 94,000 tons, passing Tokyo Wan East Fairway Central No. 2 Light Beacon bounding to Uraga Suido Traffic Route, and having Vessels C and D for escort. We will proceed south by following to Pilot F on the right side.	
12:04:04	Pilot A ₂ : Course 230°(true bearing, the same shall apply hereinafter)	

*³ “Voyage Data Recorder (VDR)” refers to a device that is able to record VHF radio communications and voices and other information in the bridge in addition to the data regarding the navigation such as ship position, course, speed, and radar images.

12:04:31 to 12:05:31	<p>Pilot A₁: Pilot F, are you reducing speed now?</p> <p>Pilot A₁: We are going to increase the speed to 15 kn. Are you planning to keep the speed at 15 kn?</p> <p>Pilot A₁: We are going to increase the speed to 15 kn. Please increase the speed if possible.</p> <p>Pilot A₁: Roger that. We will follow you.</p>	<p>Pilot F: We are proceeding at 15 knots (kn) (speed over ground, the same shall apply hereinafter).</p> <p>Pilot F: We are trying to increase the speed further, but it seems it is not increased yet.</p> <p>Pilot F: We will adjust the speed while watching other ships. Please keep that in mind.</p>
12:09:56	Pilot A ₁ : Roger.	Pilot F: Pilot A ₁ , now we will increase the speed up to 17 kn.
12:10:08 to 12:10:18	Pilot A ₂ : Roger.	Vessel C: Pilot A ₂ , there are two tankers in the vicinity of Nakanose Traffic Route No. 7 and No. 8 Light Buoy. The speed of the tanker near buoy No. 7 is 8.5 kn. It bounds to Kawasaki.
12:10:24	Pilot A ₂ : Course 235°	
12:10:39 to 12:10:59	<p>Pilot A₂: Is it a forward one?</p> <p>Pilot A₂: Roger.</p>	<p>Vessel C: Pilot A₂, the tanker that passed through No. 7 and No. 8 is a foreign-flag ship named Vessel B.</p> <p>Vessel C: Yes. The forward one. It is near No. 7 and is named Vessel B.</p>
12:11:34	Pilot A ₂ : Course 240°	
12:13:48 to 12:13:58	Pilot A ₂ : Vessel C, we are reducing speed 1 kn.	Vessel C: Roger. The speed of Vessel B at front left is 12.1 kn.

	Pilot A ₂ : Roger.	
12:15:57 to 12:16:13	(Two prolonged blasts)	Vessel C: Pilot A ₂ , the speed of Vessel B is 11.4 kn.
12:16:15	Pilot A ₂ : Vessel C, we are giving whistles (five short blasts).	
12:16:38 to 12:17:20	<p>Pilot A₁: <i>Vessel B, Vessel B, this is LNG tanker calling, over.</i></p> <p>Pilot A₁: <i>You pass our head? Vessel B, please stop there, turn to right.</i></p> <p>Pilot A₂: <i>Starboard five.</i></p> <p>Pilot A₁: <i>OK, I heard you reduce speed. But you increased now. Stop engine, please.</i></p> <p>Pilot A₁: OK, thank you.</p>	<p>Vessel B: <i>Vessel A, this is Vessel B.</i></p> <p>Vessel B: <i>Yes, go ahead please. This is Vessel B, over.</i></p> <p>Vessel B: <i>Yes, stop now.</i></p> <p>Vessel B: <i>Stop engine, now.</i></p>
12:17:22 to 12:17:47	Pilot A ₂ : Vessel C, we are alerting her course to the starboard.	Vessel C: It seems Vessel B will cross ahead of Vessel C.
	Pilot A ₁ : We asked Vessel B to stop the engine. Vessel C should go ahead in front of Vessel B.	
12:18:00	Pilot A ₂ : <i>Midship.</i>	
12:18:05	(Two prolonged blasts)	

12:18:20	Pilot A ₁ : <i>Vessel B, this is LNG tanker calling. You said stop engine. But, not stop. Please stop quickly.</i>	
12:18:40	Pilot A ₁ : Is this Vessel B? Pilot A ₂ : Yes.	
12:18:50	Pilot A ₁ : Is Vessel D able to put at the bow? Pilot A ₁ : Push the bow.	
12:18:57	Pilot A ₂ : <i>Hard starboard.</i>	
12:19:01	Pilot A ₁ : It seems dangerous.	
12:19:07	Pilot A ₁ : We would collide.	
12:19:10	Master A: <i>Oh my God.</i>	
12:19:25	Pilot A ₂ : <i>Hard port.</i>	
12:19:27	(A heavy crush sound like “bump”)	
12:19:30	Pilot A ₂ : <i>Stop engine.</i>	
12:20:01	Pilot A ₂ : <i>Captain, could you stand-by boat station?</i>	
12:20:16	Pilot A ₂ : <i>Dead slow ahead.</i>	
12:20:43		Tokyo MARTIS: Tugboat Vessel D or Vessel C, this is Tokyo MARTIS.
12:20:50		Vessel C: Tokyo MARTIS, this is Vessel C.
12:20:56	Pilot A ₂ : <i>Stop engine.</i>	
12:21:20	Pilot A ₁ : Vessel D, we shall immediately anchor for investigation and to report the accident. Please make contact if we are able to anchor in either YL3 or YL4.	
12:21:56	Pilot A ₂ : Course 240°	
12:22:48 to 12:23:47	Pilot A ₁ : Tokyo MARTIS, this is Vessel A. Pilot A ₁ : Roger, Channel 13.	Tokyo MARTIS: Vessel A, this is Tokyo MARTIS. Change to Channel 13, over.

	<p>Pilot A₁: Tokyo MARTIS, this is Vessel A. How do you read me?</p> <p>Pilot A₁: We have collided with foreign-flag Vessel B at west of Nakanose delta buoy. We'd like to anchor somewhere nearby and assess the accident.</p> <p>Pilot A₁: Yes, we are able to proceed.</p> <p>Pilot A₁: Roger.</p>	<p>Tokyo MARTIS: Vessel A, this it Tokyo MARTIS, over.</p> <p>Tokyo MARTIS: Roger. Are you able to proceed to YL3?</p> <p>Tokyo MARTIS: Roger. Please go ahead to YL3 for now.</p>
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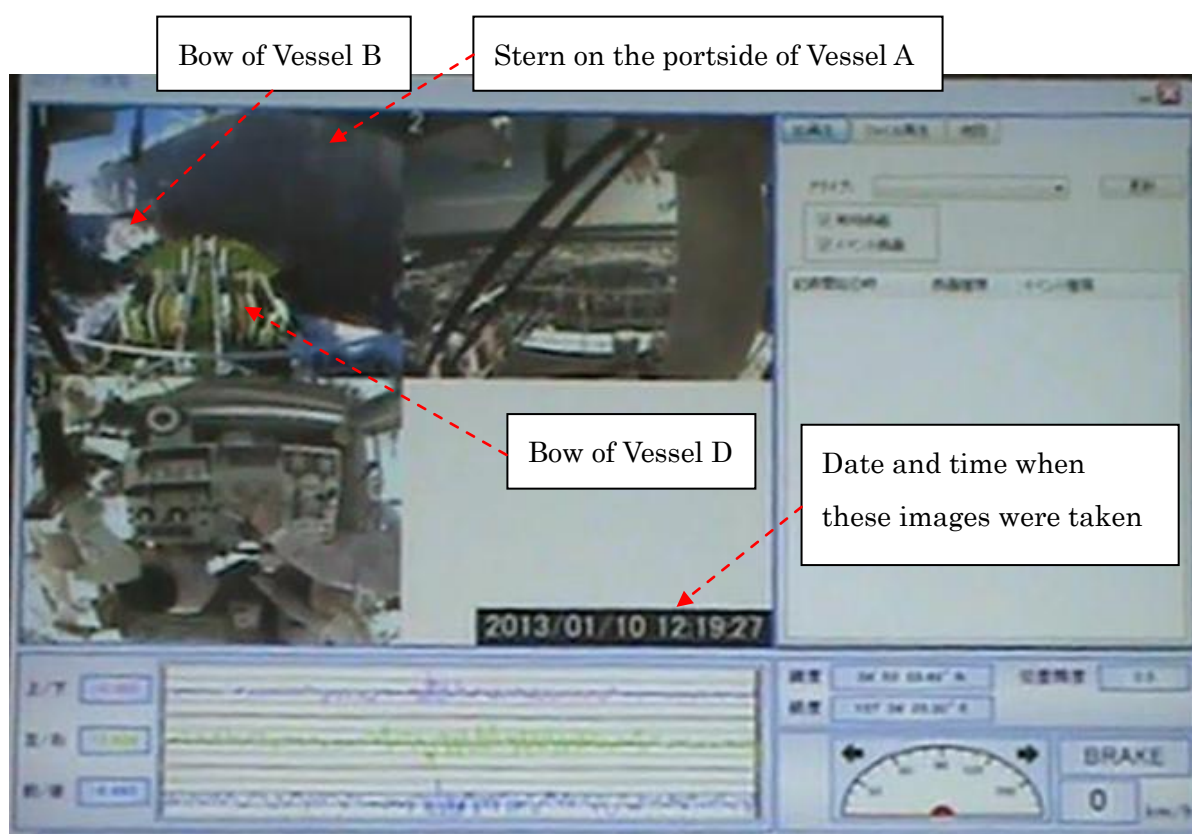


Photo 2.1-1 Image at the time of collision taken by the image recorder equipped in Vessel D

2.1.3 Conditions of Vessel B Approaching Vessel A Recorded by the Radar of Vessel A

According to the VDR information recorded by Vessel A, the period when the information of Vessel B was shown in the radar of Vessel A was between 12:17:00 and 12:18:30. The following shows the details (See Photo 2.1-2).

Time (hh:mm:ss)	Bearing (°)	Distance (nautical mile)	TCPA* ⁴ (minute)	CPA* ⁵ (nautical mile)	BCT* ⁶ (minute)	BCR* ⁷ (nautical mile)
12:17:00	223.8	0.87	2.16	0.10	1.39	0.26
12:17:18	224.8	0.77	1.59	0.11	1.20	0.27
12:17:31	225.9	0.68	1.44	0.11	1.03	0.29
12:17:46	227.3	0.59	1.30	0.12	0.48	0.29
12:18:00	228.9	0.50	1.17	0.11	0.30	0.20
12:18:15	230.6	0.41	1.06	0.09	0.32	0.23
12:18:30	231.4	0.33	0.59	0.04	0.30	0.12

*⁴ "TCPA" is the abbreviation of Time to the Closest Point of Approach, which refers to the time until two ships most approach each other.

*⁵ "CPA" is the abbreviation of Closest Point of Approach, which refers to the distance when two ships most approach each other.

*⁶ "BCT" is the abbreviation of Bow Crossing Time, which refers to the time until another ship passes over the bow of their own ship.

*⁷ "BCR" is the abbreviation of Bow Crossing Range, which refers to the distance when another ship passes over the bow of their own ship.

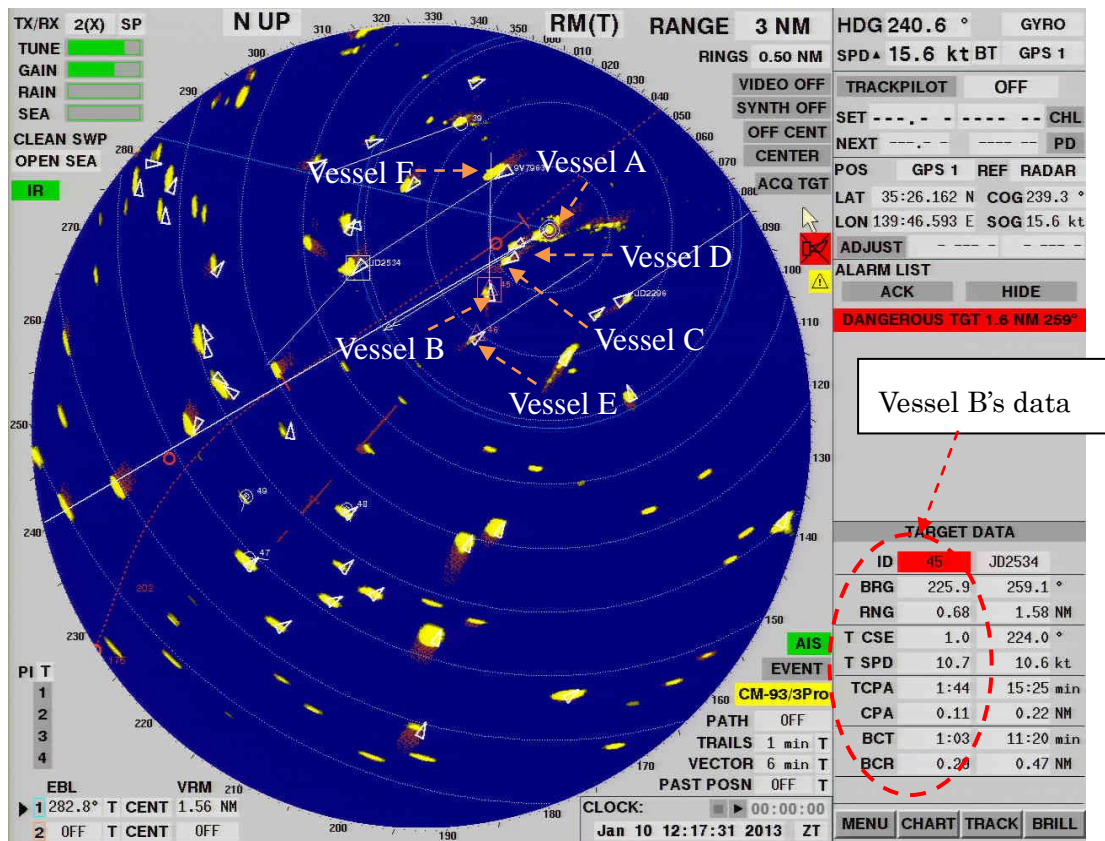


Photo 2.1-2 Image of radar taken by Vessel A

2.1.4 Progress of the Accident According to the Statements of the Relevant Persons

According to the statements of the Master A, Second officer (hereinafter referred to as “Second officer A”), Third officer (hereinafter referred to as “Third officer A”), Pilot A₁, Pilot A₂, the Master of Vessel B (hereinafter referred to as “Master B”), Second officer (hereinafter referred to as “Second officer B”), the Master of Vessel C (hereinafter referred to as “Master C”), the Master of Vessel D (hereinafter referred to as “Master D”), the Master of Vessel E (hereinafter referred to as “Master E”), and the responsible person of Tokyo MARTIS, as well as the Statements of Fact of Vessels A and B, the progress of the accident was as follows.

(1) Vessels A, C, and D

Vessel A was boarded by the Master A and 31 other crew members (three Indians, 24 Malaysians, one Yemenite, one Filipino, two Pakistanis), after unloading at the private berth located in Chiba district of Chiba port in Chiba Prefecture, and

departed the berth under the pilotage^{*8} of the pilot of the port at about 11:00, January 10, 2013.

In Vessel A, with Master A, Chief officer, Second officer A, Fourth officer, able bodied seaman and ordinary seaman arranged in the bridge, in the vicinity of the border of Chiba Port at around 11:20, the pilot was changed from the harbour pilot to Pilots A1 and A2 who embarked Vessel A at around 10:18 and finished the meeting about the sailing plan in Tokyo Bay with Master A.

Pilots A1 and A2 practically took command of the ship and, after the harbour pilot disembarked, put Vessel C preceded at approximately 0.5 nautical miles (M) from the bow on the portside based on the determination that it would be dangerous if other ships approach within 0.5 M, and also put Vessel D preceded at approximately 0.3 M from the bow on the starboard side so that they could cope with small ships trying to pass over between Vessels A and C, and asked Master A to increase the speed to 15 kn, and then they proceeded her toward the east fairway of Tokyo Bay Aqua-Line.

When Pilots A1 and A2 asked Master A to increase the speed, they were told by Master A that it requires 30 to 50 minutes to increase from the Harbour full ahead from 13 kn to 15 kn and 10 to 15 minutes to reduce the speed from 15 kn to 13 kn.

When Third officer A went up to the bridge and shifted with Chief officer at around 12:00, Vessel A had passed the east fairway of Tokyo Bay Aqua-Line and was proceeded while increasing speed with the course of approximately 223°, instead of the normal course of 235°, because of a ship being proceeded on the starboard side in addition to Vessel F.

At around 12:04, after Pilot A2 ordered to alter the course to 230°, Pilot A1 communicated with Pilot F by VHF to set the speed to 15 kn and to follow Vessel F. After that he noticed that the speed of Vessel A was approximately 16 kn and asked Master A to reduce the speed to 15 kn.

At around 12:10, Pilots A1 and A2 were reported from Vessel C about the name of Vessel B and that its speed was 8.5 kn. Based on this report, they thought Vessel B reduced the speed from 11 kn to pass over the stern of Vessel A because the speed of Vessel B was lower than the general speed limit for vessels like Vessel B in

^{*8} "Pilotage" refers to the guidance of the relevant ship in a pilotage water with a pilot on board (Article 2, Pilotage Act).

Nakanose Traffic Route. Pilot A2 ordered to alter the course to 235° so that Vessel B would be able to pass over the stern of Vessel A.

At around 12:12, Pilot A1 informed Master A that Vessel B reduced her speed and would pass over the stern of Vessel A. Pilot A2 ordered to alter the course to 240° to widen the distance from Vessel B to pass, as the distance from Vessel B was approximately 2.8 M.

When Master A was told from Pilot A1 that Vessel B would pass over the stern of Vessel A, he thought that the pilot ordered in Japanese to Vessel C and others, as well as Vessel C or D made a communication with Vessel B.

At around 12:14 , Pilots A1 and A2 were told from Vessel C that the speed of Vessel B increased to 12.1 kn. According to this report, Pilot A1 confirmed the speed of Vessel B and the distance of approximately 2 M from her through the image of the radar.

When Second officer A was turning a knob of the telegraph on the right edge of the console for the portside while communicating with the duty engineer in order to reduce the speed of the engine, he heard that Third officer A was reporting to Pilots A1 and A2 that Vessel B was approaching from the portside. He moved to the console for the starboard side to confirm that Vessel B was approaching through the image of the radar, and then he showed the image of Vessel B to Pilot A1. Pilot A1 said that there was no problem because Vessel B reduced her speed and would turn to right and pass over the stern of Vessel A. So he thought that Pilot A1 communicated with Vessel B in Japanese.

At around 12:16, Pilot A1 sounded two prolonged blasts by a whistle to attract attention to Vessel B as she increased the speed, even though it was thought that she reduced her speed to allow Vessel A to go ahead. At that time, as he was told from Vessel C by VHF that the speed of Vessel B was 11.4 kn, he sounded five short blasts by a whistle as warning signals.

Vessel C sounded signals to attract attention, following the whistles sounded by Vessel A. Also, Vessel D gave caution signals to Vessel B through the search lights.

At around 12:17, Pilot A1 noticed that the name of Vessel A was called by VHF in English and found that it was a call from Vessel B, and then he asked Vessel B to stop the engine and turn to right. There was an answer from Vessel B to stop the engine. After Pilot A2 ordered the 5° to the starboard, he asked Vessel B to stop the

engine immediately. After that there was an answer from Vessel B that she stopped the engine.

Pilot A1 thought that it would be dangerous to alter her course to the starboard because Vessel A was the stand-on vessel against Vessel B as well as Vessel F was proceeding in parallel at the point of approximately 0.6 M on the starboard side. Also, Pilot A2 thought that it was hard to imagine that Vessel B would pass over the bow of Vessel A because Vessel F was proceeding in parallel on the starboard side.

As Master D heard that Vessels A and B communicated by VHF and Vessel B accepted the request from Vessel A, he stopped signals to attract attention and kept the navigation. However, he thought that there was no significant change in the speed of Vessel B.

Master C had not made direct communication with Vessel B until then, and he had never heard the communication regarding the acceptance that Vessel B would pass over the stern of Vessel A.

As Pilot A1 was given a report from Vessel C that Vessel B would cross ahead of Vessel B, he ordered Vessel C to go ahead in front of Vessel B and also ordered Vessel D to push the bow of Vessel B. However, he thought that the speed of Vessel B was still approximately 8 kn by visual measurement.

Under the instruction from Pilot A1, Vessel C approached Vessel B by making a left turn while sounding the whistle and positioned around the stern on the starboard side of Vessel B.

Pilot A2 ordered to put the helm hard to port at around 12:19.

While Master D stopped the ship to wait for Vessel B and shouted “astern” repeatedly by loudspeaker after altered her course to port and approached Vessel B, he was ordered by Pilot A1 and tried to push Vessel B with her bow by applying it at the front of the starboard side of Vessel B, but it immediately rebounded. Immediately after that, he recognized that the center of the portside of Vessel A collided with the bow of Vessel B.

The engine of Vessel A was stopped immediately after the collision and the ballast water splashed out at the points of collision. Vessel B was dragged by her bow by Vessel A and altered her course to port.

Master D saw no other ships due to which Vessel B might hesitate to turn right.

Pilot A1 informed Tokyo MARTIS that there was a collision. After that, Vessel A anchored in the anchorage area of Yokohama district of Keihin port at around 12:45 .

Master C thought that Vessel A was able to go ahead of the bow of Vessel B if her speed was approximately 13 kn and Master D thought that it was impossible to precede Vessel A because the speed of Vessel D immediately before the accident was approximately 15.9 kn, respectively.

(2) Vessel B

Vessel B was boarded by Master B and 13 other crew members (all Filipinos). At around 10:05, near the entry of Tokyo Bay, the composition of bridge team was changed to stand by for port entry from normal one for watch keeping at sea, while Master B took the command of the ship, Third officer and a able bodied seaman took look out duty, and another manoeuvring able bodied seaman took manual steering operation, respectively. In a short time, she passed the US line, the position reporting line^{*9}, and reported to Tokyo MARTIS.

At around 11:30, Vessel B entered from Uruga Suido Traffic Route to Nakanose Traffic Route and scheduled to arrive at 12:50 at a pilot station located in the vicinity of the entry of Tsurumi Passage in Kawasaki district of Keihin port. The ship was proceeded through Nakanose Traffic Route with the course of approximately 020° and the slow ahead engine speed of approximately 8.5 kn. At around 12:00, Second officer took over the watch from Third officer.

When taking over the watch, Second officer B was ordered from the Third officer to be careful because Vessel A was approaching.

At around 12:09, Master B first recognized Vessel A at approximately 4 M from the bow on the starboard side through the image taken by the radar with the range being set in 6 M. In a short time when the ship reached the exit of Nakanose Traffic Route, he made steering order of port.

When the distance from Vessel A was approximately 3 M, Master B carried out a simulation with Second officer B with Automatic Radar Plotting Aids* 10

^{*9} “Position Reporting Line” refer to the lines where ships are required to report to Tokyo MARTIS by VHF or telephone about her name, current position, and the name of the passed line, when she passed the first one.

^{*10} “Automatic Radar Plotting Aids (ARPA)” refer to a device having some functions to display other ships’ courses, speeds, TCPA, CPA, and estimated future positions by automatically processing the changes of the positions in the image of them searched by the radar, as well as to issue warnings if a collision with other ships is estimated.

(hereinafter referred to as “ARPA”) and obtained the result that CPA of Vessel A would be 0.3 to 0.4 M if she kept the navigation with the planned course of 338° and present speed after departing Nakanose Traffic Route from which she would bound to the pilot station. So he thought that she would be able to pass over the bow of Vessel A by increasing the speed to widen CPA, and then he increased the speed to half ahead.

At around 12:15 where the speed reached approximately 12.0 kn, Vessels C and D approached so as to block the bow. So Master B ordered Second officer B to make a communication with them. When Second officer B called Vessel A through Channel 16 of VHF, he had an acknowledgement from Vessel A and was asked to stop the engine and alter her course to the starboard.

At around 12:17, due to the repetitive call of “astern” through the loudspeaker from Vessel D, Master B stopped the engine which was run in Half ahead, and then selected slow astern, but kept midships because he thought, if altered her course to the starboard, the portside of Vessel B would collide with the portside of Vessel A and Vessel B would change. After that, even though he selected Half astern at around 12:18, and then selected Full astern at around 12:19, the bow of Vessel B collided with the center on the portside of Vessel A.

In accordance with the order from Kawasaki Port Radio, Vessel B anchored in the Nakanose anchorage area at around 13:42.

(3) Vessel E

When Vessel E proceeded northeast in the marine area west of Nakanose from Yokohama district of Keihin port to Katsunan district of Chiba port, Master E recognized Vessel B being navigated toward the exit of Nakanose Traffic Route and kept monitoring. After that Vessel B turned to left around the exit of Nakanose Traffic Route so that it would cross ahead of Vessel E from right to left, Vessel E was navigated by altering her course to starboard so that it would be able to pass over the stern of Vessel B at around 12:14.

(4) Tokyo MARTIS

On the day of the accident, Tokyo MARTIS had not made any communication with both Vessels A and B except routine position reporting and necessary other information.

The time of this accident was at about 12:19:27, January 10, 2013 and the location was around 320°, 1,950 m from the Kisarazuko Offing Light Beacon located in Kisarazu City Chiba Prefecture.

(See Attached diagram 1: Outline of Tokyo Bay, Attached diagram 2: Estimated Navigational Routes of Vessels A, B, E, and F, and Attached diagram 3: Situation of Vessels A, B, C, and D when the Accident was Occurred.)

2.2 Injuries to Persons

According to the statements of Masters A and B, there were no casualties among the crew members on both tankers.

2.3 Damage to Vessel

Vessel A received some dents and cracks on its hull around the center of the portside and Vessel B received crushes on its hull of the bow and some dents on the bulbous bow.

(See Photos 2.3-1 and 2.3-2.)



Photo 2.3-1 Damaged state of Vessel A



Photo 2.3-2 Damaged state of Vessel B

2.4 Crew Information

(1) Gender, Age, and Certificate of Competence

Master A: Male, 35 years old,

Nationality: India

Endorsement attesting the recognition of certificate under STCW regulation I/10,

Master (issued by Malaysia)

Date of issue: Unknown

(Valid until January 30, 2013)

Pilot A₁: Male, 71 years old,

First grade pilot in Yokosuka area

Date of registered: December 15, 1995

Date of issue: November 19, 2010

Date of expiry: December 14, 2013

Pilot A₂: Male, 59 years old

First grade pilot in Tokyo Bay area

Date of registered: March 26, 2010

Date of issue: March 26, 2010

Date of expiry: March 25, 2015

Master B: Male, 54 years old,

Nationality: Republic of the Philippines

Endorsement attesting the recognition of certificate under STCW regulation I/10,

Master (issued by Republic of Panama)

Date of issue: October 3, 2011

(Valid until September 6, 2016)

(2) Major Seagoing Experience

According to the statements of Master A, Pilots A₁ and A₂, and Master B, their major seagoing experiences are as follows.

1) Master A

After boarding as the Chief officer in an LNG tanker managed by the owner of Vessel A on May 2007, he experienced three ships of the same type, and then he boarded Vessel A as the master from April 2010. After that, he boarded the ship one year and eight months in total and proceeded Tokyo Bay several times. He was

trained for BRM^{*11} in the period between June 23 and 25, 2008, and had the certification. He was in good health condition at the time of the accident.

2) Pilot A₁

Pilot A₁ started the operation as a pilot in the Yokosuka pilotage area in 1995. Since then he piloted more than 4,000 ships. When he renewed his license in 2009, he was trained for BRM through simulation. He was in good health condition at the time of the accident.

3) Pilot A₂

Pilot A₂ had been working in a ship company approximately 36 years. After he experienced being a master for approximately four and a half years, he became a pilot from April 2010. Since then, he piloted approximately 80 ships in the area from Chiba Port and Tokyo district of Keihin port to Uraga Suido Traffic Route via the east fairway of Tokyo Bay Aqua-Line. He was in good health condition at the time of the accident.

4) Master B

Master B became a master from 2001 and boarded Vessel B from November 2012. Before that, when he boarded a sister ship of Vessel B for approximately six months, he had had entered in Kawasaki district of Keihin port and other areas, so he knew well the situation in the vicinity of Nakanose Traffic Route. He was trained for BRM in the period between September 12 and 16, 2011, and had the certification. He was in good health condition at the time of the accident.

2.5 Vessel Information

2.5.1 Particulars of Vessel

(1) Vessel A

IMO number: 9229647

Port of registry: Port Kelang (Malaysia)

Owner: PUTERI NILAM SATU L PVT LTD. (Malaysia)

^{*11} “BRM” is the abbreviation of Bridge Resource Management, which refers to the activities for effectively utilizing (managing) every kind of resource that is available in the bridge such as crew, facilities, and information in order to proceed the ships safely. For this purpose, various trainings are conducted including classroom lectures and ship manipulation simulations.

Management company: MISC BERHAD (Malaysia) (hereinafter referred to as
“Company A”)

Classification Society: Lloyd’s Register

Gross tonnage: 94,446 tons

L x B x D: 276.00 m x 43.40 m x 25.50 m

Hull material: Steel

Engine: One turbine engine

Output: 26,800 kW

Propulsion: One fixed pitch propeller

Date of launch: September 22, 2000

(2) Vessel B

IMO number: 9355290

Port of registry: Panama (Republic of Panama)

Owner: COWBELL SHIPPING S.A (Republic of Singapore)

Management company: BERNHARD SCHULET SHIPMANAGEMENT

(SINGAPORE) PTE. LTD. (Republic of Singapore) (hereinafter referred to as
“Company B”)

Classification Society: Nippon Kaiji Kyokai (Class NK)

Gross tonnage: 2,997 tons

L x B x D: 95.88 m x 15.00 m x 7.00 m

Hull material: Steel

Engine: One diesel engine

Output: 2,647 kW

Propulsion: One fixed pitch propeller

Date of launch: November 21, 2005

2.5.2 Loading Conditions

(1) Vessel A

According to the statement of Master A, there was no cargo but loaded ballast seawater, and the draught level was approximately 9.2 m at the bow and approximately 9.8 m at the stern.

(2) Vessel B

According to the statement of Third officer of Vessel B, the draught level at the time of departure of Tianjin Port, People’s Republic of China on January 6 with no cargo

but ballast seawater loaded was approximately 2.58 m at the bow and approximately 4.64 m at the stern.

2.5.3 Navigational Equipments and Others

(1) Vessel A

1) Navigational equipments

Vessel A was equipped with two radars, VDR, AIS, and two VHF's in the bridge.

2) Conditions of hull and main engine at the time of accident

According to the statement of Master A, there was no malfunction or failure to the hull, engine, and equipment.

(2) Vessel B

1) Navigational equipments

Vessel B was equipped with two radars, AIS, and two VHF's in the bridge.

2) Conditions of hull and main engine at the time of accident

According to the statement of Master B, there was no malfunction or failure to the hull, engine, and equipment.

2.5.4 Maneuverability of the Ships

(1) Vessel A

According to the speed indicator and speed test data of Vessel A and the statement of Master A, the maneuverability of Vessel A was as follows.

1) Harbour log speed (ahead)

Type	Engine (rpm)	Log speed (kn)
Full ahead	46	11.2
Half ahead	38	9.2
Slow ahead	29	7.0
Dead slow ahead	23	5.4

2) Log speed at rpm

Engine order (rpm)	Log speed (kn)
89 (full sea ahead)	20.38
70	16.00
66	15.11
61	13.97
57	13.05

53	12.14
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3) Test results when full astern with normal ballast condition

Status when astern is commanded	Time (minute)	Distance (M)
Full sea ahead	10.0	1.6
Full ahead	7.1	0.8

4) Test results when making a right turn with normal ballast condition

Type	Advance* ¹² (M)	Time (minute)	Transfer* ¹³ (M)	Time (minute)
Full ahead	0.41	1.6	0.43	3.5

(2) Vessel B

According to the Vessel B's result of sea trials and the statement of Master B, the maneuverability of Vessel B was as follows.

1) Harbour log speed

Type	Engine (rpm)	Log speed (kn)
Full ahead	190	11.4
Half ahead	175	10.4
Slow ahead	130	7.3
Dead slow ahead	90	4.7

2) Results of astern test when proceeding with normal ballast condition and the log speed of 14.3 kn (240 rpm)

Type	Time	Log speed (kn)	Distance run (m)
Order to crash astern ~ Revolution of propeller stop	2 min. 15 sec.	5.5	650
Order to crash astern ~ Step of ship	3 min. 53 sec.	0.0	815

3) Result of turning test with normal ballast condition

Type	Advance (m)	Time (minute:second)	Transfer (m)	Time (minute:second)
Right turn	357.6	0:57.8	103.8	1:51.0
Left turn	338.7	0:58.6	127.3	1:49.6

*¹² "Advance" refers to an advancement distance of the center of ship gravity toward the original course from the center of ship gravity at the start of turning to when the ship is turned 90°.

*¹³ "Transfer" refers to a lateral movement distance of the center of ship gravity on the original course from the center of ship gravity at the start of turning to when the ship is turned 180°.

(3) Vessels C and D

According to the particular sheets for Vessels C and D, the maximum speeds of Vessels C and D are 15.5 kn and 16.0 kn, respectively. Both ships are classified to Class 4 vessel with fire fighting facilities^{*14}.

2.6 Role Allotment between Main Pilot and Copilot

According to the statements of Pilots A₁ and A₂, their roles were as follows.

- (1) According to the internal regulation of the Tokyo Bay Licensed PILOTS' Association, the main pilotage operation for an LNG tanker shall be taken by a pilot having experience of at least five years after the admission of the association. The role allotment between main pilot and copilot was as follows.

Main pilot: order of ship maneuvering, and communication with escort tugboats, etc.

Copilot: lookout, creation of documents, and explanation of voyage planning to the master, etc.

- (2) At the time of the accident, more roles than normal were allotted for Pilot A₂ for the purpose to gain more experience for Pilot A₂ under the acceptance of Master A asked for by Pilot A₁. For the increased roles, Pilot A₂ would perform the part under the supervision and advice of Pilot A₁. The role allotment was as follows.

Pilot A₁: VHF communications, lookout (including radar), and communications other than course orders with Vessels C and D, etc.

Pilot A₂: order of ship maneuvering, and course orders to Vessels C and D, etc.

According to the pilotage terms and conditions stipulated by the Tokyo Bay Licensed PILOTS' Association, in the case of navigation operation and when piloting an LNG tanker, in general, with either a gross tonnage of at least 80,000 tons or a cargo capacity of at least 130,000 m³, the pilot may have other pilots on board upon the discussion with the master or owner for the purpose to secure safe navigation.

2.7 Weather and Sea Conditions

(1) Weather Data

^{*14} A "Class 4 vessel with fire fighting facilities" refers to a ship equipping the device having the fire extinguishing ability to release at least 2 tons of fire extinguishing powder at a speed of at least 30 kg/second.

- 1) The weather data at the time of the accident observed at the Tokyo Aviation Weather Service Center located approximately 7.2 M away to the north from the location where the accident was occurred was as follows.

January 10

Time: 12:00, Wind direction: NNW, Wind speed: 5.5 m/s, and Amount of rainfall:
0 mm

Time: 12:10, Wind direction: North, Wind speed: 4.8 m/s, and Amount of rainfall:
0 mm

Time: 12:20, Wind direction: North, Wind speed: 5.3 m/s, and Amount of rainfall:
0 mm

- 2) According to the logbook of Vessel B, the weather condition on the day of 10th at 12:00 was as follows.

Weather: Cloudy, Wind direction: West, Wind speed: 3.4 to 5.4 m/s, Visibility: 5.0
to 25.0 M, Wave height: 0.5 to 1.25 m

- 3) According to the tide-tables issued by the Japan Coast Guard, the direction and speed of the tidal stream around 260°, 2.6 M from the location where the accident occurred were 021° and approximately 0.4 kn, respectively, and the tide was in the middle of the incoming tide.

2.8 Characteristics of the Area

2.8.1 Navigation Rules and Safe Navigation Orders

(1) Speed limit

According to Clause 4 of the enforcement order for the Maritime Traffic Safety Act, it is stipulated that ships and vessels shall not proceed all of the area of Nakanose Traffic Route at a log speed exceeding 12 kn.

- (2) In the safe navigation orders issued by the Japan Coast Guard (on July 2011), the following descriptions are provided.

○ *Uraga Suido and Nakanose Traffic Routes and their nearby areas*

The 3rd Regional Coast Guard Headquarters provide the following safe navigation orders.

1. Pilots on board

The following ships shall have at least a pilot on board.

(1) Foreign-flag ships

Snip

5. Speed limit

All ships also do not proceed at a high speed in the bay area outside the Traffic Route.

- (3) In the booklet called Safety Tokyo Bay (subtitle: “To safely proceed Tokyo Bay where many ships are congested”) (Revised on July 1, 2010) supervised by the 3rd Regional Coast Guard Headquarters, there is a figure titled “Information to be given to inbound/outgoing ships” showing that the location where this accident occurred is a congested area and adding an attention that reads “the outgoing ships should be aware for crossing-over inbound ships.”

2.8.2 Arrangement of Course Patrol Ships and Fire Protection Ships

According to Clause 23 of the Maritime Traffic Safety Act (orders to huge ships), Clause 15 of the enforcement order for the Maritime Traffic Safety Act, and the announcement stipulating the standards regarding the contents of the orders for the arrangement of the vessel for guarding the course, the vessel with fire fighting facilities, and the ships patrolling the sideways (Japan Coast Guard announcement No. 29 on February 2, 1976), the liquefied gas loaded tankers with a gross tonnage of at least 25,000 tons which are classified as a huge ship shall have vessel for guarding the course and a vessel with fire fighting facilities, respectively, in the area between the pilot station off the south of Uraga Suido Traffic Route and around the berth when proceeding through Uraga Suido Traffic Route or Nakanose Traffic Route.

The vessel for guarding the course being arranged to the huge ship are allowed to be proceeded with a speed 3 kn faster than the speed of the huge ship being proceeded through the Traffic Route. The ships carrying liquefied gas with a gross tonnage of at least 25,000 tons shall arrange a Class 4 vessel with fire fighting facilities.

2.8.3 Forced Pilotage Area and the Ships Subject to Pilotage

According to Clause 5 of the enforcement order for the Pilotage Act, it is stipulated as follows.

Yokohama and Kawasaki Areas: ships with a gross tonnage of at least 3,000 tons and ships carrying dangerous cargo with a gross tonnage of less than 3,000 tons

Tokyo Bay Area: ships with a gross tonnage of at least 10,000 tons

2.8.4 Examples of Collision Accidents

According to the Japan-Marine Accident Risk and Safety Information System (J-MARISIS) created by the Japan Transport Safety Board, the number of collisions after

1989 involving cargo ships and tankers being proceeded outside the traffic route in the vicinity of the area near the location of this accident under the condition where the visibility was not limited is 16. The breakdown is as follows. (See Attached diagram 2.8-1.)

- (1) Foreign-flag ship-involved accidents: 11
- (2) Accidents occurred while being proceeded with pilot arranged: 5 (all foreign-flag ships) (See Attached diagram 9 Examples of Past Accidents.)
- (3) By conduct vessel
 - 1) Crossing: 10
 - 2) Overtaking: 1
 - 3) Others: 5



- : Collisions occurred before the board is established of JTSB(October 1,2008)
- : Collisions occurred after the board is established of JTSB

Attached diagram 2.8-1 Locations of Collisions

2.9 Status of the Provision of Safety Orders for Crew Members

2.9.1 Status of Navigational Management of Vessel A

In the Bridge Procedure Manual of the Safety Management System guide created by Company A, the relationship with the pilot on board was stipulated as follows.

If the Pilot's actions could endanger the safety of the ship or the environment in the professional opinion of the Master or the OOW, they shall not hesitate to question the Pilot's decision. The Master and/or OOW upon their discretion shall take proper steps if such

action/s by the pilot, without doubt, could endanger the safety of the vessel. Such situation shall be deemed to exist but is not limited to the following:

- (i) Communication breakdown between the Pilot and the Bridge Team.
- (ii) Pilot found fatigued/stressed or under the influence of alcohol.
- (iii) Bridge Team fails to verify the commands given to the tug by the pilot.

2.9.2 Status of Navigational Management of Vessel B

According to the Safety Management Manual created by Company B, it was stipulated as follows.

(1) Configuration of bridge team

If the Master is in charge during standby conditions, he must always be assisted by a Navigator.

(2) General guidance to prevent collision in accordance with the treaties regarding the international regulations for preventing collisions at sea 1972

As far as possible and practical in the traffic density, without endangering the vessel, a minimum CPA of one mile must be maintained. If the Officer of the watch has to pass a ship with a CPA of less than one mile, the Master should be informed.

2.9.3 Status of the Operation of Escort Tugboats

According to the patrol ship operating manual created by the owner of the escort tugboats, it stipulates the watch duty and communications as follows.

III Tasks during patrolling

2 Look out of patrol ship

(2) The ships under patrol shall always take into account that it is not able to avoid a dangerous situation promptly due to its kinematic performance, and shall immediately inform if it found a ship that seems irregular and also shall give attention using whistle and signal lights. If necessary, it shall inform and ask to the pilot to dispatch a tug immediately to the ship to give way, and to stay there until it is able to confirm that the ship has taken avoiding action.

3 Communication and notification of patrol ship

o Communication to other ships

(1) If it is necessary to communicate with other ships to avoid a dangerous situation, be sure to ask permission to the pilot before doing so.

(2) *When communicating with other ships under the order of the pilot, it shall be simple and brief according to the object of the pilot. Also be sure to report the contents of the communication to the pilot.*

2.10 Safety Margin in Narrow Waters

According to reference*¹⁵, it is described as follows.

The distance between the ships to be maintained as the result of the avoidance manoeuvring is called passing distance. For how much distance should be maintained against the other ship when making an avoidance manoeuvring, there is no standard for estimating enough distance. So it depends on the coming officer estimation what he considers the safety margin around his ship in which he thinks he would not want to allow other ships to enter.

Figure 3.1.5 (omitted) shows the analysis results of the questionnaires regarding the conscious of the coming officer about the passing distance in narrow waters such as inside a port. Formula (3.1.5) shows an analysis result of the marginal passing distance for the area in which ship operators want no more ships to enter. Formula (3.1.6) shows the analysis result of the sufficient passing distance that coming officer think that it is safe if they proceed by maintaining at least this distance. Where FA is the desired passing distance of the coming officer toward the fore-and-aft direction, SP is the desired passing distance of the coming officer for the left and right directions, L₀ is the length of the own ship, and L_t is the master of the other ship.

Marginal passing distance (limit of approach inside the port area)

$$\left. \begin{aligned} FA &= (0.015L_t + 2.076) L_0 \\ SP &= (0.008L_t + 0.667) L_0 \end{aligned} \right\} \dots\dots\dots (3.1.5)$$

Sufficient passing distance (enough distance inside the port area)

$$\left. \begin{aligned} FA &= (0.025L_t + 3.125) L_0 \\ SP &= (0.012L_t + 1.096) L_0 \end{aligned} \right\} \dots\dots\dots (3.1.6)$$

3 ANALYSIS

3.1 Situation of the Accident Occurrence

*¹⁵ Reference: "Theory and practice of ship handling" written by Kinzo Inoue, published by the Seizando-Shoten Publishing Co., Ltd. (issued on March 8, 2011)

3.1.1 Course of the Events

From 2.1.1 to 2.1.4 and 2.8.2, the course of the events was as follows:

(1) Vessel A

- 1) It is highly probable that Vessel A was proceeding, following Vessels C and D, at a heading of about 228° and a speed of about 14.7 kn near the southwest entrance of the east fairway of Tokyo Bay Aqua Line at about 12:05 on January 10, 2013, in compliance with the Maritime Traffic Safety Act.
- 2) It is highly probable that Pilots A₁ and A₂, while proceeding at a heading of about 230° and a speed of about 15.9 kn about 3.4 M in the north-northeast of the exit of Nakanose Traffic Route, received a report at about 12:10 from Vessel C that Vessel B was proceeding toward Kawasaki at a speed of 8.5 kn, and that Pilot A₂ ordered a course of 235°.
- 3) It is highly probable that Pilot A₂ received a report from Vessel B at about 12:11 that Vessel B was of foreign nationality and proceeded on Nakanose Traffic Route.
- 4) It is highly probable that Pilot A₂ ordered a course of 240° at about 12:12.
- 5) It is highly probable that Pilots A₁ and A₂ received a report from Vessel C at about 12:14 that the speed of Vessel B was 12.1 kn.
- 6) It is highly probable that Pilot A₁ sounded the whistle for one prolonged blast two times at about 12:16 and, receiving a report from Vessel C that the speed of Vessel B was 11.4 kn, then sounded the whistle for five short blasts.
- 7) It is highly probable that Pilot A₁ noticed Vessel B at 16° 0.9 M on the port bow at about 12:16:30 to 12:17:30, requested her by VHF to stop the engine and turn to right, then requested her to immediately stop the engine, and received a reply from Vessel B that she stopped the engine.
- 8) It is probable that Pilot A₂ ordered hard starboard at about 12:19 and hard port at about 12:19:30.
- 9) It is highly probable that Master A, and Pilots A₁ and A₂ heard a sound of collision at about 12:19:30 and that Pilot A₂ ordered stopping the engine.
- 10) It is highly probable that Vessel A anchored temporarily at anchorage YL in Yokohama district of Keihin port at about 12:45, following Pilot A₁ reporting the accident to Tokyo MARTIS at about 12:23.

(2) Vessel B

- 1) It is highly probable that Vessel B was proceeding on Nakanose Traffic Route at a heading of about 022° and a speed of about 8.6 kn at about 12:02.

- 2) It is highly probable that Vessel B started turning to left near the exit of Nakanose Traffic Route at about 12:10.
- 3) It is probable that Vessel B increased the speed from slow ahead to half ahead at about 12:11.
- 4) It is highly probable that Vessel B proceeded at a heading of about 350° and a speed of about 11.0 kn about 550 m in the north of the exit of Nakanose Traffic Route at about 12:13.
- 5) It is probable that Vessel B, while proceeding at a heading of about 000° and a speed of about 11.1 kn, stopped the engine at the request of Vessel A at about 12:17 and soon get her engine to slow astern.
- 6) It is probable that Vessel B got her engine to half astern at about 12:18 when it recognized Vessel A at 46°0.6 M on the starboard bow.
- 7) It is probable that Vessel B get her engine to full astern at about 12:19 when it recognized Vessel A at 52° 0.2 M on the starboard bow.
- 8) It is highly probable that Vessel B alters her course over the ground from about 356.3° to about 113.1° and the speed from about 6.3 kn to about 1.9 kn at about 12:19:30 to 12:20 and, during this period, collided with Vessel A.
- 9) It is probable that Vessel B anchored temporarily at the anchorage of Nakanose at about 13:42 at the order from Kawasaki port radio.

3.1.2 Date and Time and Place of Accident Occurrence

It is highly probable from the following that this accident occurred at about 12:19:27 on January 10, 2013, around 320° 1,950 m from Kisarazuko Offing Light Beacon.

- (1) From 2.1.2, sound of collision was recorded at 12:19:27 and the time recorded on the video captured by the video recorder of Vessel D was the same.
- (2) From 2.1.1, Vessel B altered the course over the ground from 356.3° to 113.1° and the speed from 6.3 kn to 1.9 kn at 12:19:26 to 12:19:57.
- (3) From 2.1.1, the position of Vessel A at 12:19:32 was at latitude of 35°26.0'N and longitude of 139°46.2'E, while Vessel B was at latitude 35°26.0'N north and longitude 139°46.1'E.

3.1.3 Situation of Collision

It is highly probable from 2.1.1, 2.3, and 3.1.2 that the center part of the port side of Vessel A collided with the bow of Vessel B while Vessel A was proceeding at a heading

of about 268° and a speed of 14.6 kn and Vessel B, at a heading of about 351° and a speed of about 6.3 kn.

3.2 Causal Factors of the Accident

3.2.1 Situation of Crew, etc.

From 2.4, the situation of the crew was as follows:

- (1) Master A had a legal and valid endorsement alerting the recognition of certification under STCW regulation 1/10 and had attended a lecture on BRM. Master A also had experiences proceeding in Tokyo Bay several times and it is probable that he had no health problems at the time of the accident.
- (2) Pilot A₁ held a legal and valid pilot license. In addition, Pilot A₁ had piloted more than 4,000 vessels in Tokyo Bay and it is probable that he had no health problems at the time of the accident.
- (3) Pilot A₂ held a legal and valid pilot license. In addition, Pilot A₂ had piloted about 80 vessels in the area ranging from Chiba port to the Tokyo district of Keihin port and to Urata Channel, and it is probable that he had no health problems at the time of the accident.
- (4) Master B had a legal and valid endorsement alerting the recognition of certification under STCW regulation 1/10 and had attended a lecture on BRM. Master B also had experiences entering ports in the Kawasaki district of Keihin port and it is probable that he had no health problems at the time of the accident.

3.2.2 Situation of the Vessels

From 2.5.3, it is probable that Vessels A and B had no defect or fault in their hull, engine, and apparatus.

3.2.3 Situation of Lookout and Maneuvering

From 2.1.1 to 2.1.4, 2.5.4, 2.6,2.8.1, and 2.8.2, situation of lookout and maneuvering was as follows:

(1) Vessels A, C, and D

- 1) It is probable that Master A conned Vessel A, second officer A, third officer A, fourth officer, and an ordinary seaman were on the lookout, and another ordinary seaman was on the steering to manual, and that Pilots A₁ and A₂ practically conned the respective vessels. It is probable that Pilot A₁ was usually

on the lookout and Pilot A₂ issued orders concerning steering and the main engine.

- 2) It is probable that Pilots A₁ and A₂ led Vessels C and D forward and, after the harbour pilot disembarked, requested Master A to increase the speed to about 15 kn.
- 3) It is probable that Pilot A₁ noticed at about 12:10 that the speed of Vessel A was about 16 kn, and asked Master A to reduce the speed to 15 kn, and around this time, received an order from Pilot F to increase the speed to 17 kn.
- 4) It is probable that Pilots A₁ and A₂ received a report at about 12:10 from Vessel C that the speed of Vessel B was 8.5 kn around the exit of Nakanose Traffic Route and were notified the destination of Vessel B. Because the speed of Vessel B was slower than the speed limit on Nakanose Traffic Route, which was the general speed of vessels equivalent to Vessel B, Pilot A₂ believed that Vessel B would slow down around the exit of Nakanose Traffic Route and passed through in the direction of the stern of Vessel A, and thus ordered course 235° to Vessel B so that it would pass astern of Vessel A.
- 5) It is probable that Master A, hearing from Pilot A₁ at about 12:12 that Vessel B would decelerate and pass astern of Vessel A, believed that the pilot issues orders in Japanese to Vessel C and others and Vessel C or D communicated with Vessel B.
- 6) It is probable that Pilots A₁ and A₂ received a report from Vessel C at about 12:14 that Vessel B was at a speed of 12.1 kn, and, around this time, heard from third officer A that Vessel B was approaching from the port side.

It is probable that second officer A, hearing the above report of third officer A, pointed out the radar image of Vessel B to Pilot A₁, and heard from Pilot A₁ that there would be no problem because Vessel B would decelerate, turn to right, and pass astern of the Vessel A.

However, it is probable that Pilots A₁ and A₂, still believing that Vessel B would pass astern of Vessel A, kept proceeding, maintaining the course and speed.

- 7) It is probable that Pilot A₁, realizing at around 12:16 that Vessel B that he believed had decelerated to let Vessel A go first increased the speed, sent a signal to attract attention and, receiving a report from Vessel C that the speed of Vessel B was 11.4 kn, sounded a warning signal.

- 8) It is probable that Vessels C and D, following the whistle blown by Vessel A, sent a signal for attracting attention of Vessel B by whistle and searchlight, respectively.
- 9) It is highly probable that Pilot A₁ requested Vessel B by VHF at about 12:16:30 to 12:17:30 to stop the engine and turn to right, then requested Vessel B again immediately to stop the engine, and received a reply from Vessel B that it had stopped the engine.
- 10) It is probable that the situation of Vessel A was that Vessel B was proceeding around 16.2°0.87 M from the port bow of Vessel A, BCR was 0.26 M, and Vessel F was proceeding at a speed of about 15.4 kn around 76.9°0.60 M from the starboard bow of Vessel A.

It is probable that Pilot A₁, believing that turning to right was dangerous because Vessel A was a stand-on vessel and Vessel F was proceeding in parallel with Vessel A around 0.6 M from the starboard bow of Vessel A, and Pilot A₂, believing that Vessel B would not pass ahead of Vessel A because Vessel F was proceeding in parallel with and on the starboard side of Vessel A, continued proceeding, maintaining the course and speed.

However, it is somewhat likely that Vessel A could avoid collision with Vessel B without colliding with Vessel F if Vessel A made steering of hard starboard.

- 11) It is probable that Master D, learning from VHF that Vessel B responded to the request of Vessel A, stopped sending a signal for attracting attention, but that the speed of Vessel B did not alter much.
- 12) It is probable that Master C believed that he could prevent the approach by Vessel B before Vessel A if the speed of Vessel A was about 13 kn, and that Master D believed that Vessel D could not lead Vessel A as long as the speed of Vessel D was about 15.9 kn.

It is somewhat likely that Vessel A was involved in the occurrence of this accident because it was difficult for it to let Vessels C and D go ahead of it to take actions to prevent collision such as urging Vessel B to turn right because the speed of Vessel A was about 16 kn about 3 minutes before the accident.

(2) Vessel B

- 1) It is probable that Master B conned Vessel B, second officer B and one ordinary seaman were on the lookout, and another ordinary seaman was on the steering to manual.

- 2) It is probable that Master B recognized Vessel A on radar at about 12:09 for the first time when it was about 14°4.0 M of the starboard bow of Vessel B.
- 3) It is probable that Master B conducted simulation by using ARPA with second officer B when the distance of Vessel B to Vessel A was about 3 M and increased the speed from slow ahead to half ahead at about 12:11, believing that he could expand the distance from Vessel A if he increased the speed on the planned course of 338° after departing Nakanose Traffic Route.
- 4) It is probable that Vessel B proceeded on a course of about 350° at about 12:13 to give way to Vessel E because Vessel E, which had been proceeding in the west of Nakanose toward the northeast, altered the bearing 0.9° and approached from the port side between 12:11 to 12:13.
- 5) It is somewhat likely that Master B recognized Vessel F at about 29.9°1.89 M of the starboard bow at about 12:15 and altered the course about 000° to give way to the Vessel F because Vessel F altered the bearing 2.7° in 2 minutes from 12:13 to 12:15.
- 6) It is probable that Master B was proceeding, approaching the bow of Vessel A because Vessel B increased its speed at a heading of 349° to 006° and altered the course to about 000° at about 12:16 after departing Nakanose Traffic Route as a result of giving way to Vessels E and F, though the planned course after departing Nakanose Traffic Route was 338°.

It is probable that Master B did not notice Vessel A coming close to the bow of Vessel B because he had to give way to Vessels E and F in about 4 minutes after passing Nakanose Traffic Route.

- 7) It is probable that Master B ordered at about 12:16 second officer B to communicate by VHF with Vessel A because Vessels C and D were getting closer and that the second officer called Vessel A by VHF.
- 8) It is probable that Vessel B stopped the engine because it was requested by Vessel A at about 12:16:30 to 12:17:30 to stop the engine and turn to right and then requested again immediately to stop the engine. Vessel B even got her engine to full astern but proceeded on the same course, fearing that, if Vessel B turned to right, it would collide with Vessel A on the port side and capsize.
- 9) It is probable that about this time, Vessel B recognized Vessel A at 43°0.9 M of the starboard bow and could not avoid collision with Vessel A unless Vessel A cooperated, judging from the minimum stop distance of Vessel B, because Vessel B had about 600 m to go to the point where the course lines of Vessels A and B

crossed. However, it is somewhat likely that Vessel B could avoid collision with Vessel A if Vessel B turned fully to the right, judging from the fact that no vessels other than Vessels C and D were approaching the starboard side of Vessel B and from the advance of Vessel B when it turned to right.

3.2.4 Analysis of Passing Distance Limit

From 2.10, it is somewhat likely that the passing distance limits of Vessels A and B on the ahead and the quarter were 0.52M and 0.32M, respectively.

3.2.5 Analysis of Sailing Rules

From 2.1.1, 2.1.3, 2.10, 3.2.3, and 3.2.4, the following can be said:

(1) Applicable law

This accident occurred by Vessels A and B colliding with each other while sailing in an area to which the Maritime Safety Traffic Act is applicable. However, because this Act does not provide a traffic method that can be applied to this accident, it is probable that the Act on Preventing Collision at Sea is applied to the accident.

(2) Vessels B and E

It is probable that Vessel E, which was approaching Vessel B from the port side altered the bearing about 0.9° at 12:11 to 12:13, might have collided with Vessel B. However, Vessel B altered the course about 350° at about 12:13 and Vessel E turned to right at about 12:14, changing its bearing about 16.8° of the stern. As a result, the possibility of collision between Vessels B and E was dispelled.

It is probable that Vessel B did not alter the course to the planned course of 338° because it departed Nakanose Traffic Route at about 12:11 and was the stand-on vessel in relation with Vessel E.

(3) Vessels A, B, and F

Because the possibility of collision between Vessels B and E was dispelled at about 12:15, because the alteration in bearing between Vessels A and B was about 3.7° for about 2 minutes from 12:15 to 12:17, and because the distance between Vessels A and B was reduced to about 1.7 to 0.9 M at about 12:15 to 12:17, it is probable that the Vessels A and B had to consider that they might collide with each other. In the meantime, Vessel F was proceeding about 0.60 M of the starboard side of Vessel A and this did not pose any problem to taking such action as will be best aid to avoid collision, as described in 3.2.3 (1). Vessel F could have decelerated. It is probable that Vessel B altered the course to about 000° at about 12:15 to give way to Vessel F.

The bearing of Vessel F altered 6° or more in 1 minute toward the bow and the situation was not for Vessel F to give way, creating a relation of crossing vessels between Vessels A and B. It is probable that Vessel A was the stand-on vessel and Vessel B was the give-way vessel.

3.2.6 Situation of Communication by VHF

The situation of communication was as follows from 2.1.2, 2.1.4 and 3.2.3:

(1) Vessel A

Pilots A₁ and A₂ received a report at about 12:14 from Vessel C that the speed of Vessel B was 12.1 kn and, around this time, they also received a report from third officer A about Vessel B approaching from the port side. But based on the judgment at the time of having received information on Vessel B, they were proceeding, believing that Vessel B passed astern. However, it is probable that, because Vessel B gave way to Vessel E and others, they did not proceed according to their initial judgment, and Vessel B approached the bow of Vessel A, colliding with it in the end. When a vessel gets close to another vessel with its course cross that of the other in a situation where the route density is congested with vessels, the possibility of collision should be considered. It is probable that occurrence of this accident could have been prevented if the intention of Vessel B to increase the speed had been confirmed through communication by VHF at an early stage and when it was learned that Vessel B was speeding up.

(2) Vessel B

Master B conducted simulation by using ARPA with second officer B when the distance to Vessel A was about 3 M and believed at about 12:11 that he could widen the distance from Vessel A when Vessel B would pass ahead of Vessel A if Vessel B proceeded on the planned course of 338° and at the present speed after departing Nakanose Traffic Route where a pilot would embark because Master B obtained the result that CPA of Vessel A was 0.3 to 0.4 M. Vessel B therefore increased the speed from slow ahead to half ahead. It is probable, however, that Vessel B did not convey its intention of increasing the speed to Vessel A.

Vessel B could no longer proceed on the planned course and the CPA of Vessel B was no longer as had been expected because it gave way to Vessel E. Vessel B approached the bow of Vessel A. The passing distance of a vessel differs depending on its type. It is probable that a vessel should inform other vessels of its maneuvering intention early in a situation of traffic density so that the other vessel

can take an appropriate step to avoid collision, as the former can influence the judgment of the other.

It is somewhat likely from the above that Master B could have avoided occurrence of this accident if he had communicated with Vessel A early and told it its intention of increasing the speed.

(3) Tokyo MARTIS

It is probable that Tokyo MARTIS received a report on the position reporting line of Vessels A and B but did not offer information to both the vessels.

3.2.7 Situation Navigation Control

It was as follows from 2.1.4, 2.9.1, 2.9.2, and 3.2.3:

(1) Vessel A

It is probable that Master A heard from Pilot A₁ at about 12:12 that Vessel B would slow down and pass astern of Vessel A and might believe that the pilot had issued orders in Japanese to Vessel C and others and that Vessel C or B had communicated with Vessel B but that he could not confirm the orders by the pilot to Vessel C and others.

It is therefore somewhat likely that Master A could have found out that it was false assumption of the pilot that Vessel B would pass astern of Vessel A if he had confirmed the orders by the pilot to Vessel C and others.

(2) Vessel B

Vessel B could no longer proceed on the planned course and came close to the bow of Vessel A because Vessel B gave way to Vessel E. But it is somewhat likely that Master B did not realize that he was proceeding in a situation to approach the bow of Vessel A because he had to give way to Vessels E and F about 4 minutes after passing Nakanose Traffic Route.

On the bridge of Vessel B, three crew members, aside from the master, took their position and second officer B and one ordinary seaman were on the lookout. It is somewhat likely that occurrence of this accident could have been prevented if the bridge team had confirmed the change in the CPA of Vessel A, grasped its approach, and shared that information, in line with the concept of BRM, in the situation where Vessel B had to give way to more than one vessel.

3.2.8 Situation in Northern Area of Nakanose Traffic Route

It is probable from 2.8.1 and 2.8.4 that the situation was as follows:

- (1) Vessels proceeding north or northwest after departing Nakanose Traffic Route, vessels proceeding northeast from the western area of Nakanose Traffic route, and vessels proceeding southwest for the western area of Nakanose Traffic Route concentrate on the northern area of Nakanose Traffic Route.
- (2) Situations where the courses of vessels passing Nakanose Traffic Route and proceeding for Kawasaki district of Keihin port intersect with the courses of vessels proceeding south toward the western area of Nakanose Traffic Route and vessels proceeding northeast from the western area of Nakanose Traffic Route take place.
- (3) Three collision accidents, excluding this accident, occurred since 1989 in which a vessel passing Nakanose Traffic Route and proceeding north or northwest collided with a vessel proceeding southwest or south for the western area of Nakanose Traffic Route in the situation a pilot is boarding on both vessel or either vessel.

3.2.9 Situation of Weather and Sea State

From 2.7, it is probable that it was cloudy, the wind was from the north at a velocity of 3, the tide was in the center period of the rising tide, the current in surrounding areas was a tidal direction of 021° and current speed of 0.4 kn, and the visibility was about 5 M or more.

3.2.10 Analysis on Occurrence of the Accident

From 3.1.1 and 3.2.3, the accident occurred as follows:

- (1) Vessel A was proceeding west-southwest off the east of Yokohama district of Keihin port for the western area of Nakanose Traffic Route at about 12:10 on January 10. Pilots A₁ and A₂ received a report from Vessel C that the speed of Vessel B at about the exit of Nakanose Traffic Route was 8.5 kn. It is probable that, because the speed of Vessel B was slower than the normal speed of other equivalent vessels, the pilots believed that Vessel B would slow down around the exit of Nakanose Traffic Route, and Pilot A₂ ordered course 235° to Vessel A so that Vessel B could pass astern of Vessel A.
- (2) It is probable that Vessel B increased the speed from slow ahead to half ahead, believing at about 12:11 that, if it increased the speed on the planned course of 338° after departing Nakanose Traffic Route, it could widen the distance when it would pass ahead of Vessel A.

- (3) It is probable that, because Vessel E was proceeding northeast in the western area of Nakanose approached from the port side at about 12:13, Vessel B altered the course to about 350° to give way to Vessel E.
- (4) It is probable that Master B altered the course to about 000° at about 12:15 to give way to Vessel F approaching from the starboard bow side because the bearing of Vessel F was 2.7° in 2 minutes from 12:13 to 12:15.
- (5) It is probable that Vessel B was proceeding in a situation to approach the bow of Vessel A because, although the planned course after departing Nakanose Traffic Route was 338°, Vessel B was proceeding, increasing the speed, at a heading of 349° to 006° after departing Nakanose Traffic Route and after giving way to Vessels E and F and altering the course to about 000° at about 12:16, maintaining the course and speed.

It is somewhat likely that Master B did not realize that he was proceeding in a situation to approach the bow of Vessel A because he had to give way to Vessels E and F during about 4 minutes after departing Nakanose Traffic Route.

- (6) It is probable that Pilots A₁ and A₂ received a report from Vessel C at about 12:14 that the speed of Vessel B was 12.1 kn and, around this time, Master A received a report from third officer A that Vessel B was approaching from the port side.

It is probable that second officer A, hearing the above report from third officer A, pointed the radar image of Vessel B to Pilot A₁, heard from Pilot A₁ that there would be no problem because Vessel B would decelerate, turn to right, and pass astern of vessel, and thus Vessel A was proceeding, maintaining the speed and course as Pilots A₁ and A₂ still believed that Vessel A would pass astern of Vessel B.

- (7) It is probable that Pilot A₁ sent a signal for attracting attention at about 12:16 because Vessel B, which he believed would decelerate to let Vessel A go first, increased the speed, received a report from Vessel C that the speed of Vessel B was 11.4 kn, sounded a warning signal, requested by VHF at about 12:16:30 to 12:17:30 Vessel B to stop the engine and turn to right, and then requested Vessel B again to stop her engine immediately.
- (8) It is probable that Vessel B, having received a request from Vessel A to stop the engine, stopped the engine, even got her engine motion at full astern, but Master B maintained the course because he believed that, if Vessel B turned to right, its port side would collide with the port side of Vessel A.

- (9) It is probable that Vessel A continued proceeding, maintaining the course and speed because Pilot A₁ believed it would be dangerous for Vessel A to turn right because Vessel A was a stand-on vessel and was proceeding in parallel with Vessel F which was proceeding at almost the same speed at about 0.60 M of the starboard bow of Vessel A, and because Pilot A₂ believed that Vessel B could not pass ahead of Vessel A because Vessel F was proceeding on the same course on the starboard side of Vessel A.
- (10) It is probable that Vessels A and B collided because Vessel A was proceeding, maintaining the course and speed, because Pilots A₁ and A₂ believed that Vessel B would pass astern of Vessel A, even though Pilot A₂ ordered a hard starboard. It is probable that Vessel B collided with Vessel A even though Master B ordered to get her engine motion at full astern when Vessel B came close to Vessel A, while Vessel B was proceeding in a situation to approach the bow of Vessel A.
- (11) It is probable that the speed of Vessel A, which was about 16 kn about 3 minutes before occurrence of this accident, was involved in the occurrence of the accident, because it was difficult for Vessel A assist Vessels C and D go ahead to take actions to avoid collision, such as urging Vessel B to turn right.

4 CONCLUSIONS

4.1 Findings

- (1) It is probable that Vessel A believed, while proceeding west-southwest for the western area of Nakanose off the east of Yokoyama district of Keihin port, that Vessel B would decelerate around the exit of Nakanose Traffic Route and pass astern of Vessel A, because Pilots A₁ and A₂ received a report from Vessel C that the speed of Vessel B at about the exit of Nakanose Traffic Route was 8.5 kn, which was slower than the speed limit of other vessels equivalent to Vessel B on Nakanose Traffic Route. (3.2.10 (1))*¹⁶
- (2) It is probable that Vessel B increased her speed from slow ahead to half ahead at about 12:11 because Master B believed that it could widen the distance when it would pass ahead of Vessel A if Vessel B increased the speed on the planned course of 338° after departing Nakanose Traffic Route. (3.2.10 (2))

*¹⁶ The numbers at the end of the sentences in this chapter correspond to the numbers in “3 ANALYSIS”.

(3) It is probable that Vessel B was proceeding in a situation to approach the bow of Vessel A because, even though the planned course of Vessel B after departing Nakanose Traffic Route was 338°, Vessel B increased the speed at a heading of 349° to 006° and, after changing the course to about 000° at about 12:16, was proceeding, maintaining the course and speed.

It was probable that Master B did not notice that Vessel B was proceeding in a situation to approach the bow of Vessel A because he had to give way to Vessels E and F during about 4 minutes after departing Nakanose Traffic Route. (3.2.10(5))

(4) It is probable that Vessel A proceeded, maintaining the course and speed because Pilots A₁ and A₂ believed that Vessel B would pass astern of Vessel A, even though they had received a report from Vessel C at about 12:14 that the speed of Vessel B was 12.1 kn. (3.2.10 (6))

(5) Vessel B was requested by Vessel A at about 12:16:30 to 12:17:30 to stop the engine and turn to right and then requested again to immediately stop engine, Vessel B stopped the engine and even got her engine motion at full astern. It is probable that Vessel B maintained the course and proceeded after that because it believed that, if it turned to right, its port side would collide with the port side of Vessel A and thus Vessel B would capsize. (3.2.10 (7), (8))

(6) It is probable that Vessel A kept proceeding, maintaining the course and speed, because Pilot A₁ believed that Vessel A was a stand-on vessel and it would be dangerous for Vessel A to turn right because Vessel F was proceeding in parallel at almost the same speed at about 0.6 M of the starboard side and because Pilot A₂ believed that Vessel B could not pass ahead of Vessel A because Vessel F was proceeding in parallel with Vessel A. (3.2.10 (9))

(7) It is probable that Vessels A and B collided even though Pilot A₂ ordered Vessel A to turn fully to the right and Master B ordered Vessel B to get her engine motion at full astern. (3.2.10 (10))

4.2 Probable Causes

It is probable that this accident occurred as follows: Vessel A was proceeding west-southwest off the east of Yokohama district of Keihin port, piloted by Pilots A₁ and A₂ and led by Vessel C and others, while Vessel B was proceeding north departing Nakanose Traffic Route. Vessel A was proceeding, maintaining the course and speed because Pilots A₁ and A₂ believed that Vessel B would pass astern of Vessel A. Master B was proceeding in a situation to approach the bow of Vessel A.

It is probable that the reason why Pilots A1 and A2 kept proceeding, maintaining the course and speed and believing that Vessel B would pass astern of Vessel A was that they received a report from Vessel C that the speed of Vessel B at about the exit of Nakanose Traffic Route was 8.5 kn and believed that Vessel B would decelerate at about the exit of Nakanose Traffic Route because the speed of Vessel B was slower than the speed limit of other equivalent vessels on Nakanose Traffic Route.

It is probable that the reason why Master B was proceeding in a situation to approach the bow of Vessel A was that Vessel B, though its planned course after departing Nakanose Traffic Route was 338°, increased the speed at a heading of 006° to 349° because it had given way to Vessels E and F, changed the course to about 000° at about 12:16, and proceeded, maintaining the course and speed.

It is somewhat likely that the speed of Vessel A was about 16 kn about 3 minutes before occurrence of the accident was involved in occurrence of the accident because, at that speed, it was difficult for Vessel A to let Vessels C and D go ahead to take actions to avoid collision, such as urging Vessel B to turn right.

4.3 Other Discovered Safety-Related Matters

It is probable that Master A might believe, hearing from Pilot A1 that Vessel B would decrease and pass astern of Vessel A, that the pilot issued orders in Japanese to Vessel C and others and Vessel C or D communicated with Vessel B, but it is also probable that Master A could not confirm the order by the pilot to Vessel C and others.

It is somewhat likely that Master A could have properly brought the vessel to be maneuvered if he confirmed the order by the pilot to Vessel C because doing so he could have found out that it was false assumption of the pilot that Vessel B would pass astern of Vessel A.

5 SAFETY ACTIONS

It is probable that this accident occurred as follows: Vessel A was proceeding west-southwest off the east of Yokohama district of Keihin port, piloted by Pilots A₁ and A₂ and led by Vessel C and others, while Vessel B was proceeding north after departing Nakanose Traffic Route. Vessel A was proceeding, maintaining the course and speed because Pilots A₁ and A₂ believed that Vessel B would pass astern of Vessel A. Master B was proceeding in a situation to approach the bow of Vessel A.

It is somewhat likely that the speed of Vessel A was about 16 kn about 3 minutes before occurrence of the accident was involved in occurrence of the accident because, at that speed, it was difficult for Vessel A to let Vessels C and D go ahead to take actions to avoid collision, such as urging Vessel B to turn right.

It is probable that Master A might believe, hearing from Pilot A1 that Vessel B would decelerate and pass astern of Vessel A, that the pilot issued orders in Japanese to Vessel C and others and Vessel C or D communicated with Vessel B, but it is also probable that Master A could not confirm the order by the pilot to Vessel C and others.

It is somewhat likely that Master A could have properly brought the vessel to be maneuvered if he confirmed the order by the pilot to Vessel C because doing so he could have found out that it was false assumption of the pilot that Vessel B would pass astern of Vessel A.

It is therefore desirable that the following actions should be taken to prevent occurrence of similar accidents:

- (1) Pilots A₁ and A₂ believed, based on their first judgment when they obtained information on Vessel B, that Vessel B would pass astern of Vessel A. But Vessel B did not proceed their course as they expected because it gave way to Vessels E and others, getting close to the bow of Vessel A and colliding with it in the end. When a vessel gets close to other with the course of it coming close to that of the other in a situation of traffic density, vessels proceeding in the northern area of Nakanose Traffic Route should confirm early by VHF the intention of other vessels whose course will cross theirs, taking into account the possibility of collision.

The speed of Vessel A was about 16 kn about 3 minutes before occurrence of this accident, which made it difficult to take an action to avoid the collision, such as letting Vessel C and others go ahead of Vessel A. Vessels should proceed at a proper speed even out of traffic route with a speed limit by accurately understanding the performances of escort tugboats and letting the escort tugboats precede effectively to prevent collisions.

- (2) It is probable that Master A, hearing from Pilot A₁ that Vessel B would slow down and pass astern of Vessel A, believed that the pilot had given an order in Japanese to Vessel C and others and that Vessel C or D communicated with Vessel B, but could not confirm the order by the pilot to Vessel C.

Master A should confirm the order by the pilot to the escort tugboats without hesitation when he could not confirmed the order.

- (3) Vessel B could no longer take the planned course and its CPA was not as expected after Vessel B had given way to Vessel E and others, resulting in getting close to the bow of Vessel A. The passing distance of a vessel differs depending on its type. When one

vessel approaches another, therefore, it should inform the other of its maneuvering intention early in a situation of traffic density so that the other vessel can take an appropriate step to avoid collision, because the former can influence the judgment to take avoiding action for other vessel.

As described above, Vessel B got close to the bow of Vessel A. However, three crew members, aside from the master, took their position on the bridge of Vessel B and second officer B and one ordinary seaman were on the lookout. It is nevertheless probable that Master B did not notice that he was proceeding in a situation to approach the bow of Vessel A. In a situation where a vessel gets close to other, it should be grasp the situation of approach by confirming changes in the CPA of the other vessel and assess the risk of collision, and the bridge team should share that information.

5.1 Safety Actions Taken

5.1.1 Pilot society the pilots belong to (hereafter referred to as the “pilot society”)

The pilot society informed the outline of the accident and measures to prevent accidents to its member pilots at an accident prevention measure committee held on January 23, 2013, and decided to issue and issued recommendations to the pilots in accordance with the re-education training and maritime accident correspondence rules provided as the rules of the society.

(1) Accident prevention measures

- 1) Maintain a proper speed and pay close attention in congested waters.
- 2) Pay attention not to proceed in parallel with other vessels so that an emergency avoidance action can be taken.
- 3) Get information on movements of other vessels, using “AIS on Internet”, before starting piloting.
- 4) If your vessel is expected to cross the course of another vessel or approaching with each other, confirm the intention of both by directly communicating with each other by VHF early so that neither will fall into a dangerous situation.
- 5) Ensure safety of marine traffic by referring to “Procedure for operation of vessels for guarding for course, etc.” of “Procedure for navigation operations” and effectively using vessels for guarding for course.

(2) Situation of recommendations and their implementation

- 1) It was recommended that pilots attend the latest BRM training provided by Japan Federation of Pilots’ Association and the training was conducted on August 22 and 23, 2013. The main contents of the BRM training were as follows:

- a Awareness when working as a pilot
 - b Pilot's capability and limit
 - c Importance of communication
 - d Correct recognition of situation
 - e Countermeasures against human errors
- 2) It was recommended to take ship maneuvering training with the same vessel type and conditions as those in this accident by using a ship maneuvering simulator, and the training was provided on May 28, 2013.

5.1.2 Company A

Company A investigated the accident and obtained the following results:

- (1) Cause
- 1) Vessel B non-compliance to COLREGS
 - 2) Pilot was conversing in the local Japanese language when communicating with the other pilot, escort tugboats and VTS which was not understood by the Bridge Team.
 - 3) Direction communication between Pilot and Master of Vessel B was done only 3 minutes prior collision.
 - 4) The 2 escort tugboats provided were not used effectively or timely to let the Vessel B give way by the pilot.
- (2) Background factors
- 1) Vessel B was without pilot (exempted by local regulations).
 - 2) Communication in the local Japanese language is customary practice and acceptable by Authorities and beyond the Master's control.
 - 3) Pilot's communication with Vessel B, which was initially done via the escort tugboat, may not have done in ample time to avoid collision.
 - 4) Vessel A was not able to turn to right because the overtaking vessel was proceeding 0.5 N.M. away.
 - 5) Insufficient deterrence or warning by the escort tugboats.
 - 6) Pilot's assurance that Vessel B would make a starboard alteration to pass astern of Vessel A via information from escort tugboats without direct communication from Vessel B.
- (3) Safety actions taken
- 1) The results of the investigation were shared by masters and senior officers at a seminar and a forum targeted for senior officers.

- 2) The marine superintendent discussed “navigation in Tokyo Bay” with the masters of all LNG vessels.
- 3) The master and officers of Vessel A at the time of the accident attended an additional course of BRM.
- 4) The bridge team was ordered to make more detailed and extensive voyage plans and risk assessment.
- 5) It was emphasized at a forum for young officers that navigation around the location of this accident should be closely monitored by every available means and that ensuring safe voyage and grasping the situation by monitoring the movements of other vessels to be noted were important.
- 6) The results of the investigation and lessons learned were shared among fleet vessels.
- 7) The auditor and education team of company A conducted in-house voluntary re-investigation into the bridge team, and pilots of the vessels and escort tugboats belonging to company A and calling at Japanese ports, and the actual situations including the situations of vessels proceeding in surrounding sea areas.

5.1.3 Company B

Company B investigated the accident and obtained the following results:

(1) Cause

- 1) Failure to comply with the International Regulations for Preventing Collision at Sea – Rule 15, 16
- 2) Failure of the Bridge Team in making a proper assessment of the surrounding situation and of the risk of collision.
 - a Detection of Vessel A was delayed due to insufficient lookout on RADAR/Visually in ample time;
 - b Movement of the opponent vessel was not continuously monitored;
 - c Wrong appreciation of the risk of collision in a situation slightly opening visual bearing when the large LNG tanker was approaching at a close range;
 - d Assessment to pass ahead of the LNG vessel with a CPA of 0.4 nm, was based on scanty information which was made during course alteration on the same wrong assumption our vessel had increased her speed from Slow Ahead to Halt Ahead at the time of altering course there by increase CPA.
 - e Not reducing speed/stop her engine inside Nakanose Traffic Route when she was on 020° T course, before the alteration point;

- f Not considering alteration of course to avoid the incident after leaving Nakanose Traffic Route;
- g Ineffective Bridge Team with respect to:
 - (a) Lack of communication
 - (b) Improper awareness of importance for team work;
 - (c) Lack of consequential awareness situation
- 3) The Master failed to lead the Bridge Team and monitor the effectiveness of various Activities of the Bridge Team.

(2) Safety actions taken

Company B notified safety matters reflecting this accident and requested all vessels under its management that may call on Japanese ports to take the following accident preventive measures on February 22, 2013.

- 1) Vessels calling TOKYO BAY are to note that LNG vessels are highly dangerous vessels owing to the nature of cargo carried on board these vessels. All vessels must avoid impeding the passage of LNG vessels and avoid a close-quarter situation with other vessel.
- 2) Masters must conduct an extra-ordinary Safety Meeting on the receipt of this Safety Circular and:
 - a Explain the importance of continuous look-out during navigation, especially in areas of high traffic density like the TOKYO BAY. Visual measuring bearings of approaching ships shall be taken well in advance to determine risk of collision;
 - b explain and ensure proper use of RADAR and Automatic Radar Plotting Aids (ARPA). Long range Radar scanning shall be conducted by switching the Radar range scales between various ranges at regular intervals for early detection of targets;
 - c explain and ensure that proper VHF watch is maintained when at sea, particularly when proceeding through coastal waters;
 - d explain and ensure that anti-collision action is taken in ample time and any alteration of course and/or speed shall be taken largely and unambiguously to other vessels in the vicinity.
- 3) Guidance for safe voyage was provided by a safety supervisor to the crew of Vessel B when the vessel made the first voyage after the accident.
- 4) The collision prevention system of Vessel B was replaced with a system that can capture more vessels.

- 5) The safety supervisor at company B decided to provide a training to the bridge watch team when visiting the management ship two times a year on average to provide safety guidance.
- 6) The importance of coordination with the bridge watch team will be explained during training prior to boarding to new officers who will go on board.
- 7) This accident was discussed and the importance of influences of accidents in Tokyo Bay, especially, collision with an LNG vessel was informed at a conference of managers of each type of ship which was held by company B on May 2013.

5.2 Safety Actions Required

In light of the results of investigation into this accident, the Japan Transport Safety Board will request cooperation to the relevant pilot society and ship management companies in taking the following measures and making this report public:

5.2.1 Pilots

- (1) It is desired that pilots should proceed at an appropriate speed when they let an escort tugboat go ahead effectively to prevent collision even outside route where there is no speed limit.
- (2) It is desirable that, when a pilot comes close to another vessel whose course cross that of the pilot, the pilot should thoroughly confirm the other's intention of maneuvering by communicating with the other vessel by VHF early, taking into consideration of the possibility of a collision, when the pilot proceeds in the northern area of Nakanose Traffic Route.

5.2.2 Vessel A

It is desirable that Vessel A should confirm the order of the pilot to the escort tugboat without hesitation when Vessel A cannot confirm the order.

5.2.3 Vessel B

- (1) As a vessel has the passing distance of a vessel differs depending on its type, it is desirable that a vessel, when it approaches other vessel, should communicate with the other vessel by VHF early to thoroughly learn the other's intention of maneuvering, taking into consideration that the movement of the vessel may affect the decision of the other on navigation, so that the other can appropriately maneuver, in a situation where a traffic density is taking place.

- (2) It is desirable that, when a vessel approaches another vessel, the vessel grasps the situation of approach by using the concept of BRM and confirming changes in the CPA of the other vessel to assess the possibility of a collision, and the bridge team should thoroughly share that information.

Figure 1 Outline of Tokyo Bay

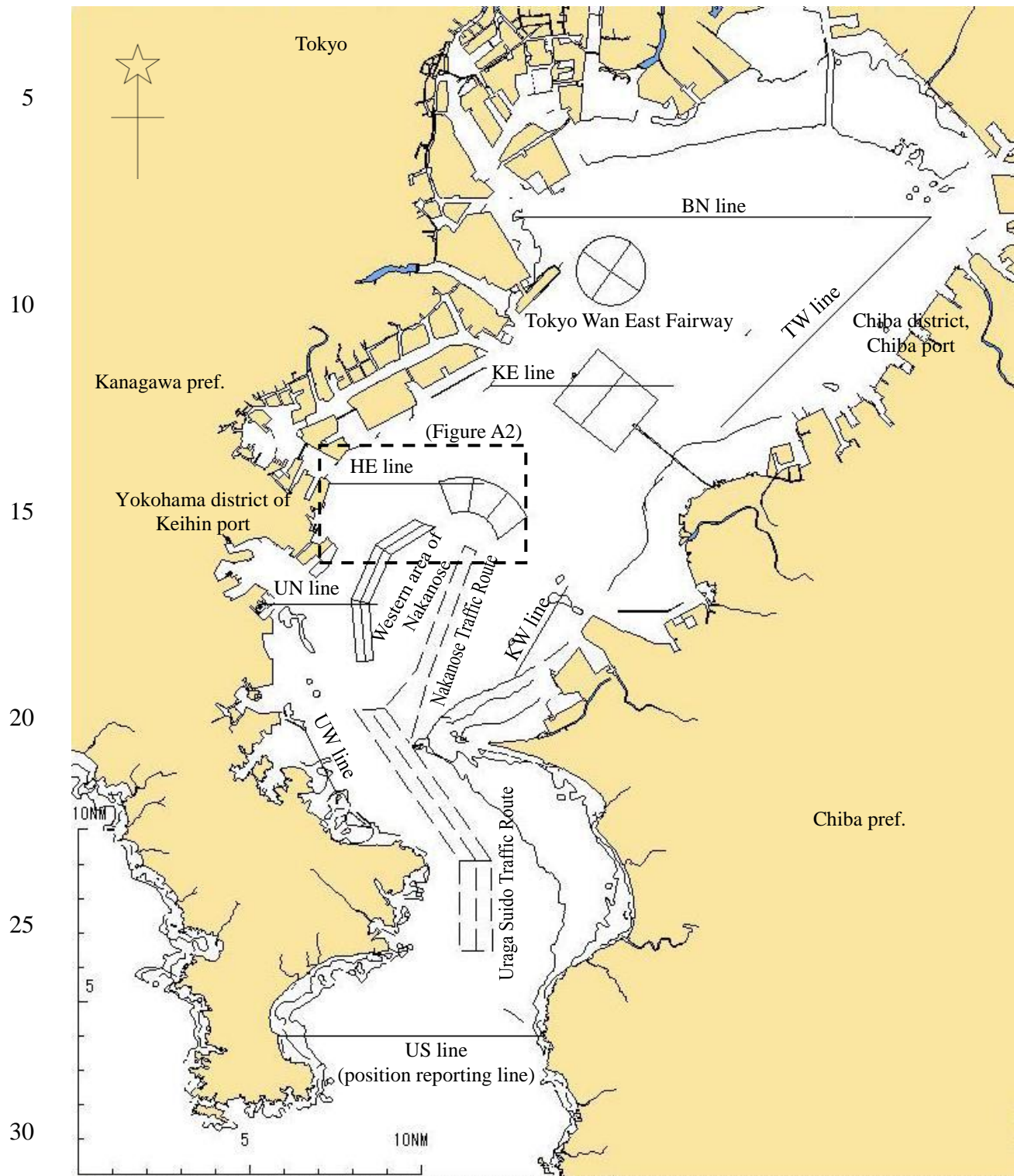


Figure 2 Estimated routes of vessels A, B, E, and F

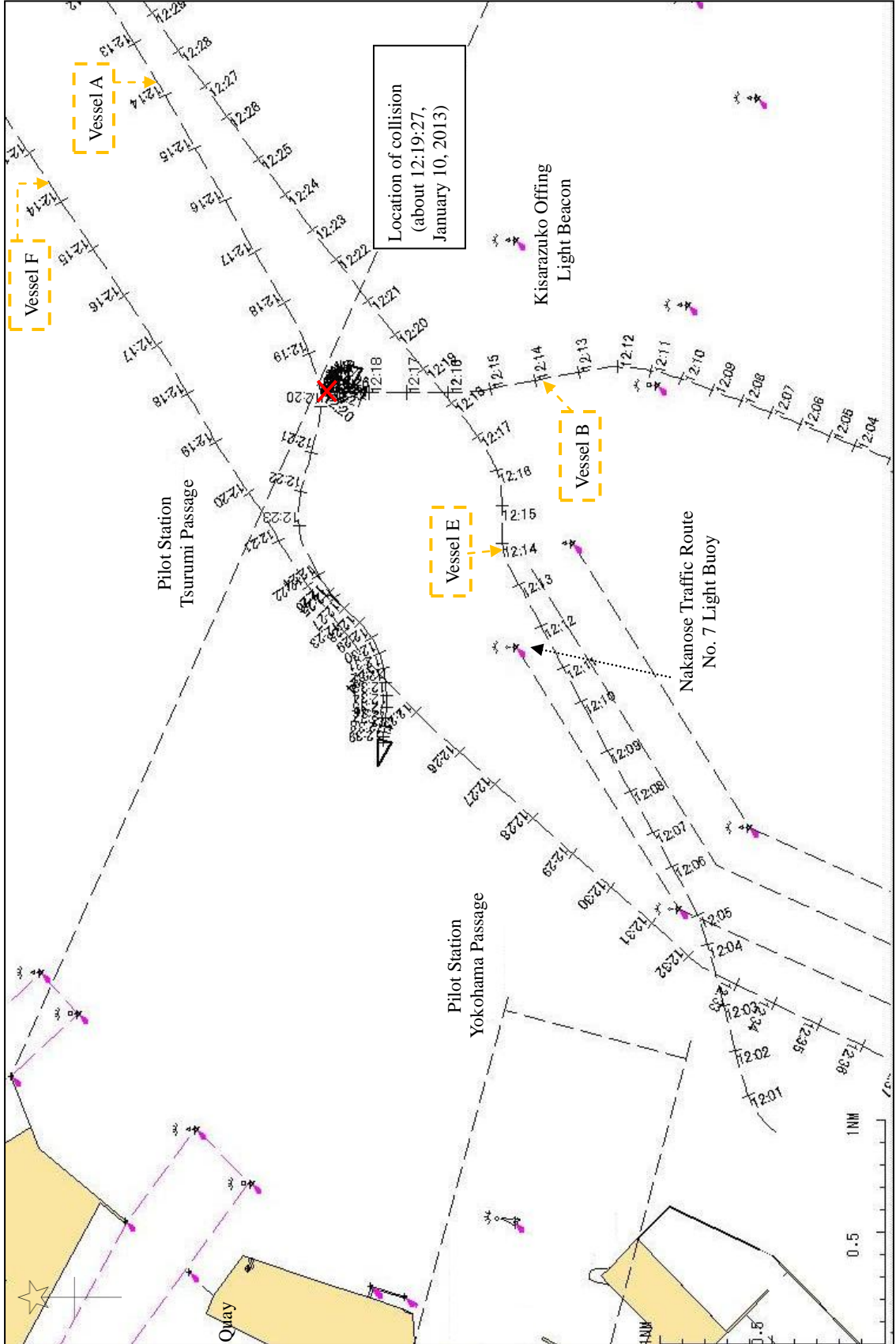


Figure 3 Situation of Vessels A, B, C, and D at the time of the accident

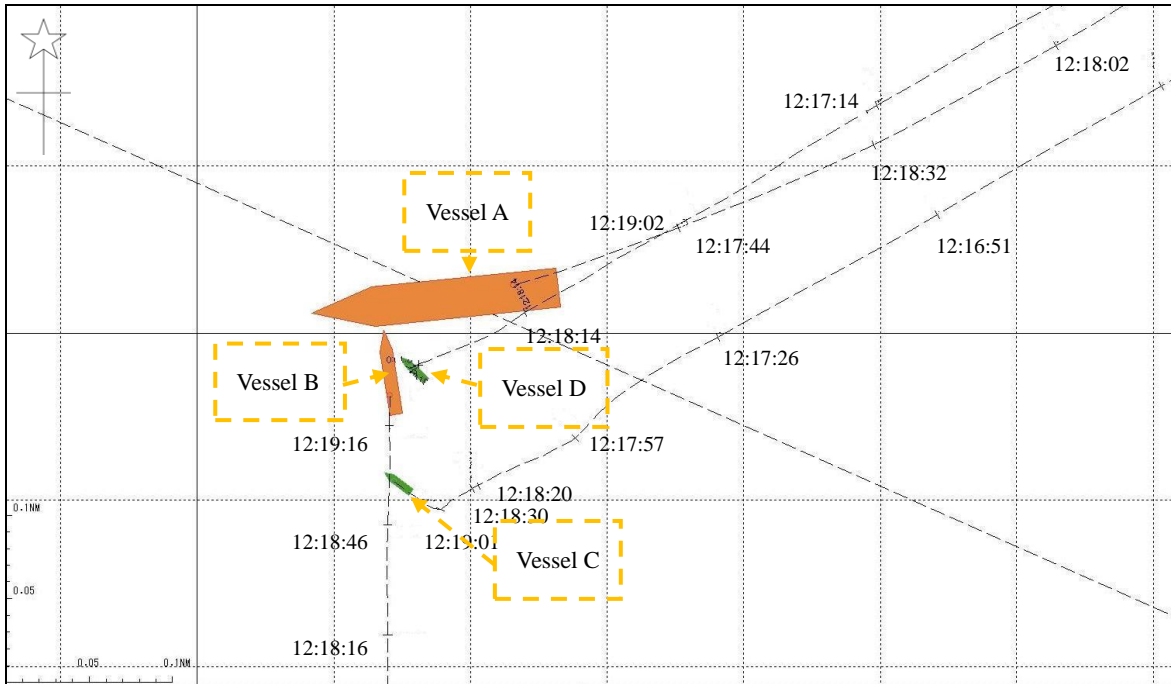


Table 1 AIS information record of Vessel A

Time (H:M:S)	Latitude (N) (°-'-")	Longitude (E) (°-'-")	Heading (°)	COG (°)	Speed (kn)
12:04:56	35-28-10.8	139-50-02.1	228	225.2	14.7
12:05:32	35-28-04.7	139-49-54.1	230	228.3	14.9
12:06:02	35-27-59.6	139-49-47.0	230	228.8	15.1
12:06:32	35-27-54.7	139-49-39.9	230	229.6	15.1
12:07:02	35-27-50.0	139-49-33.0	230	230.3	15.2
12:07:33	35-27-44.9	139-49-25.5	230	230.0	15.5
12:08:02	35-27-39.9	139-49-18.2	230	229.2	15.4
12:08:32	35-27-35.0	139-49-11.1	230	230.2	15.6
12:08:56	35-27-31.0	139-49-05.3	230	229.8	15.6
12:09:32	35-27-24.7	139-48-56.1	230	229.7	15.8
12:10:02	35-27-19.7	139-38-49.1	230	229.8	15.9
12:10:32	35-27-14.6	139-48-41.6	230	229.9	16.0
12:11:02	35-27-09.5	139-48-34.1	231	229.2	16.0
12:11:32	35-27-04.2	139-48-26.3	233	231.2	16.0
12:12:02	35-26-59.3	139-48-18.8	236	232.3	16.1
12:12:32	35-26-54.6	139-48-10.5	238	237.0	16.0

12:13:02	35-26-50.5	139-48-02.5	240	239.0	16.0
12:13:32	35-26-46.3	139-47-54.0	240	239.7	16.1
12:14:02	35-26-42.3	139-47-45.5	241	240.2	16.1
12:14:32	35-26-38.2	139-47-36.9	240	240.4	16.1
12:15:02	35-26-34.2	139-47-28.4	240	240.0	16.0
12:15:32	35-26-30.2	139-47-19.9	240	240.1	16.1
12:16:02	35-26-26.2	139-47-11.3	240	240.4	15.9
12:16:32	35-26-22.2	139-47-02.8	240	239.9	15.8
12:17:02	35-26-18.4	139-46-54.4	240	240.7	15.7
12:17:32	35-26-14.6	139-46-46.4	240	240.0	15.6
12:18:02	35-26-10.3	139-46-37.7	243	239.7	15.4
12:18:32	35-26-06.8	139-46-29.7	250	244.0	15.3
12:19:02	35-26-03.8	139-46-21.1	256	249.4	15.2
12:19:32	35-26-01.3	139-46-12.2	268	252.7	14.6
12:20:02	35-26-00.5	139-46-04.0	284	274.7	13.3

Table 2 AIS information record of Vessel B

Time (H:M:S)	Latitude (N) (°-′-″)	Longitude (E) (°-′-″)	Heading (°)	COG (°)	Speed (kn)
12:01:56	35-23-19.0	139-45-42.6	022	021.4	8.6
12:02:56	35-23-26.9	139-45-46.3	021	020.9	8.5
12:03:56	35-23-35.0	139-45-50.1	021	020.7	8.6
12:04:56	35-23-43.0	139-45-53.8	022	021.1	8.5
12:05:56	35-23-50.9	139-45-57.5	022	020.8	8.5
12:06:57	35-23-59.1	139-46-01.4	022	021.0	8.6
12:08:06	35-24-08.1	139-46-05.7	022	020.9	8.6
12:08:57	35-24-15.0	139-46-08.9	022	021.4	8.5
12:09:57	35-24-23.0	139-46-12.5	020	019.4	8.5
12:10:26	35-24-26.9	139-46-14.1	016	017.2	8.5
12:10:57	35-24-31.1	139-46-15.4	010	012.2	8.4
12:11:26	35-24-35.1	139-46-16.2	006	009.7	8.5
12:11:57	35-24-39.9	139-46-16.7	001	001.3	9.8
12:12:26	35-24-44.7	139-46-16.6	352	354.6	10.2
12:12:57	35-24-50.2	139-46-15.5	350	349.1	11.0

12:13:26	35-24-55.6	139-46-14.3	350	349.8	11.6
12:13:57	35-25-01.6	139-46-12.9	349	348.6	12.1
12:14:26	35-25-07.4	139-46-11.6	349	349.5	12.1
12:14:57	35-25-13.6	139-46-10.2	349	349.8	12.0
12:15:26	35-25-19.2	139-46-09.0	356	352.8	11.5
12:15:57	35-25-25.1	139-46-08.6	000	358.6	11.4
12:16:27	35-25-30.4	139-46-08.5	000	357.8	10.8
12:16:57	35-25-36.1	139-46-08.5	000	000.8	11.1
12:17:26	35-25-41.3	139-46-08.5	359	359.3	10.6
12:17:57	35-25-46.4	139-46-08.4	000	359.8	9.2
12:18:37	35-25-52.0	139-46-08.4	359	359.6	7.8
12:18:57	35-25-54.5	139-46-08.4	359	001.5	7.2
12:19:26	35-25-57.8	139-46-08.5	351	356.3	6.3
12:19:57	35-25-57.6	139-46-09.5	292	113.1	1.9

Table 3 AIS information record of Vessel C

Time (H:M:S)	Latitude (N) (°-'-")	Longitude (E) (°-'-")	Heading (°)	COG (°)	Speed (kn)
12:14:57	35-26-19.1	139-47-03.5	239	240.0	15.4
12:15:26	35-26-15.4	139-46-55.5	239	240.4	15.4
12:15:57	35-26-11.2	139-46-47.2	239	238.4	15.4
12:16:26	35-26-07.5	139-46-39.3	240	240.5	15.4
12:16:57	35-26-03.5	139-46-30.8	240	239.7	15.6
12:17:26	35-25-59.9	139-46-22.8	241	241.2	15.0
12:17:58	35-25-56.1	139-46-16.5	243	226.7	9.1
12:18:30	35-25-54.4	139-46-12.1	239	242.0	7.4
12:18:59	35-25-53.7	139-46-10.7	258	234.5	1.4
12:19:30	35-25-54.8	139-46-08.4	314	305.9	6.9
12:19:59	35-25-56.8	139-46-04.9	277	290.1	8.0

Table 4 AIS information record of Vessel D

Time (H:M:S)	Latitude (N) (°-'-")	Longitude (E) (°-'-")	Heading (°)	COG (°)	Speed (kn)
12:14:57	35-26-26.8	139-47-06.9	241	241.4	15.7
12:15:28	35-26-22.3	139-46-58.4	238	236.7	15.7
12:15:57	35-26-18.6	139-46-50.7	240	241.0	15.7
12:16:27	35-26-14.4	139-46-42.7	234	235.9	15.6
12:16:57	35-26-10.4	139-46-34.5	240	241.2	15.6
12:17:26	35-26-06.4	139-46-26.3	237	238.7	15.3
12:17:57	35-26-02.7	139-46-18.4	238	240.4	14.3
12:18:31	35-25-59.2	139-46-10.5	246	245.5	12.3
12:19:00	35-25-58.8	139-46-09.7	239	186.5	0.5
12:19:30	35-25-58.7	139-46-09.4	314	348.9	0.8
12:19:58	35-25-58.8	139-46-08.9	262	236.7	2.2

Table 5 AIS information record of Vessel E

Time (H:M:S)	Latitude (N) (°-'-")	Longitude (E) (°-'-")	Heading (°)	COG (°)	Speed (kn)
12:12:03	35-25-01.7	139-44-52.3	062	061.7	12.6
12:13:02	35-25-07.5	139-45-05.9	062	061.5	12.6
12:14:02	35-25-12.0	139-45-19.1	088	084.3	10.7
12:15:02	35-25-12.2	139-45-31.5	086	088.8	9.8
12:16:02	35-25-13.6	139-45-43.1	067	072.3	9.9
12:17:03	35-25-18.8	139-45-54.2	056	054.7	11.0
12:18:03	35-25-25.7	139-46-05.2	050	049.5	11.6

Table 6 AIS information record of Vessel F

Time (H:M:S)	Latitude (N) (°-'-")	Longitude (E) (°-'-")	Heading (°)	COG (°)	Speed (kn)
12:09:58	35-27-46.3	139-48-11.2	225	233	14.8
12:10:28	35-27-41.4	139-48-04.7	228	226	14.6
12:10:58	35-27-36.1	139-47-57.5	232	228	14.7
12:11:34	35-27-30.8	139-47-48.9	235	234	14.7
12:11:58	35-27-27.7	139-47-43.1	235	235	14.7

12:12:28	35-27-23.5	139-47-35.6	235	236	14.8
12:12:58	35-27-19.4	139-47-28.0	235	236	14.9
12:13:28	35-27-15.5	139-47-20.8	235	236	15.0
12:13:58	35-27-11.0	139-47-12.6	235	236	15.1
12:14:28	35-27-06.9	139-47-05.2	235	236	15.1
12:14:58	35-27-02.5	139-46-57.1	235	236	15.2
12:15:28	35-26-58.4	139-46-49.6	235	236	15.2
12:16:04	35-26-53.2	139-46-40.3	235	236	15.3
12:16:28	35-26-49.8	139-46-34.0	235	236	15.3
12:16:58	35-26-45.3	139-46-25.6	235	236	15.4
12:17:28	35-26-41.4	139-46-18.6	238	236	15.4
12:17:58	35-26-37.2	139-46-10.0	238	239	15.3
12:18:28	36-26-33.4	139-46-02.1	238	238	15.4
12:18:59	36-26-29.5	139-45-53.9	235	240	15.3
12:19:28	35-26-25.4	139-45-46.3	235	236	15.3

Table 7 Bearings of Vessels A, E, and F from Vessel B

Time (H:M)	Vessel A		Vessel E		Vessel F	
	Bearing (°) Relative bearing (°)	Distance (M)	Bearing (°) Relative bearing (°)	Distance (M)	Bearing (°) Relative bearing (°)	Distance (M)
About 12:09	036.2 *S14.2	3.98				
About 12:10	035.9 S15.9	3.61				
About 12:11	035.8 S24.8	3.22	286.6 *P83.4	1.38		
About 12:12	035.7 S34.7	2.84	286.6 P74.4	1.20	022.5 S21.5	3.00
About 12:13	036.3 S46.3	2.45	285.7 P64.3	0.99	021.6 S31.6	2.63
About 12:14	037.4 S48.4	2.08	280.9 P68.1	0.74	020.9 S31.9	2.22
About 12:15	039.1	1.69	264.1	0.53	018.9	1.89

	S39.1		P84.9		S29.9	
About 12:16	040.4 S40.4	1.30	286.9 P123.1	0.41	016.7 S16.7	1.50
About 12:17	042.8 S42.8	0.92			010.4 S10.4	1.09
About 12:18	045.8 S45.8	0.56				
About 12:19	051.5 S52.5	0.22				

* “S” indicates the starboard side and “P” indicates the port side. The same will apply below.

Table 8 Bearing of Vessel F from Vessel A

Time (H:M)	Bearing (°)	Relative bearing (°)	Distance (M)
About 12:11	310.5	S74.5	0.67
About 12:12	311.9	S75.9	0.69
About 12:13	314.1	S74.1	0.68
About 12:14	314.6	S73.6	0.67
About 12:15	315.6	S75.6	0.65
About 12:16	316.5	S76.5	0.62
About 12:17	316.9	S76.9	0.60
About 12:18	316.6	S73.6	0.59
About 12:19	316.4	S60.4	0.56

Table 9 Examples of past accidents

No.	Date/time	Type of vessel	Pilot	Escort tugboat	Outline of accident
1	December 22, 1989 About 16:31	A Cargo ship	○		Vessel A departed Chiba port and was proceeding southeast at about 13.6 kn for the western area of Nakanose while Vessel B departed Nakanose Traffic Route proceeding north at about 9.5 kn. Pilot A sounded a signal for attracting attention of Vessel B that approached to the distance of about 1M, followed by a warning signal. He believed that Vessel B would soon give way and continued proceeding. Master B believed that Vessel A would pass in front of his vessel and continued proceeding, without confirming the movement of Vessel A, but both the vessels collided.
		B Chemical tanker			
2	February 25, 1992 About 18:49	A Cargo ship	○		Vessel A was proceeding north in the western area of Nakanose, gradually decrease her speed from about 12 kn, for an anchorage while Vessel B, departing Tokyo district of Keihin port, was proceeding toward the western area of Nakanose. Pilot A believed that he could pass through Vessel B on the port side in the same way as a third vessel that led Vessel B, and did not take an adequate step to prevent collision. Master B, reaching the point of altering the course, turned to the left and then instructed turning to the right. Vessel B move toward the front of Vessel A and collided with it.
		B Cargo ship			
3	June 9, 1995 06:46:30	A Cargo ship	○	○ (Shore-arrival assistance)	Vessel A was approaching the entrance of Keihin Yokohama Passage from Uraga Channel Route and Vessel B left anchorage in Yokohama district of Keihin port, proceeding for the entrance of Yokohama Passage. Pilot A, believing that Vessel B would give way if he conveyed his intention that his vessel would like to go ahead to Pilot B by transceiver because Vessel A was under navigation control, conveyed his intention via escort tugboat and did not wait for the acknowledgement of Pilot B. Vessel B gradually increased its speed and fell under the situation where Vessel B was entering Yokohama Passage, competing with Vessel A, but did not realize Vessel A was approaching. Although Vessel B learned the intention of Vessel A via escort tugboat, both the vessels collided.
		B Cargo ship	○	○ (Shore-arrival assistance)	
4	August 30, 1987 17:29:30	A Cargo ship			Vessel A was proceeding south-west at about 11.2 kn toward the western area of Nakanose from Chiba port in Chiba prefecture, while Vessel B was proceeding north at about 4.7 kn for an anchorage off Kawasaki district of Keihin port. Ordinary seaman A, who was on the lookout at the bridge, first recognized Vessel B at about 3M on the port bow side approaching, departing Nakanose Traffic Route and crossing in front of Vessel A toward the right. He believed that Vessel B would give way if there was a danger of collision, whereas Pilot B believed that Vessel A would pass in front of Vessel B because Vessel A got close to an anchorage and slowed down. Consequently, both the vessels collided.
		B Cargo ship	○		
5	June 23, 2004 23:12	A Cargo ship	○		Vessel A passed Nakanose Traffic Route from Uraga Suido Traffic Route and was proceeding northwest at about 5 kn for the entrance of Tsurumi Passage of Keihin port, relieving the escort tugboat from duty, while Vessel B, departing the short of Kawasaki district of Keihin port, was proceeding south for the western area of Nakanose, increasing the speed. Pilot A recognized the masthead light and green light of Vessel B and judged that Vessel B would pass astern of Vessel A safely, but later, Vessel B finished turning to the right and proceeded toward the front of Vessel A, showing the port light. Pilot A called Pilot B by transceiver and VHF but got no response. Pilot B only confirmed that there was no vessel departing Yokohama route and Tsurumi route and that there were no their vessels proceeding around the D lighted buoy, and turned to the right without noticing Vessel A. Though the bearing of Vessel A changed slightly toward the right, Vessel A did not show any clear change, which Pilot B did not realize. Nor did he realize the call from Pilot A. As a result, the two vessels collided.
		B Cargo ship	○		