MI2018-1

MARINE INCIDENT
INVESTIGATION REPORT

January 25, 2018

JTSB Japan Transport Safety Board

The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board is to prevent future accidents and incidents. It is not the purpose of the investigation to apportion blame or liability.

Kazuhiro Nakahashi
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 INCIDENT INVESTIGATION REPORT

December 13, 2017
Adopted by the Japan Transport Safety Board
Chairman Kazuhiro Nakahashi
Member Yuji Sato
Member Kenkichi Tamura
Member Toshiyuki Ishikawa
Member Makiko Okamoto

Incident type	Unnavigable state (hull list)
Date and time	Around 12:00 on January 11, 2017 (local time, UTC+9 hours)
Location	Off the north of Oshima Island, Munakata City, Fukuoka Prefecture (approximately 33°56.3'N, 130°25.3'E)
Summary of the Incident	While cargo ship TONG DA was proceeding east-northeast in Genkai-nada, with a master and 13 other crew members onboard, her hull listed to port and she was intentionally run aground. TONG DA had seawater damage to her engine, cargo, etc.
Process and Progress of the Incident Investigation	The Japan Transport Safety Board (hereinafter referred to as "JTSB") appointed an investigator-in-charge and two other investigators to investigate this incident on January 13, 2017. January 13, 14 and May 22, 2017: Interviews January 15, 17, 18 and April 25, 2017: On-site investigations April 10, 21 and May 26, 2017: Collection of questionnaire Comments on the draft report were invited from parties relevant to the cause of incident.
Factual Information	
Vessel type and name	Cargo ship TONG DA (flag state: unknown)
Gross tonnage	2,994 tons
IMO number	8649993
Owner	SHANGHAI JIAYUN INVESTMENT MANAGEMENT CO., LTD (hereinafter referred to as 'Company A')
Management company	UNION LINK INTERNATIONAL (HK) LIMITED
Classification Society	Unknown
L×B×D, Hull material	93.92m (Lr) × 14.20m × 7.20m, Steel
Engine, Output	Diesel Engine, 1,765kW
Date of launch	January 2005
	(1) Registry 1) The vessel was flying the flag of the Republic of Fiji at the time of the incident. 2) Because the vessel had a certificate of registry and other documents issued by the Republic of Fiji, the JTSB notified the Republic of Fiji of the incident. However, the JTSB received a response indicating that the vessel was not a vessel of the Republic of Fiji.

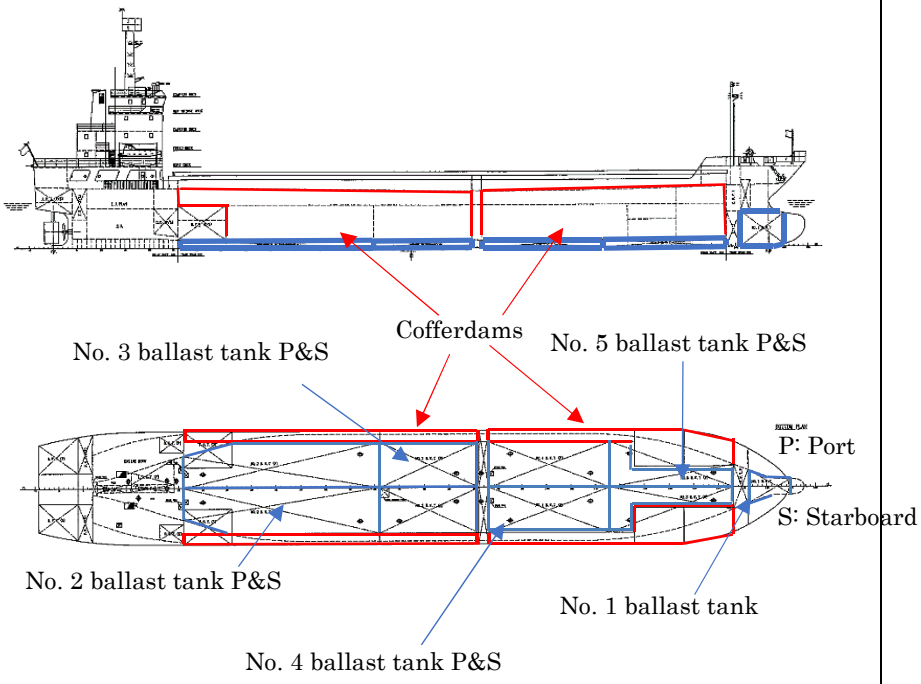
3) According to information of the IMO's Global Integrated Shipping Information System (GISIS), the registry of TONG DA (hereinafter referred to as "the Vessel") has been unknown since June of 2016. The Vessel's registry theretofore was as shown in the following table.

Registry	Month and Year of Registry
People's Republic of China	January 2005
North Korea	November 2011
People's Republic of China	April 2014
Kingdom of Cambodia	April 2014
People's Republic of China	July 2015
Republic of Sierra Leone	July 2015
Republic of Togo	January 2016
People's Republic of China	January 2016

(2) Hull structure

The Vessel was a cargo ship with a forecastle and poop and aft engine. Her hull had a No. 1 cargo hold and a No. 2 cargo hold arranged in order from the bow. Ballast tanks were arranged beneath the No. 1 and No. 2 cargo holds. Cofferdams were arranged along the shell plating on both sides of the cargo holds. (See Photo 1 and Figure 1)

Photo 1 The Vessel

	 Figure 1 General Arrangement Plan
Crew Information	Master (Nationality: People's Republic of China), male, 48 years old Endorsement attesting the recognition of certificate under STCW regulation I/10: Master (issuing country: unknown) Endorsement No.: FJCR84928/CE7 Date of issue: July 26, 2016 (valid until January 27, 2019) The master began serving as an able seaman in 1987. He subsequently became a navigation officer in 1998 and became a master of cargo ships and container ships in 2010. He came aboard the Vessel in around August of 2016. According to the STCW Convention, *1 different numbers are assigned as the endorsement number of the endorsement attesting the recognition of certificate under STCW regulation 1/10 for master and for chief officer; however, the same number was given to both.
Injuries to Persons	None
Damage to Vessel	Seawater damage to engine, cargo, etc.
Events Leading to the Incident	At around 02:30 on January 7, 2017 (Japan time, hereinafter the same), the Vessel, with a master and 13 other crew members (six nationals of the Republic of China, two nationals of the Socialist Republic of Viet Nam, and five nationals of the Republic of the Union of Myanmar), departed Weifang Port, Shandong Province, People's Republic of China, with a load of approximately 4,154.8 tons of sodium chloride, magnesium chloride, and other items for

*1 The "STCW Convention" refers to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers of 1978.

	Hachinohe Port, Hachinohe City, Aomori Prefecture. At around 14:00 on January 9, when the Vessel began proceeding east at a speed over the ground of approximately 8 knots (kn) for the western gateway of Kanmon Passage while off to the southwest of Jeju Island, Republic of Korea, she was subjected to wind and waves coming from her port side and began rolling to port and starboard at about 10° to 20°. At around 05:00 on January 10, the master arose and came up to the bridge and observed that the Vessel was listing approximately 3° to port. He thought there was flooding in a ballast tank and ordered the chief officer to conduct a sounding of the tank. However, a measurement could not be taken due to the Vessel's rolling, and thus the master decided to let go anchor and then take the sounding. At around 19:10, after the Vessel let go anchor off to the northeast of Hiradoshima Island, Hirado City, Nagasaki Prefecture, the master went to take a sounding of each ballast tank together with the chief officer and found that there was no flooding in any of the ballast tanks. When the master next opened the hatch cover of the No. 2 cargo hold to inspect the inside of the hold, he saw that the space between the port-side wall of the No. 2 cargo hold and the cargo had narrowed, and he therefore thought that the hull was listing to port because the cargo in the No. 2 cargo hold had shifted to port. Because the master had had previous experience navigating with a hull list of approximately 3°, he thought he could again safely navigate with a list. Thus, the Vessel weighed anchor at around 02:55 on January 11 and resumed navigating toward Hachinohe Port. At around 09:00, the master took over the bridge watch from the chief officer and remained on watch with the hull continuing to list approximately 3° to port. However, at around 12:00, he became concerned because the hull was listing approximately 10° and the port stern was sinking, and seawater was washing over the upper deck. He decided to let go anchor and inspect the cargo holds. At around 14:09, the master let go anchor off to the north of the Ashiyakaigan Coast, Okagaki Town, Fukuoka Prefecture and instructed the chief officer to inspect the cargo holds. When the chief officer conducted an inspection by entering each of the holds from the hatchways to both cargo holds located between the No. 1 cargo hold and No. 2 cargo hold together with an able seaman (hereinafter referred to as "Able Seaman A"), he found no abnormalities in the No. 1 cargo hold but observed flooding in the No. 2 cargo hold. The chief officer sent Able Seaman A to call the master and communicated with the chief engineer to ask him to discharge seawater from the No. 2 cargo hold.

The chief engineer received the communication and began discharging water from the No. 2 cargo hold with the bilge pump.

When the master heard Able Seaman A's report and checked the situation in the No. 2 cargo hold, he observed that the flooding had reached roughly half the cargo hold's height. He felt there was a risk of foundering and at around 15:20 decided to intentionally run aground.

At around 15:25, the Vessel weighed anchor and began navigating toward Ashiyakaigan Coast. The master then requested rescue from Japan Coast Guard and ordered the crew to prepare to abandon ship. At around 16:00 the master intentionally ran the Vessel aground on the coast's sandy beach.

All crew members of the Vessel initially remained on duty on board under the supervision of a patrol vessel that had arrived to provide assistance. However, because the hull's pitching and rolling eventually intensified, all crew members left the Vessel by life raft at around 23:25 and then transferred to the patrol vessel.

Subsequently, the Vessel was found to have cracking of her bottom shell plating in a total of approximately ten locations in a hull survey that was conducted by the salvage company contracted to handle salvage work and was scrapped.

(See Attached Figure 1 Outline Map of the Course of the Incident Events and Attached Figure 2 Navigation Path)

Weather and Sea Conditions

Weather: Weather: cloudy, wind direction: north, wind force: 6
Sea conditions: Wave direction: north, wave height of approximately 2.0 meters

(1) Wind and ocean wave observations made by the Vessel's crew

According to the Vessel's logbook, the situation was as follows.

1) Observations while proceeding east off to the southwest of Jeju Island

Data and time	Wind		Wave	
	Wind direction	Wind force	Wave direction	Class
January 9 21:00	North	6	North	5 (2.0 – 2.5m)
January 10 01:00	NW	6	NW	5
05:00	NW	5	NW	4 (1.0 – 1.5m)
09:00	North	5	NW	4

2) Observations while proceeding east-northeast in Genkai-nada after weighing anchor off to the northeast of Hiradoshima Island

Data and time	Wind		Wave	
	Wind direction	Wind force	Wave direction	Class
January 11 05:00	NW	4	NW	3 (0.6m)
09:00	NW	5	NW	4
13:00	North	6	North	5

(2) Wind and ocean wave observations made by the Nationwide Ocean Wave information network for Ports and HArbourS (NOWPHAS)

NOWPHAS's wind and ocean wave observations in Genkai-nada (approximately 2.3 M to the east of the location of the incident described here) on January 11 were as follows.

Time (hr:min)	Wind direction	Wind speed (m/s)
08:00	NNW	9
09:00	NNW	8
10:00	North	8
11:00	North	7
12:00	North	6
13:00	North	6

Time (hr:min)	Significant wave*2		Wave direction
	Wave height (m)	Period (s)	
08:00	1.69	5.8	NNE
09:00	1.85	5.8	North
10:00	1.62	6.5	North
11:00	1.65	6.4	North
12:00	1.51	6.3	NNE
13:00	1.72	6.6	NNE

Other Matters

(1) Information on the Vessel

1) Draft, etc.

a At the time that the Vessel departed Weifang Port, her draft was approximately 5.40 meters at the bow, approximately 6.00 meters at the stern, and approximately 5.70 meters

*2 "Significant wave" is obtained when observing waves continuously at a particular point by selecting one-third of the number of all observed waves in order from the highest and then finding the mean height and period of those waves. It is also referred to as the "one-third maximum wave."

amidships. Her trim by the stern was approximately 0.60 meters.

b At the time of the incident, there was no malfunction of the navigation equipment or engine of the Vessel.

c At the time of the incident, no work to fill the ballast tanks with seawater or to drain the ballast tanks of seawater (hereinafter referred to as "Ballast Work") was taking place aboard the Vessel.

2) Information concerning hatch covers

a The hatch covers of the Vessel were pontoon-type covers. Five hatch covers were arranged on the No. 1 cargo hold and six hatch covers were arranged on the No. 2 cargo hold. Each hatch cover had a length (in the bow-stern direction) of approximately six meters.

b The hatch covers of the Vessel maintained weathertightness[*3] by crimping the hatch covers and hatch coaming by overlaying and tightening cleats onto snags installed on the hatch covers. (See Figure 2)

c According to "Annex I: Regulation for determining load lines" of the International Convention on Load Lines of 1966 (hereinafter referred to as "the LL Convention"), the arrangement of the cleats should have been as follows.

Regulation 15: Cleats (10)

Cleats shall be spaced not more than 600 millimetres (23 1/2 inches) centre to centre.

d The cleats on the Vessel's hatch covers were arranged into two locations, on the fore side and aft side, on both sides of a hatch cover. The center-to-center space between the two locations exceeded 600 mm.

3) Information concerning the cargo

a According to the Vessel's stowage plan, the situation was as follows.

Item	Cargo hold	Number (sacks)	Weight (tons)
Sodium chloride	No. 1	1,650	1,651.7
	No. 2	1,900	1,901.8
Magnesium chloride	No. 1	300	300.3
	No. 2	300	300.3
Empty sacks	No. 1	-	-
	No. 2	30	0.7
Total		4,180	4,154.8

(See Annex Figure 3 Circumstances of Cargo Loading)

[*3] Weathertight means that in any sea conditions water will not penetrate into the ship.

b According to the statement of the person in charge at the ship's agent in Noshiro Port, Noshiro City, Akita Prefecture, when the Vessel was loaded with sodium chloride and other cargo at the same loading port as that was involved in the incident, the cargo was found to have seawater damage when it was unloaded at Noshiro Port on December 1, 2016.

c Other information

There was a space between the side wall and the cargo on both sides of the No. 2 cargo hold at the time that the Vessel departed from Weifang Port, and no measures to prevent cargo shifting were taken inside of the No. 2 cargo hold. (See Photo 2)

Photo 2 Situation at the Time of the Inspection of the No. 2 Cargo Hold after Letting Go Anchor

4) Information concerning the weathertightness of the cargo holds, hatchways, ballast tanks, etc. (See Figure 3)

a Places missing the cleats used to preserve the weathertightness of the cargo holds' hatch covers and places where cleats could not be securely attached due to deformation of the snug that receives the cleat were found. (See Photo 3 and Figure 2)

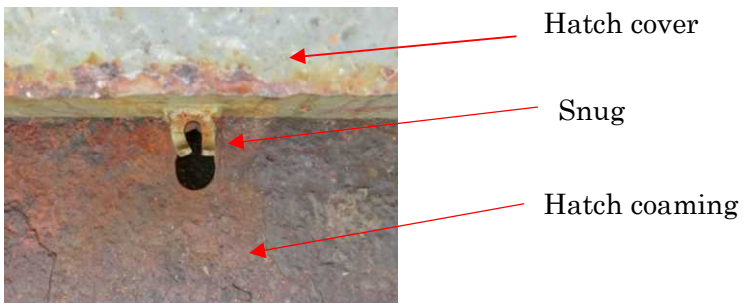


Photo 3 Snug (Photographic View from Above)

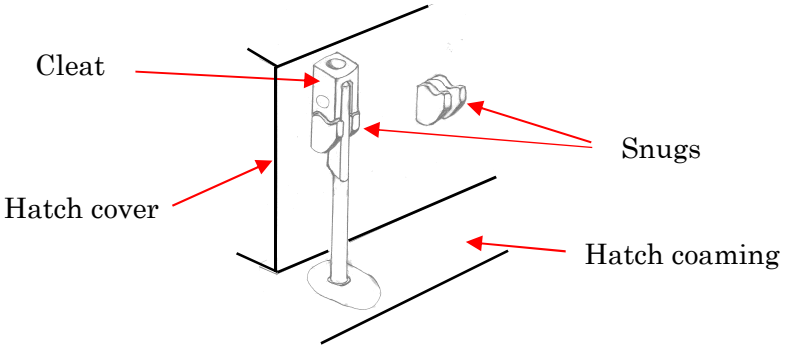


Figure 2　Snug and Cleat

b　Although gaskets (rubber fixtures for preventing leaks that are used on stationary parts) were installed on the hatch covers of the cargo holds, unevenness was observed in places where adjoining hatch covers came into contact. (See Photo 4)

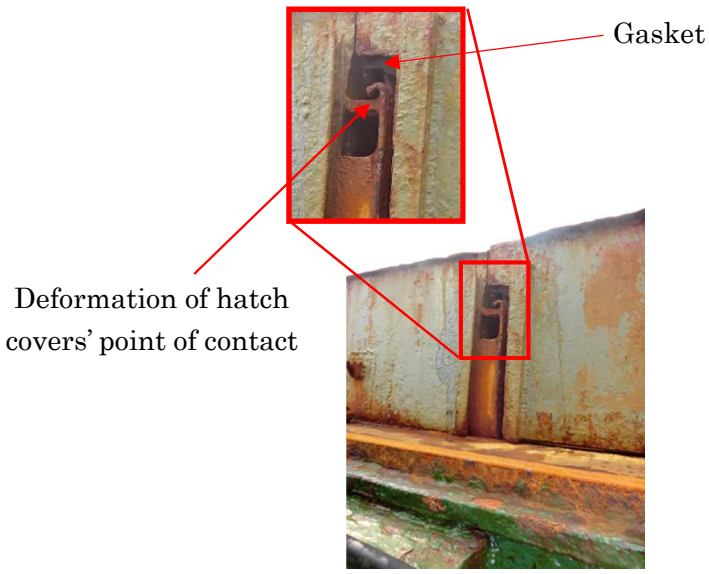


Photo 4　Hatch Covers

c　The hatchways to both cargo holds that were located between the No. 1 cargo hold and No. 2 cargo hold were in a state that did not permit them to preserve weathertightness with the gasket due to unevenness occurring in the upper part of the hatch coaming and deformation of the hatch cover. (See Photo 5)

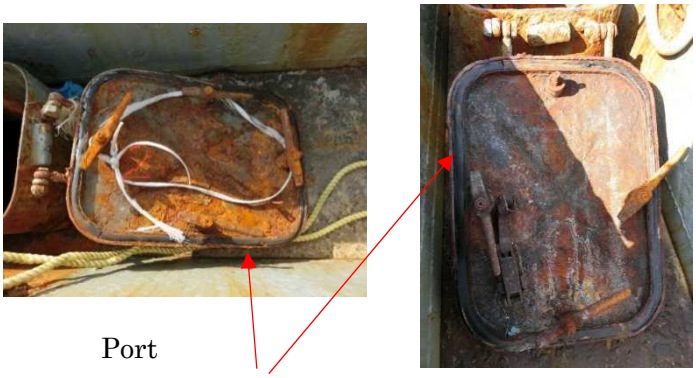


Photo 5　Hatchways

d　The air vent pipe installed on the starboard side of the No. 2 cargo hold's upper-deck hatch was observed to have several corrosion-caused holes in it. (See Photo 6)

Photo 6　Air Vent Pipe

e　Sounding tubes located in the port aft area of the upper deck had cracks and were missing a cap needed to preserve weathertightness. (See Photo 7)

Photo 7　Sounding Tubes

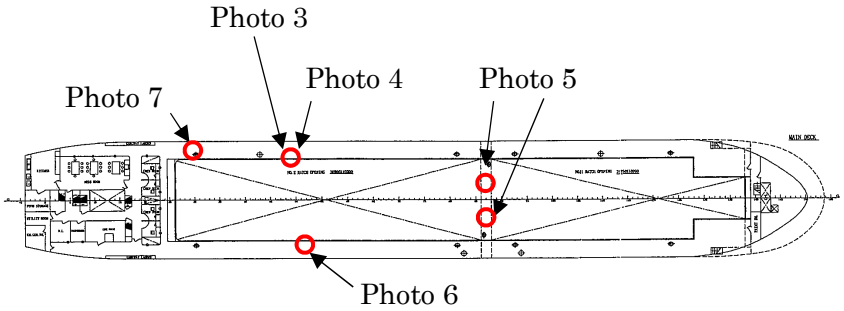


Figure 3　Damaged Locations of the Upper Deck

5) Damage to the bottom

The results of the hull survey that was conducted by the salvage company are as follows.

a　No. 2 ballast tank (port): Cracks in five locations

b　No. 3 ballast tank (starboard): Cracks in one location

c　No. 4 ballast tank (port): Cracks in two locations

d　No. 4 ballast tank (starboard): Cracks in one location

e　No. 5 ballast tank (port): Cracks in one location

f　Bending and other damage to the port bilge keel

(2) Information on oil releases and release control

1)　Fuel oil and other substances were released near the location where the Vessel was intentionally run aground and a portion washed ashore on southern Ashiyakaigan Coast.

2)　Some of the floating oil was recovered with absorbent mats.

3)　The oil that washed ashore on Ashiyakaigan Coast's sandy beach was recovered and disposed of.

4)　The fuel oil remaining in the Vessel's tanks was removed by a company that was contracted to perform oil release control work on January 18 and 19.

Analysis

Involvement of crew members	Applicable
Involvement of vessel, engine, etc.	Applicable
Involvement of weather and sea conditions	Applicable
Analysis of the findings	(1) Conditions of weather and sea conditions The wind and ocean waves while the Vessel was proceeding east off to the southwest of Jeju Island (around 05:00 on January 10) and proceeding east-northeast in Genkai-nada (between around 09:00 and 12:00 on January 11) were as provided the following table.

Date and time	Wind		Wave	
	Wind direction	Wind speed (m/s)	Wave height (m)	Wave direction
January 10 05:00	NW	8 - 11	1.00 - 1.50	NW
January 11 09:00 – 12:00	NNW to North	6 - 8	1.51 - 1.85	North to NNE

(2) Shifting of the cargo

1) It is probable that there was a space between the side wall and the cargo on both sides of the No. 2 cargo hold at the time that the Vessel departed from Weifang Port and that no measures to prevent cargo shifting were taken.

2) It is probable that, while being subjected to wind and waves from her port side as she proceeded east off to the southwest of Jeju Island, the Vessel was navigating with her hull rolling by about 10° to 20° to both port and starboard.

3) It is probable that, at around 05:00 on January 10, the master observed the Vessel listing approximately 3° to port.

4) It is probable that, after the Vessel let go anchor off to the northeast of Hiradoshima Island, the cargo shifted to the port side and the space between the port-side wall and the cargo had narrowed at the time that the master inspected the No. 2 cargo hold.

5) From 1) to 4) above, it is probable that the cargo in the No. 2 cargo hold shifted to the port side as a result of the Vessel's rolling to port and starboard and that the hull listed approximately 3° to port.

(3) Flooding from the upper deck

1) Effects of the hull's list

From the Vessel's draft at the time that she left Weifang Port and her beam, it is probable that the situation concerning the washing up of waves with the hull's list was as follows. (See Figure 3)

a Given that, while the Vessel was proceeding east off to the southwest of Jeju Island, the freeboard near the hull's midship was approximately 1.10 meters in state in which the hull was listing approximately 3° to port, and that the wave height was between approximately 1.00 and 1.50 meters, waves were washing onto the upper deck.

b Given that, as the Vessel was proceeding east-northeast in Genkai-nada, the freeboard near the hull's midship was approximately 0.25 meters in a state in which the hull was

listing approximately 10° to port, that the wave height was between approximately 1.51 and 1.85 meters, and that the master observed seawater washing onto the upper deck, the area near the port edge of the upper deck became submerged at times.

c The angle of list at which the area near the port edge of the Vessel's upper deck near the hull's midship would become submerged was approximately 12°.

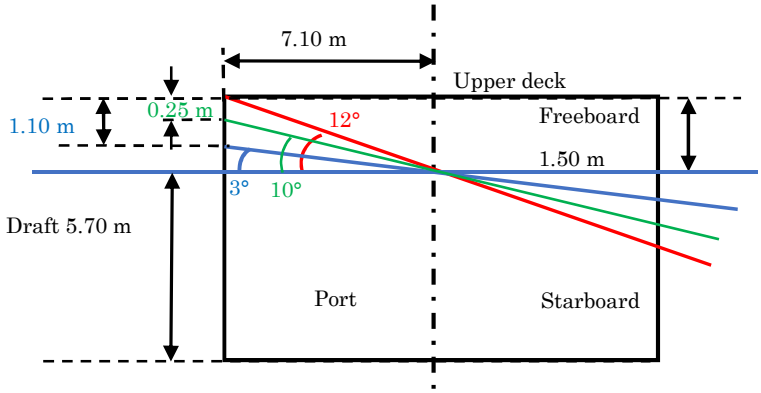


Figure 3 Circumstances of the Water Line when the Vessel Listed (Conceptual Image)

2) Effects of the trim

Given that the Vessel's trim by the stern was approximately 0.60 meters at the time that she left Weifang Port, it is probable that she was in a state whereby the No. 2 cargo hold was more susceptible to washing up of the waves than the No. 1 cargo hold.

3) Weathertightness on the upper deck

From the following, it is probable that weathertightness was not being appropriately maintained on the upper deck.

a There were places in the hatch covers of the cargo holds that were missing cleats and places at which cleats could not be securely attached due to deformation of the snug that receives the cleat.

b Although gaskets were installed on the hatch covers of the cargo holds, unevenness was observed in places where adjoining hatch covers came into contact.

c There was unevenness in the upper part of the hatch coaming and deformation of the hatch covers on the hatchways to the cargo holds.

d The air vent pipe installed on the starboard side of the No. 2 cargo hold's upper-deck hatch was observed to have several corrosion-caused holes in it.

e Some of the sounding tubes of the upper deck had cracks and were missing a cap needed to preserve weathertightness.

f It is possible that cargo had seawater damage when the Vessel was unloaded at Noshiro Port on December 1, 2016.

4) From (1), (2), and (3) 1) to 3) above, it is probable that seawater flooded the No. 2 cargo hold when it washed up onto the upper deck and the area near the port edge of the upper deck became submerged as the Vessel was navigating from off to the southwest of Jeju Island and into Genkai-nada because the weathertightness of the upper deck was not being properly maintained.

(4) Analysis of damage to the bottom shell plating

Given that there was no flooding in the ballast tanks at the time that the Vessel let go anchor off to the northeast of Hiradoshima Island and sounding of the ballast tanks was conducted, it is probable that the cracks in the bottom shell plating occurred when the Vessel was intentionally run aground and as a result of subsequent pitching and rolling of her hull.

(5) Ballast Work

It is probable that no Ballast Work was being conducted while the Vessel was navigating.

(6) Analysis concerning the circumstances of the Vessel's management

From the following items, it is somewhat likely that Company A was not in compliance with the International Convention for the Safety of Life at Sea of 1974 and other regulations aboard the Vessel.

1) Company A repeatedly transferred the Vessel's registry.

2) Although the Vessel had a certificate of registry and other documents issued by the Republic of Fiji, the JTSB received a response from the Republic of Fiji stating it was untrue that the Republic of Fiji had issued the certificate of registry and other documents to the Vessel.

3) The classification society registering the Vessel could not be confirmed.

4) Despite the fact that different numbers are normally assigned as the endorsement number of the endorsement attesting the recognition of certificate under STCW regulation 1/10 for master and for chief officer, the same number was given to both.

5) The Vessel had not received a vessel inspection that was based on an international convention.

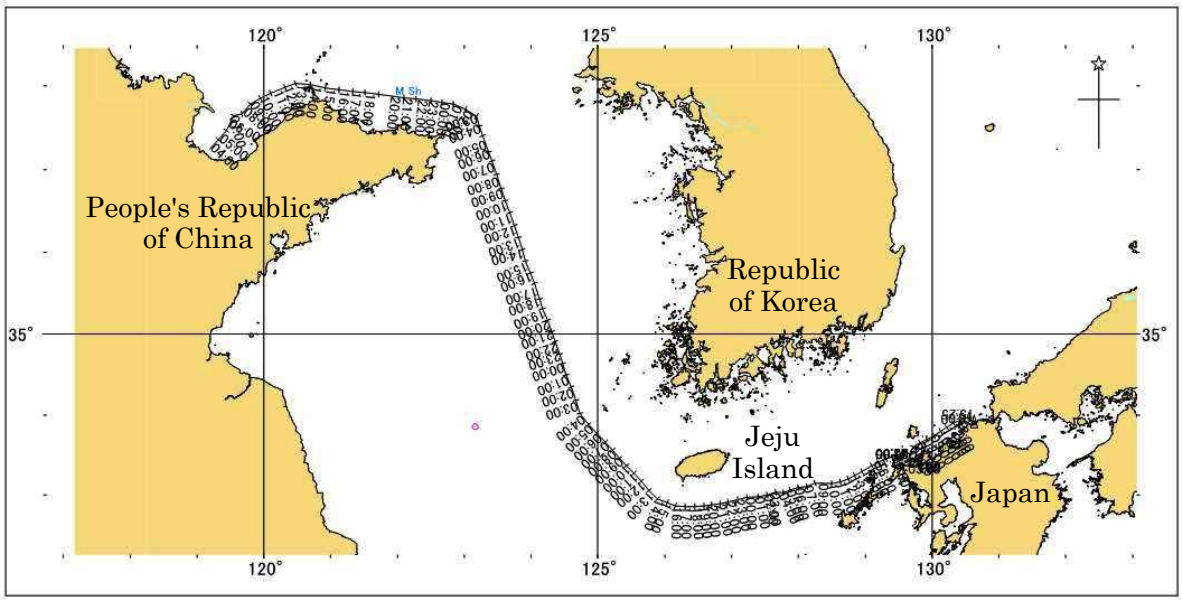
6) The arrangement of the Vessel's cleats was not based on "Annex I: Regulation for determining load lines" of the LL Convention.

(7) Analysis of the incident occurrence

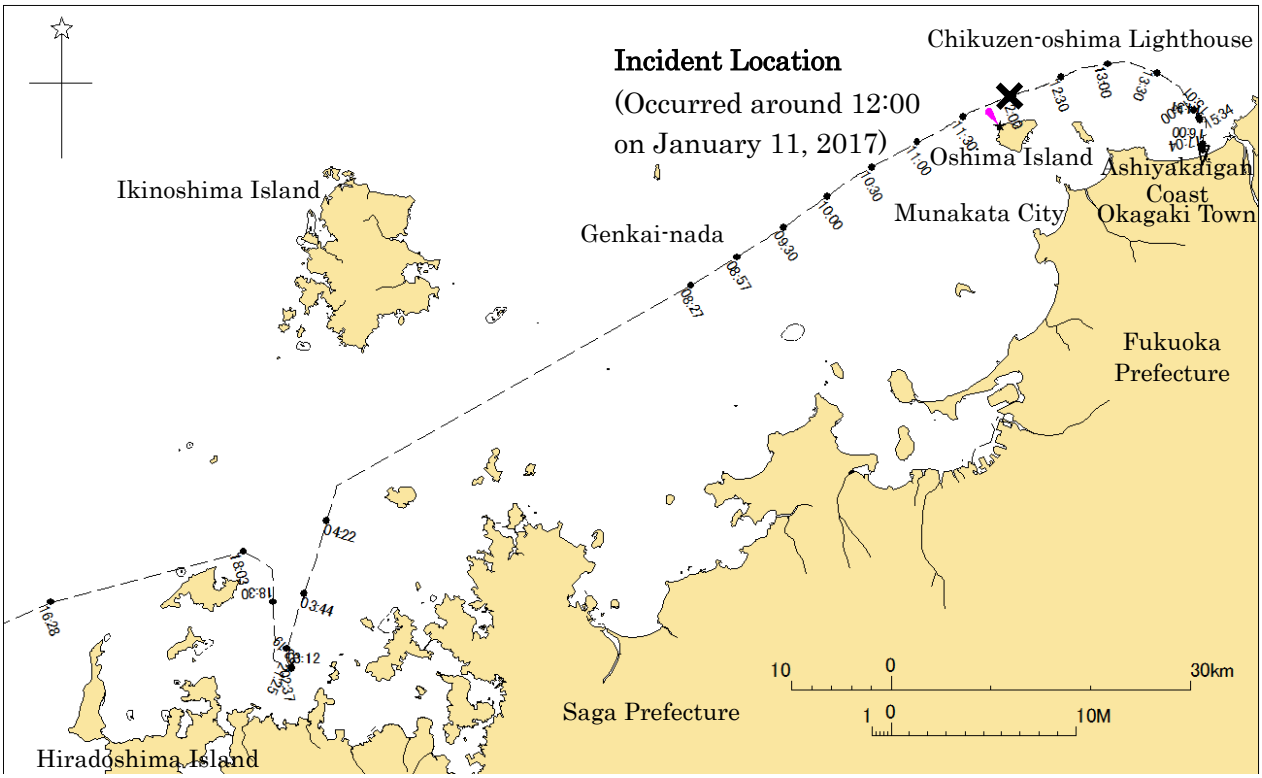
From (1) to (3) and (6) above, it is probable that the incident occurred as follows.

	1) Given that the Vessel was not in compliance with the International Convention for the Safety of Life at Sea of 1974 and other regulations, the weathertightness of the upper deck was not being properly maintained. 2) While being subjected to wind and waves from her port side as she proceeded east off to the southwest of Jeju Island, the Vessel was navigating with her hull rolling by about 10 to 20° to both port and starboard. The cargo in the No. 2 cargo hold shifted to the port side as a result of the Vessel's rolling to port and starboard and the hull listed approximately 3° to port. 3) Seawater flooded the No. 2 cargo hold when it washed up onto the upper deck and when the area near the port edge of the upper deck became submerged as the Vessel was navigating from off to the southwest of Jeju Island and into Genkai-nada because the weathertightness of the upper deck was not being properly maintained. 4) The master sensed the risk of foundering and intentionally ran the Vessel aground.
Probable Causes	It is probable that the incident occurred because, as the Vessel was proceeding east-northeast while being subjected to wind and waves from her port side in Genkai-nada while in a state in which she was listing by approximately 3° after cargo in her No. 2 cargo hold shifted to the port side due to her hull's rolling, seawater that was washing up flooded the No. 2 cargo hold because the weathertightness of the upper deck was not being properly maintained and as a result the Vessel listed approximately 10° to port.
Actions Required / Taken	The following measures are possible to prevent recurrence of similar accidents: ・ The owner complies with the LL Convention and other international conventions. ・ The owner and crew members conduct hull maintenance work in a systematic manner. ・ Implement measures to prevent shifting cargo when there are spaces in the cargo in a cargo hold.

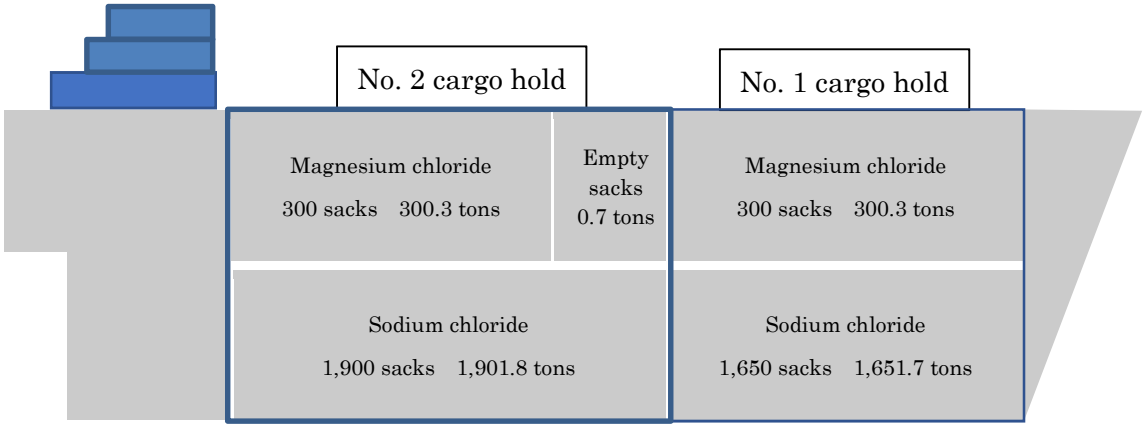
Attached Figure 1　Outline Map of the Course of the Incident Events



Attached Figure 2　Navigation Path



Annex Figure 3　Circumstances of Cargo Loading



Annex Table 1　AIS Record of the Vessel (Excerpt)

Date	Time (HH:MM:SS)	Latitude (N) (° ′ ″)	Longitude (E) (° ′ ″)	Heading (°)	Course Over the Ground (°)	Speed Over the Ground (kn)
January 10	14:52:30	33-24-19.5	129-11-18.0	058	067.5	7.1
	16:28:29	33-28-41.0	129-22-40.5	065	068.6	6.7
	18:10:50	33-30-56.9	129-36-12.5	120	119.6	8.5
	18:14:09	33-30-43.0	129-36-42.1	121	118.3	8.5
	18:17:51	33-30-22.8	129-37-06.5	183	166.2	7.5
	18:31:31	33-28-32.9	129-37-11.5	181	176.8	8.3
	18:54:51	33-25-26.9	129-37-14.0	126	150.3	7.6
	21:25:55	33-25-04.3	129-38-21.1	330	351.1	0.1
January 11	02:57:35	33-25-06.4	129-38-13.6	332	315.5	1.1
	03:12:35	33-26-06.8	129-38-01.3	019	015.1	4.8
	03:44:55	33-29-07.5	129-39-09.8	018	017.7	6.5
	04:22:54	33-33-04.6	129-40-38.2	017	017.1	6.1
	04:42:35	33-34-57.7	129-41-15.5	020	016.2	5.8
	08:27:36	33-45-55.5	130-04-20.7	056	055.6	5.7
	09:02:34	33-47-41.8	130-07-46.8	054	058.9	5.5
	09:30:03	33-49-05.4	130-10-21.9	055	056.1	5.9
	10:00:27	33-50-46.1	130-13-14.9	050	051.9	5.7
	10:30:39	33-52-20.7	130-16-08.7	062	062.8	5.6
	11:00:08	33-53-40.0	130-19-06.2	062	057.9	5.5
	11:30:00	33-55-03.7	130-22-02.7	058	058.2	5.6
	12:00:19	33-56-15.5	130-25-20.4	068	063.9	6.2
	12:30:13	33-57-14.5	130-28-28.6	063	065.3	5.2
	13:00:10	33-57-56.0	130-31-28.8	080	080.1	5.6

	13:30:08	33-57-27.3	130-34-42.1	108	110.7	6.0
	14:00:05	33-55-25.2	130-37-07.1	149	149.2	4.8
	14:08:53	33-55-04.6	130-37-23.1	141	142.0	0.8
	15:34:54	33-54-59.3	130-37-26.3	016	022.3	0.8
	15:45:03	33-54-39.1	130-37-53.9	185	186.5	6.4
	15:50:03	33-54-09.6	130-37-51.8	213	189.9	4.6
	15:55:30	33-53-55.3	130-37-42.1	182	170.7	3.1
	16:00:10	33-53-36.5	130-37-41.6	176	186.9	4.5
	16:05:10	33-53-18.2	130-37-41.7	178	178.4	2.8
	16:16:54	33-53-16.5	130-37-42.0	187	184.3	0.0

*: The vessel position indicates the position of the GPS antenna installed above the bridge, and the courses over the ground and headings indicated in true bearings.