

MA2022-07

**MARINE ACCIDENT
INVESTIGATION REPORT**

July 28, 2022



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.

TAKEDA Nobuo
Chairperson
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.

《Reference》

The terms used to describe the results of the analysis in "3. ANALYSIS" of this report are as follows.

- i) In case of being able to determine, the term "certain" or "certainly" is used.
- ii) In case of being unable to determine but being almost certain, the term "highly probable" or "most likely" is used.
- iii) In case of higher possibility, the term "probable" or "more likely" is used.
- iv) In a case that there is a possibility, the term "likely" or "possible" is used.

MARINE ACCIDENT INVESTIGATION REPORT

June 15th, 2022

Adopted by the Japan Transport Safety Board

Chairperson TAKEDA Nobuo
Member SATO Yuji
Member TAMURA Kenkichi
Member SODA Hisako
Member OKAMOTO Makiko

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| Accident type | Grounding |
| Date and time | Around 02:50 on September 12, 2020 (local time, UTC+9hours) |
| Location | Mitsushima, Tsushima City, Nagasaki Prefecture Around 323°true bearing, 150 meters from Mitsushima Lighthouse (approximately 34 °43.5' N, 129° 26.6' E) |
| Summary of the Accident | The cargo vessel CHANG SHUN I adrift in the west channel of the Tsushima Strait with the main engine stopped. Since the main engine failed to start, the vessel was pushed by wind and waves and grounded on shallows on the north side of Mitsushima. The master of CHANG SHUN I was injured and the vessel sank after the hull was split into several blocks. |
| Process and Progress of the Investigation | (1) Set up of the Investigation The Japan Transport Safety Board appointed an investigator-in-charge and two other investigators to investigate this accident on September 13, 2020. (2) Collection of Evidence September 14 to 16, 2020: On-site investigation and interviews September 23, 2020: Interviews (3) Interim Report On July 21 2021, based on the factual information gained until then, JTSB submitted an interim report to the Minister of Land, Infrastructure, Transport and Tourism and made it public. (4) Comments from Parties Relevant to the Cause Comments on the draft report were invited from parties relevant to the cause of accident. (5) Comments from the Flag State Comments on the draft report were invited from the Flag State of CHANG SHUN I. |

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| Factual Information | |
| Vessel type and name | Cargo ship, CHANG SHUN I (the Republic of Panama registry) |
| Gross tonnage | 1,467 tons |
| Vessel number | 8976841 (IMO number) |
| Owner | PACIFIC WAVE LIMITED (hereinafter referred to as “Company A”) |
| Management Company | Company A |
| Class | OMCS (Overseas Marine Certification Services) |
| L x B x D | 74.3 m(Lr) x 12.0m x 6.2m |
| Hull Material | Steel |
| Year of Launch | 1994 (Keel laid) |
| Engine, Output | Diesel, 970.6kW |
| Particulars of Engine | Manufacturer: VEB SCHHWERMASCHINENBAU KARLLIEBKNECT MAGDEBURG Model: 8 NVD 48A-2U Year of manufacture: 1989 Revolutions: 428rpm |
| Crew Information | Master (Nationality: Republic of the Union of Myanmar), Male, 56 years old Certificate: Unknown Endorsement attesting the recognition of certificate under STCW regulation I/10: Unknown Officer A (Nationality: People’s Republic of China), Male, 45 years old Certificate: Unknown Endorsement attesting the recognition of certificate under STCW regulation I/10: Unknown Chief Engineer (Nationality: Republic of the Union of Myanmar), Male, 45 years old Certificate: Unknown Endorsement attesting the recognition of certificate under STCW regulation I/10: Unknown |
| Injuries to Persons | Minor injury to one person (Master) |
| Damage to Vessel | Foundering (Total loss) |
| Weather and Sea Conditions | Weather: Weather clear; Air temperature 21.7°C; Wind Direction NNE; Wind Speed 15.0m/s Sea conditions: Wave Direction ENE; Wave Height approximately 2.4m A gale advisory was issued to Kami-Tsushima, Tsushima City, Nagasaki Prefecture, at 16:24 on September 11, and it was going on at the time of the accident. |

(1) According to the information from the Japan Coast Guard, the observed wind direction, wind speed, and wave height on September 12 at Mitsushima Lighthouse, which located approximately 200 meters northwest of the accident site, were as follows:

| Time (HH:MM) | Wind Direction | Wind Speed (m/s) | Wave Height(m) |
|--------------|----------------|------------------|----------------|
| 00:25 | NNE | 15.0 | 2.0 |
| 00:55 | NNE | 14.0 | 2.2 |
| 01:25 | NNE | 15.0 | 2.4 |
| 01:55 | NE | 14.0 | 2.2 |
| 02:25 | NNE | 14.0 | 2.4 |
| 02:55 | NNE | 16.0 | 2.3 |

(2) According to the tide tables published by the Japan Coast Guard, the following were observed:

(a) Tides in Izuhara - Okawachi Bay from September 11 to 12

| Date | Time (HH:MM) | Tide Height (cm) |
|------|--------------|------------------|
| 11 | 15:43 | 111 |
| | 21:12 | 88 |
| 12 | 03:31 | 107 |

(b) Currents in the western channel of the Tsushima Strait from September 11 to 12

| Date | Time (HH:MM) | Condi-tions | Current(kn) |
|------|--------------|--------------------|-------------------------------|
| 11 | 12:13 | Max. | WSW Current approximately 0.6 |
| | 19:36 | Change of the tide | WSW Current to ENE Current |
| 12 | 03:27 | Max. | ENE Current approximately 0.5 |
| | 11:32 | Change of the tide | ENE Current to WSW Current |

(3) Typhoon Information

According to the information from the Japan Meteorological Agency, the path of Typhoon No. 9 of 2020 (from 15:00 on August 28 to 15:00 on September 3) is shown in the following figure. At around 03:00 on September 3, a central pressure of 955hPa and a maximum wind speed of approximately 40.0 m/s were recorded in the sea area where the accident occurred.

The “○” symbols on the path in the figure 1 and 2 indicate the position at 9:00 a.m. on the day indicated next to the circles, and the “●” symbols on the path indicate the position at 9:00 p.m. (both times are Japan Standard Time), and the “→|” symbols indicates the disappearance point. The solid line of the path indicates the typhoon, and the dashed line indicates the period of the tropical cyclone and extratropical cyclone.

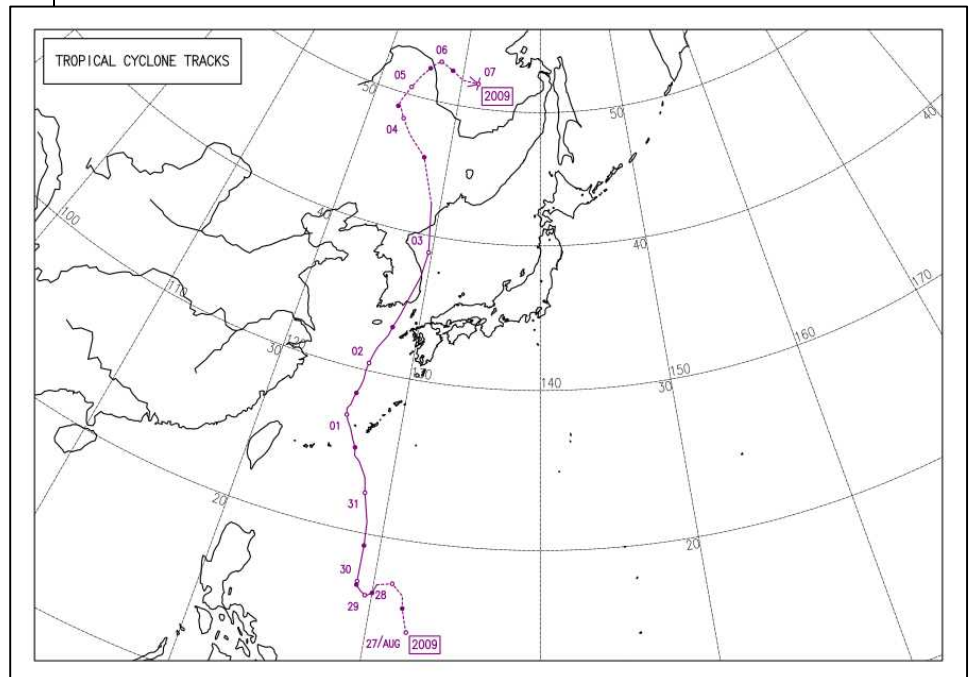


Figure 1: Typhoon path map: Typhoon No. 9 of 2020 (from the Japan Meteorological Agency website)

According to the information from the Japan Meteorological Agency, the path of Typhoon No. 10 of 2020 (21:00 on September 1 to 03:00 on September 8) is shown in the following figure. At around 06:00 on September 7, a central atmospheric pressure of 950 hPa and a maximum wind speed of 40.0 m/s were recorded in the sea area where the accident occurred.

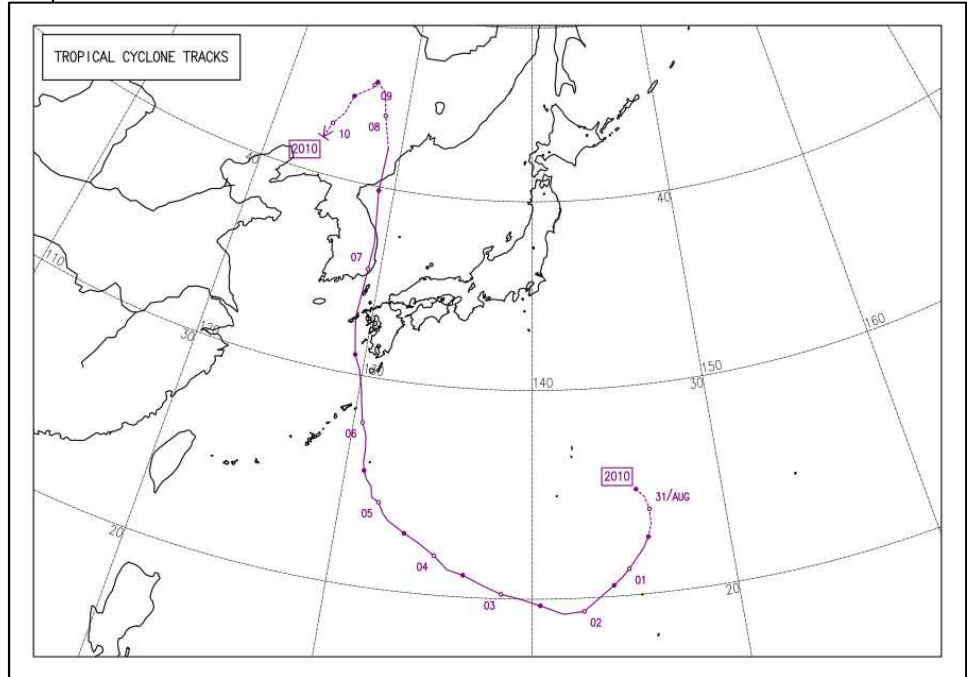


Figure 2: Typhoon path map Typhoon No. 10 of 2020 (from the Japan Meteorological Agency website)

Events Leading to the Accident

The vessel was manned by the Master, Officer A, Chief Engineer, and 11 crew members (one national of the People's Republic of China and 10 nationals of the Republic of the Union of Myanmar) on board. The vessel departed from the Busan port in the Republic of Korea (hereinafter referred to as "ROK") for the purpose of avoiding Typhoons No. 9 and No. 10 (hereinafter referred to as "the Typhoons").

The vessel sailed to the Yellow Sea on the west side of the Korean Peninsula, turned around, and returned to the waters off the Busan port on September 10 in preparation for returning to the Busan port. However, the pilotage was scheduled to board the vessel at 08:00 on September 12, and since both anchors were out of service, the vessel was unable to anchor in calm waters such as inside the port for the purpose of time adjustment. The vessel was sailing with the main engine repeatedly stopped and started, keeping the vessel's position near the middle of the Busan port, KOR, and the northern tip of Tsushima, Nagasaki Prefecture.

The vessel started its main engine at around 18:00 on September 11 and moved slowly southeast. At around 19:30 hours, the vessel

stopped its main engine and began to drift in the 347.6° true bearing, 13.1 nautical miles (M) from Mitsushima lighthouse, Tsushima City, Nagasaki Prefecture.

At around 00:20 on September 12, the vessel's Chief Engineer and other members of the engine department attempted to start the main engine under the direction of the Master, but were unable to do so and the vessel began to be pushed southward by wind and waves.

At around 00:30, Officer A tried to contact Company A, as instructed by the Master to inform the Company A of the situation that the main engine could not be started and to ask for the Company A's decision on the vessel's response. Although the phone call was made to Company A, the Company A did not take the call.

The Master contacted the Vessel Traffic Service (VTS) of KOR and requested VTS to arrange tugboats.

The Master tried to notify the the Japan Coast Guard of the occurrence , but Officer A stopped him, saying that he had to contact the Company A first. Because of this, the Master did not notify the Japan Coast Guard of the occurrence.

The Master notified the Japan Coast Gurad of the occurrence at around 02:20 because he sensed the danger of grounding, observing that the vessel was being driven toward Mitsushima without starting the main engine although Chief Engineer repeatedly tried to start the main engine but failed to do so.

At around 02:50, the vessel grounded on shallows on the north side of Mitsushima, Tsushima City, Nagasaki Prefecture. (See Photo 1)

After grounding, while moving through accomodation space, the Master sustained minor injury when his middle finger of his left hand was caught in the door of the oiler's room when the hull heeled.



Photo 1: CHANG SHUN I (provided by the Japan Coast Guard)

The Master instructed all the crew members to abandon the vessel, descended and launched the liferaft, put on lifejacket and boarded the liferaft together with the crew members at around 03:00.

While adrift in the liferaft, Officer A left the liferaft and swam out toward Mitsushima. After landing on that island, he waved his torchlight to indicate a suitable place for landing.

One of the crew members left the liferaft and swam out toward the place indicated by Officer A, holding one end of a rope attached to the liferaft (hereinafter referred to as "the rope"). However, he was driven by the current and landed from another place with the assistance of Officer A and fixed the rope to the island.

The Master and the rest of the crew members drew the liferaft to shore by pulling the rope that was fixed to Mitsushima and landed on Mitsushima.

The Master and crew members were all rescued by the helicopter of the Japan Coast Guard at around 11:40.

After grounding, the vessel heeled to port side and the hull was split into several blocks and sank around 10:00 p.m. on September 14.

(See Photo 2, Photo 3, Photo 4, Photo 5, Photo 6, Appendix 1: Schematic Diagram of the Accident Location, Appendix 2: Schematic Diagram of the Accident Process, Annex Table 1: AIS Records of the Vessel (excerpt))

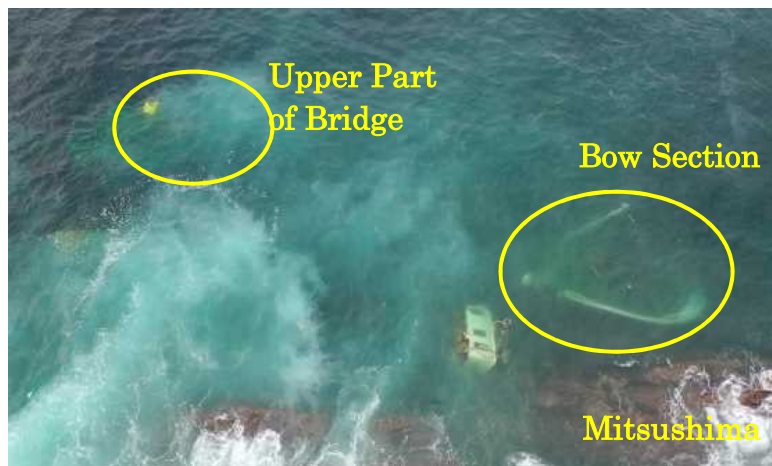


Photo 2: The sunken hull (1) (provided by Kamitsushima Fishing Cooperative)



Photo 3: The sunken hull (2) (provided by Kamitsushima Fishing Cooperative)

Other Matters

(1) Information on the breakdown of the vessel's equipment

According to the statements of the Master, Officer A, and Chief Engineer, the following equipment was out of order while the vessel was moored at the quay in the Busan port, and the vessel left port without completing the repairs.

(a) Anchoring equipment

The starboard anchor chain was removed for repairs ashore. On the other hand, the port anchor was out of order due to damage to the brake system, and the anchor was lashed with wire.

(b) Air compressor

One of the two air compressors on the vessel was out of order. It took more than two hours for one air compressor to fill the air tank for the engine.

(c) Gyrocompass

The gyrocompass was out of order, and the magnetic compass was used for navigating the vessel.

(2) Information on the main engine control system

According to the statement of Chief Engineer, the main engine could not be started because the internal mechanism of the governor*¹ did not work in accordance with the fuel supply

*1 "Governor" is a device that automatically adjusts the quantity of fuel supplied to maintain the set revolution speed when the revolution speed increases or decreases in response to changes in the engine load, and also acts as a protective device against sudden changes in revolution speed.

quantity setting scale during the last attempt to restart the main engine before the accident, which caused a problem with the fuel supply.

In the early stages of starting the main engine, Chief Engineer heard the sound of crankshaft revolution caused by the pushing of compressed air.

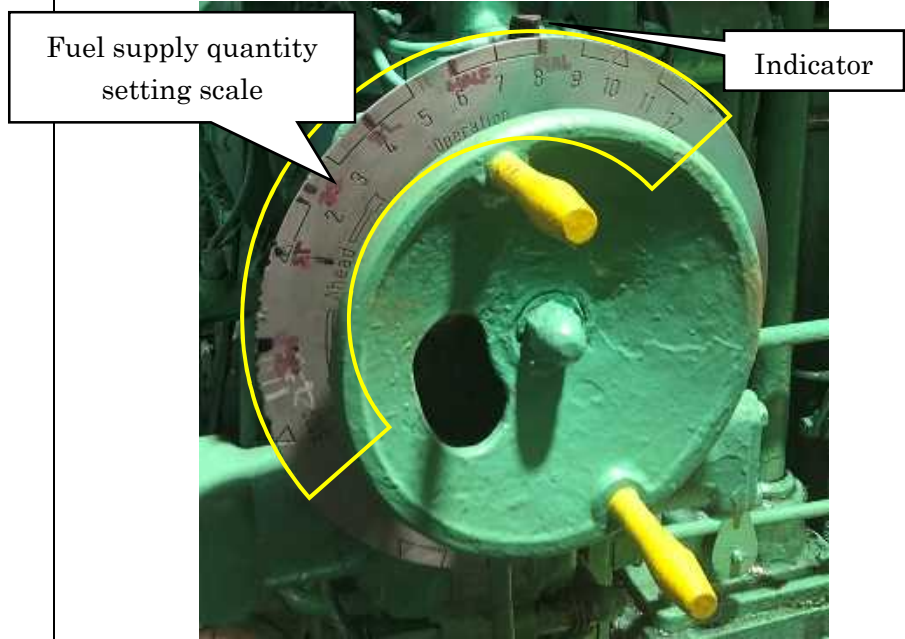


Photo 4: Governor

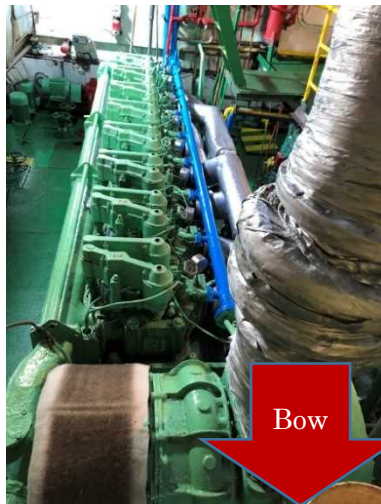


Photo 5: Main Engine(1)



Phot 6: Main Engine(2)

(3) Information on ship inspections, etc.

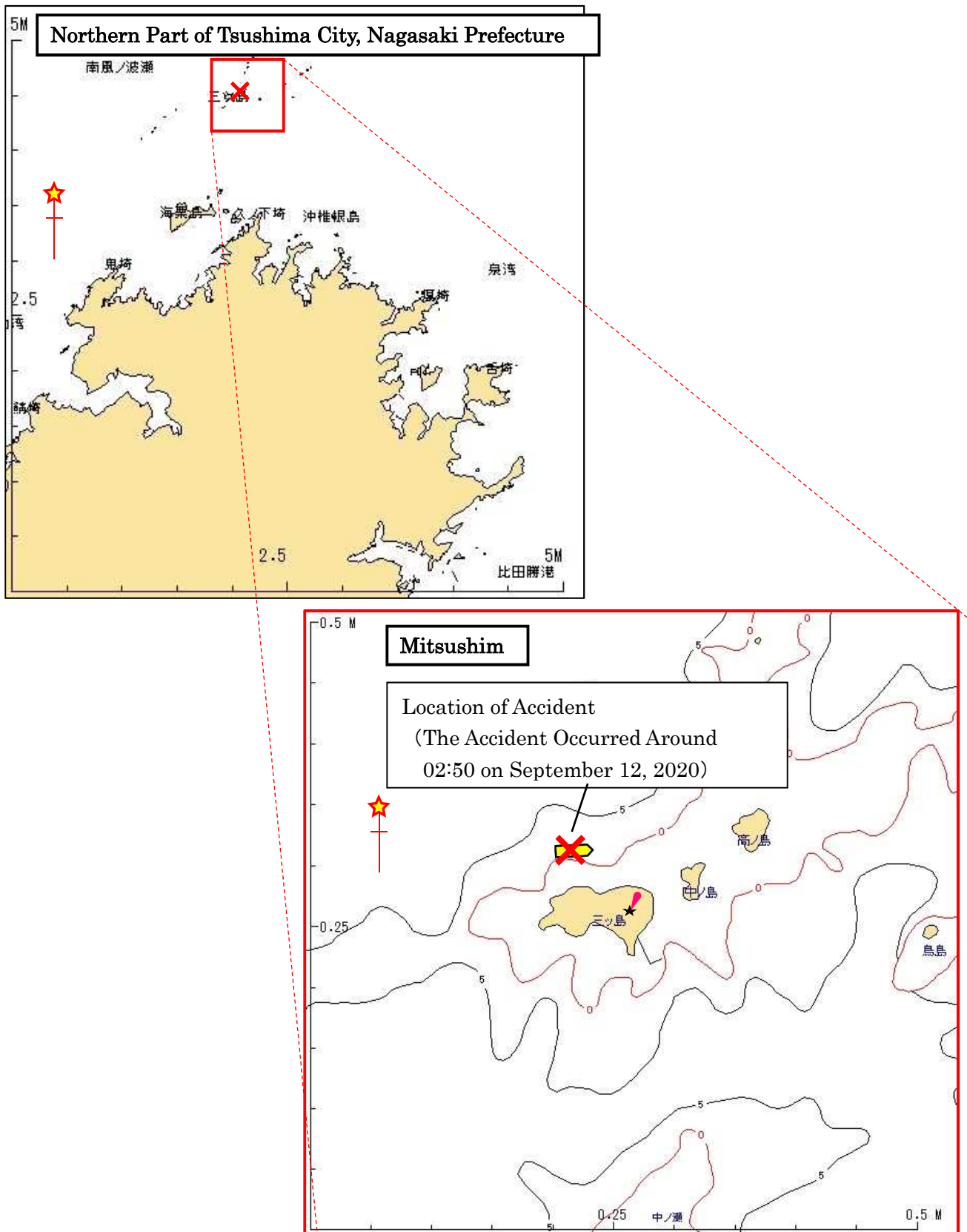
According to the response by Segmar Tokyo, the Panama Maritime Authority in Japan, the vessel had passed the annual survey in 2019 under the supervision of the OMCS and had

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| | received proper documentation. |
| <p>Analysis</p> <p>Involvement of crew members</p> <p>Involvement of vessel, engine, etc.</p> <p>Involvement of weather and sea conditions</p> <p>Analysis of the findings</p> | <p>Applicable</p> <p>Applicable</p> <p>Applicable</p> <p>The cause of this accident is probable that the vessel with both anchors disabled, having left port for the purpose of avoiding the Typhoons, was unable to start the main engine while drifting in the west channel of the Tsushima Strait for the purpose of waiting to enter the Busan port, and was pushed southward by wind and waves, and then grounded on shallows on north side of Mitsushima.</p> <p>It is probable that the vessel left port with both anchors out of order because the vessel was unable to complete repairs to the starboard anchor chain and the port anchor brake due to the Typhoons approaching while having been moored at the Busan port.</p> <p>It is probable that the vessel's main engine could not be started because the internal mechanism of the governor did not work in accordance with the fuel supply quantity setting scale, which prevented the fuel to be properly supplied in order to change pneumatic operation to fuel operation ,but the cause could not be determined.</p> <p>It is probable that after grounding, the vessel was flooded and tilted to port side, split into several blocks and sank.</p> |
| <p>Probable Causes</p> | <p>The cause of this accident is probable that the vessel with both anchors disabled, having left port at night for the purpose of avoiding the Typhoons, was unable to start the main engine while drifting in the west channel of the Tsushima Strait for the purpose of waiting to enter the Busan port, and was pushed southward by wind and waves, and then grounded on shallows on north side of Mitsushima.</p> <p>It is probable that the vessel left port with both anchors out of service because the vessel was unable to complete repairs to the starboard anchor chain and the port anchor brake due to the Typhoons approaching while having been moored at the Busan port.</p> <p>It is probable that the vessel's main engine did not start because the internal mechanism did not work according to the fuel supply volume setting scale of the governor.</p> |

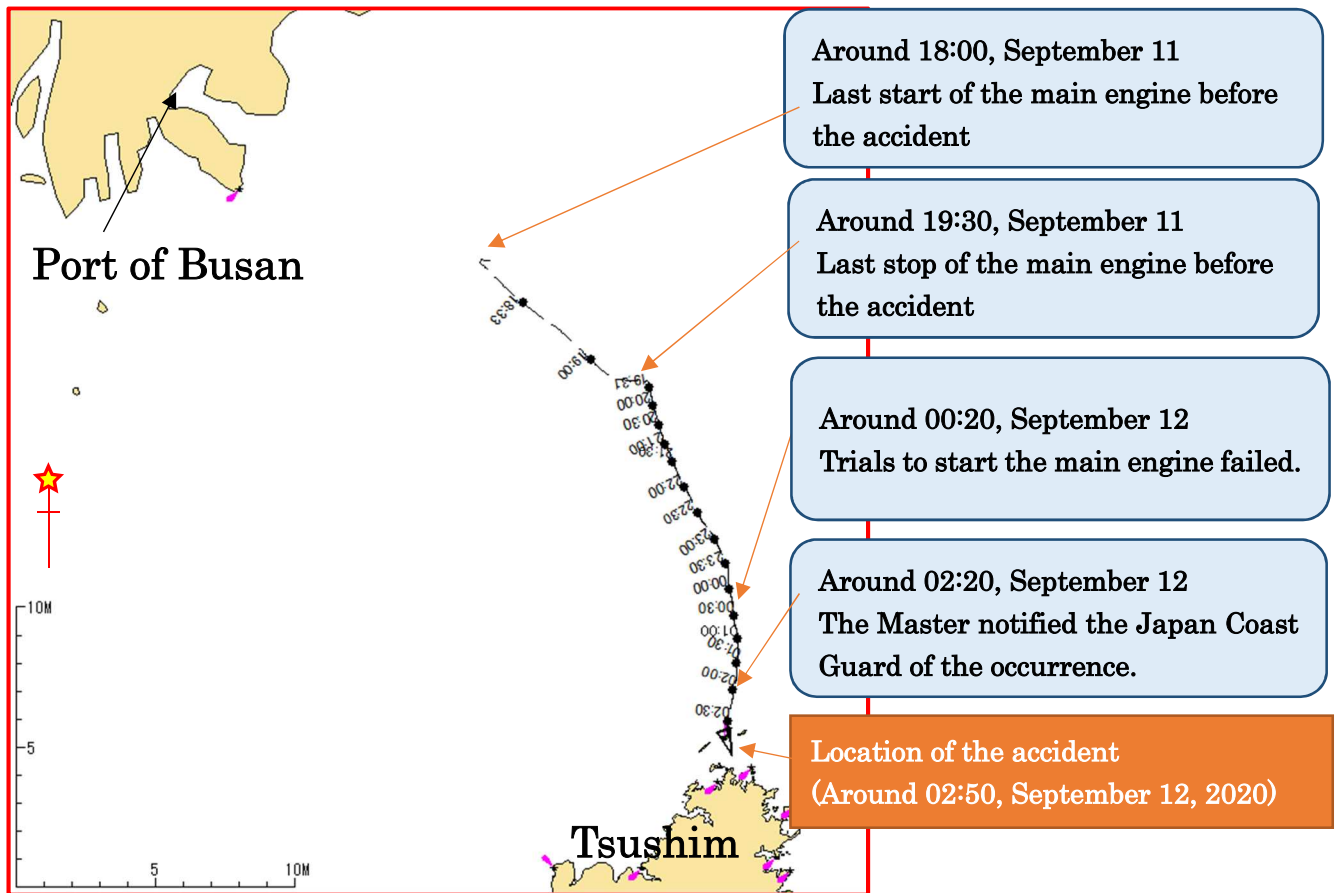
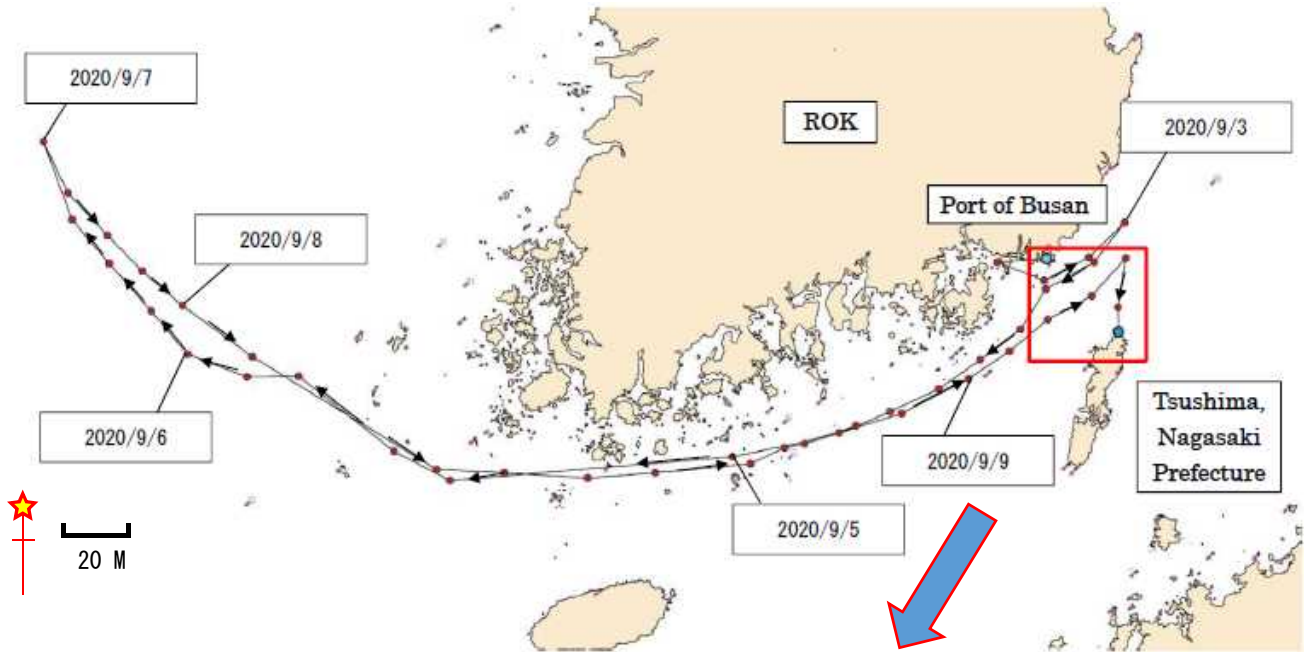
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| <p>Safety Actions</p> | <p>It is probable that the following measures will be useful in preventing the recurrence of similar accidents and reducing the damage:</p> <ul style="list-style-type: none"> (i) If the Master has no choice but to leave port with neither anchor in service in preparation for an approaching typhoon, etc., the Master should ensure that there is sufficient distance from islands and shallows when drifting in consideration of the fact that emergency anchoring to stop being pushed to the shore is not possible; (ii) When repairs of critical facilities essential for navigation, such as anchor equipment, of its managed vessel are carried out, it is necessary for Company A to obtain information on the typhoon well in advance and give instructions on whether to evacuate the vessel to the sea after recovery of critical facilities, or whether to provide other vessels for support or to dock the vessel; (iii) Company A should maintain a system to receive communications from the managed vessel at any time; and (iv) In the event that the main engine is unable to start and the vessel is pushed to shallows, the master should immediately notify the nearest SAR (Search and Rescue) organization of the occurrence to without delay. |
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APPENDIX 1: SCHEMATIC DIAGRAM OF THE ACCIDENT

LOCATION



APPENDIX 2: SCHEMATIC DIAGRAM OF THE ACCIDENT PROCESS



(*Tracks from 9 hours before the accident)

ANNEX TABLE 1: AIS RECORDS OF THE SHIP (EXCERPT)

| Date | Time (HH:MM:SS) | Position of the Ship | | COG (°) | SOG (kn) |
|--------------|--------------------|----------------------|---------------|------------|-------------|
| | | N (°.-'.") | E (°.-'.") | | |
| September 10 | 13:02:42 | 34-46-00.7 | 129-12-24.0 | 069.8 | 1.2 |
| | 13:04:50 | 34-46-02.6 | 129-12-59.5 | 060.2 | 5.6 |
| | 13:09:21 | 34-46-28.1 | 129-12-59.5 | 043.2 | 8.3 |
| | 13:57:31 | 34-52-43.2 | 129-15-42.1 | 034.3 | 8.9 |
| | 14:00:10 | 34-53-00.6 | 129-15-57.9 | 035.2 | 7.7 |
| | 14:05:11 | 34-53-29.2 | 129-16-20.4 | 032.0 | 5.6 |
| | 14:10:40 | 34-53-45.2 | 129-16-25.7 | 006.2 | 1.7 |
| September 11 | 09:27:41 | 35-04-17.8 | 129-28-55.3 | 206.9 | 1.1 |
| | 18:12:31 | 35-00-33.9 | 129-16-02.1 | 285.9 | 1.8 |
| | 18:15:20 | 35-00-27.0 | 129-15-57.6 | 150.6 | 4.9 |
| | 18:20:20 | 35-00-06.3 | 129-16-26.5 | 129.7 | 7.2 |
| | 18:33:50 | 34-59-00.5 | 129-17-51.3 | 127.9 | 7.1 |
| | 19:00:01 | 34-56-58.7 | 129-20-48.6 | 133.8 | 7.2 |
| | 19:10:10 | 34-56-17.8 | 129-22-01.2 | 110.8 | 7.0 |
| | 19:16:11 | 34-56-14.8 | 129-22-52.1 | 081.8 | 5.7 |
| | 19:21:11 | 34-56-12.9 | 129-23-15.6 | 121.5 | 1.8 |
| | 19:31:40 | 34-56-00.7 | 129-23-20.7 | 161.2 | 1.3 |
| | 20:00:31 | 34-55-21.8 | 129-23-31.2 | 136.5 | 1.6 |
| | 20:30:09 | 34-54-38.9 | 129-23-45.7 | 162.0 | 1.4 |
| | 21:00:29 | 34-53-57.2 | 129-24-02.7 | 151.4 | 1.5 |
| | 21:30:00 | 34-53-17.4 | 129-24-21.6 | 174.1 | 1.3 |
| | 22:00:11 | 34-52-24.9 | 129-24-52.8 | 143.4 | 1.7 |
| | 22:30:10 | 34-51-29.0 | 129-25—25.9 | 145.6 | 2.5 |
| | 23:00:00 | 34-50-32.1 | 129-26-10.2 | 101.0 | 3.4 |
| 23:30:21 | 34-49-39.2 | 129-26-40.2 | 128.3 | 2.3 | |
| September 12 | 00:00:00 | 34-48-45.6 | 129-26-48.0 | 130.8 | 2.7 |
| | 00:30:01 | 34-47-47.9 | 129-27-01.0 | 200.2 | 2.8 |
| | 01:00:10 | 34-46-57.9 | 129-27-10.4 | 171.0 | 1.8 |
| | 01:30:00 | 34-46-07.1 | 129-27-09.1 | 174.6 | 1.9 |
| | 02:00:00 | 34-45-07.4 | 129-26-59.7 | 178.4 | 1.8 |
| | 02:30:08 | 34-44-02.1 | 129-26-44.4 | 193.3 | 1.7 |
| | 02:40:07 | 34-43-37.1 | 129-26-41.1 | 188.5 | 2.5 |
| | 02:46:05 | 34-43-29.5 | 129-26-39.2 | 177.2 | 0.6 |
| | 02:50:48 | 34-43-29.2 | 129-26-38.1 | 007.3 | 0.1 |
| | 03:00:16 | 34-43-28.9 | 129-26-38.1 | 220.9 | 0.1 |

* The position of the ship was that of the GPS antenna installed above the bridge. The GPS antenna position information was 65m from the bow, 16m from the stern, 4m from the port side and 8m from the starboard side. The course over the ground (COG) was true bearing, and no heading had been set.