Chapter 5 Marine accident and incident investigations

1 Marine accidents and incidents to be investigated

<Marine accidents to be investigated>

◎Paragraph 5, Article 2 of the Act for Establishment of the Japan Transport Safety Board (Definition of marine accident)

The term "Marine Accident" as used in this Act shall mean as follows:

1 Damage to a ship or facilities other than a ship related to the operations of a ship.

2 Death or injury of the people concerned with the construction, equipment or operation of a ship.

<Marine incidents to be investigated>

◎Item 2, paragraph 6, Article 2 of the Act for Establishment of the Japan Transport Safety Board (Definition of marine incident)

A situation, prescribed by Ordinance of Ministry of Land, Infrastructure, Transport and Tourism, where deemed to bear a risk of Marine Accident occurring.

◎Article 3 of Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board

(A situation, prescribed by Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism, stipulated in item 2, paragraph 6, Article 2 of the Act for Establishment of the Japan Transport Safety Board)

1 The situation wherein a ship became a loss of control due to any of the following reasons:

(a) navigational equipment failure;

(b) listing of a ship; or

(c) short of fuel or fresh water required for engine operation.

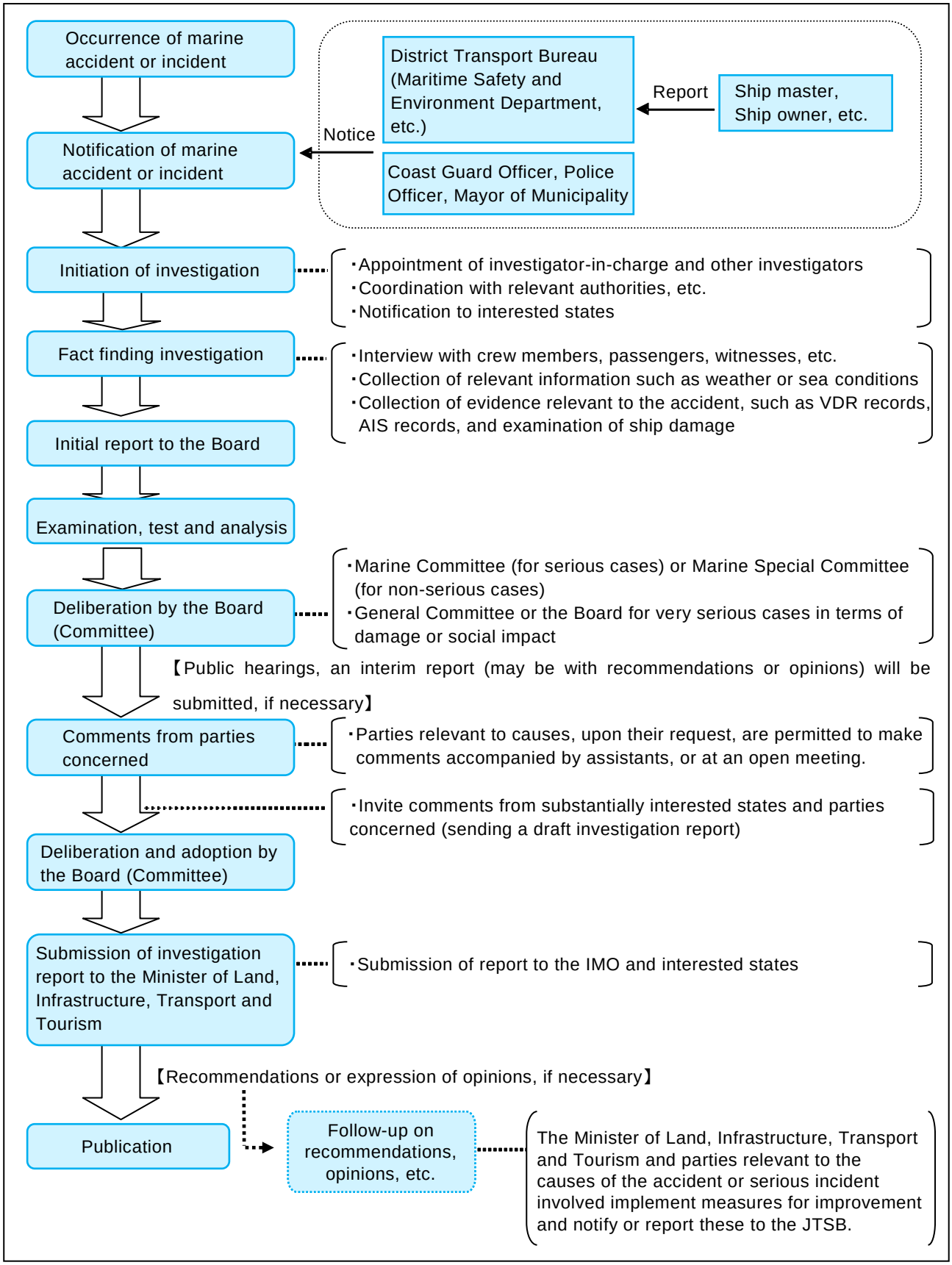
2 The situation where a ship grounded without any damage to the hull; and

3 In addition to what is provided for in the preceding two items, the situation where safety or navigation of a ship was obstructed.

<Category of marine accident and incident>

Marine accident and incident to be investigated		Type of marine accident and incident
Marine accident	Damage to ships or other facilities involved in ship operation	Collision, Grounding, Sinking, Flooding, Capsizing, Fire, Explosion, Missing, Damage to facilities
	Casualty related to ship structures, equipment or operations	Fatality, Fatality and injury, Missing person, Injury
Marine incident	Navigational equipment failure	Loss of control (engine failure, propeller failure, rudder failure)
	Listing of ship	Loss of control (extraordinary listing)
	Short of fuel or fresh water required for engine operation	Loss of control (fuel shortage, fresh water shortage)
	Grounding without hull damage	Stranded
	Obstruction of ship safety or navigation	Safety obstruction, Navigation obstruction

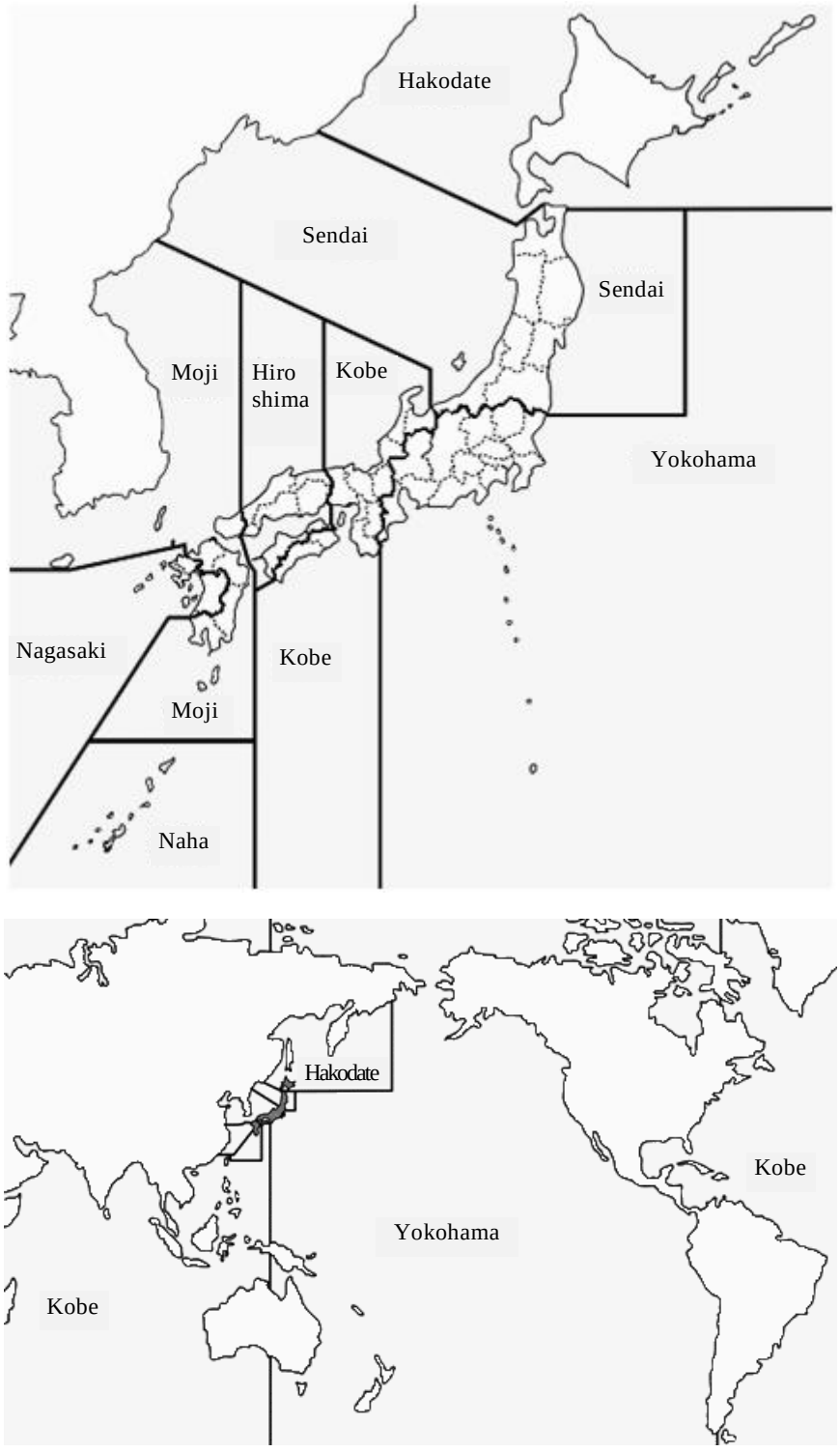
2 Procedure of marine accident/incident investigation



* Provisions of the Act for Establishment of the Japan Transport Safety Board after it came into effect in June 2020

3 Jurisdiction of the Offices over marine accidents and incidents

For the investigation of marine accidents and incidents regional investigators are stationed in the regional offices (eight offices). Our jurisdiction covers marine accidents and incidents in the waters around the world, including rivers and lakes in Japan. The regional offices are in charge of investigations in the respective areas shown in the following map. Marine accident investigators in the Tokyo Office (Headquarters) are in charge of serious marine accidents and incidents.



Jurisdiction map

4 Role of the Offices and Committees according to category of accident and incident

Serious marine accidents and incidents are investigated by the marine accident investigators in the Headquarters, and are deliberated in the Marine Committee. However, particularly serious accidents are deliberated in the General Committee, and extremely serious accidents are deliberated in the Board.

Non-serious marine accidents and incidents are investigated by regional investigators stationed in the eight regional offices, and deliberated in the Marine Special Committee.

(For the deliberation items of the Board and each Committee, refer to page 2 of the Appendixes)

<table>
<tr><td>Serious marine accidents and incidents</td><td>Office in charge of investigation: Marine accident investigators in the Headquarters
Committee in charge of deliberation and adoption: Marine Committee</td></tr>
<tr><td colspan="2">Definition of “serious marine accidents and incidents”.
•Cases where a passenger died or went missing, or two or more passengers were severely injured.
•Cases where five or more persons died or went missing.
•Cases involved a vessel engaged on international voyages where the vessel was a total loss, or a person on the vessel died or went missing.
•Cases of spills of oil or other substances where the environment was severely damaged.
•Cases where unprecedented damage occurred following a marine accident or incident.
•Cases which made a significant social impact.
•Cases where identification of the causes is expected to be significantly difficult.
•Cases where essential lessons for the mitigation of damage are expected to be learned.</td></tr>
<tr><td>Non-serious marine accidents and incidents</td><td>Office in charge of investigation: Regional investigators in the regional offices
Committee in charge of deliberation and adoption: Marine Special Committee</td></tr>
</table>

5 Statistics of investigations of marine accidents and incidents (As of end of February 2020)

The JTSB carried out investigations of marine accidents and incidents in 2019 as follows:

In 2019, 599 accident investigations had been carried over from 2018, and 836 accident investigations were newly launched. Besides, 838 investigation reports were published in 2019, and thereby 596 accident investigations were carried over to 2020.

Moreover, 87 incident investigations had been carried over from 2018, and 221 incident investigations were newly launched in 2019. Futhermore, 162 investigation reports were published in 2019, and thereby 145 incident investigations were carried over to 2020.

Among the 1,000 investigation reports published in 2019, one was issued with recommendation and one was issued with opinions.

Investigations of marine accidents and incidents in 2019

(Cases)

Category	Carried over from 2018	Launched in 2019	Not applicable	Transferred to Tokyo Office	Total	Publication of investigation report	(Recommendations)	(Safety recommendations)	(Opinions)	Carried over to 2020	(Interim report)
Marine accident	599	836	△1	0	1,434	838	(1)	(4)	(1)	596	(1)
Tokyo Office (Serious cases)	21	23	0	3	47	23	(1)	(4)	(1)	24	(1)
Regional Offices (Non-serious cases)	578	813	△1	△3	1,387	815				572	
Marine incident	87	221	△1	0	307	162	(0)	(0)	(0)	145	(0)
Tokyo Office (Serious cases)	1	1	0	1	3	2	(0)	(0)	(0)	1	(0)
Regional Offices (Non-serious cases)	86	220	△1	△1	304	160				144	
Total	686	1,057	△2	0	1,741	1,000	(1)	(4)	(1)	741	(1)

Note 1. The figures for “Launched in 2019” includes cases which occurred in 2018 or earlier, and which the JTSB was notified of in 2019 as subjects of investigation.

Note 2: The column “Not applicable” shows the number of cases which did not come under the category of accident or incident as defined in Article 2 of the Act for Establishment of the Japan Transport Safety Board.

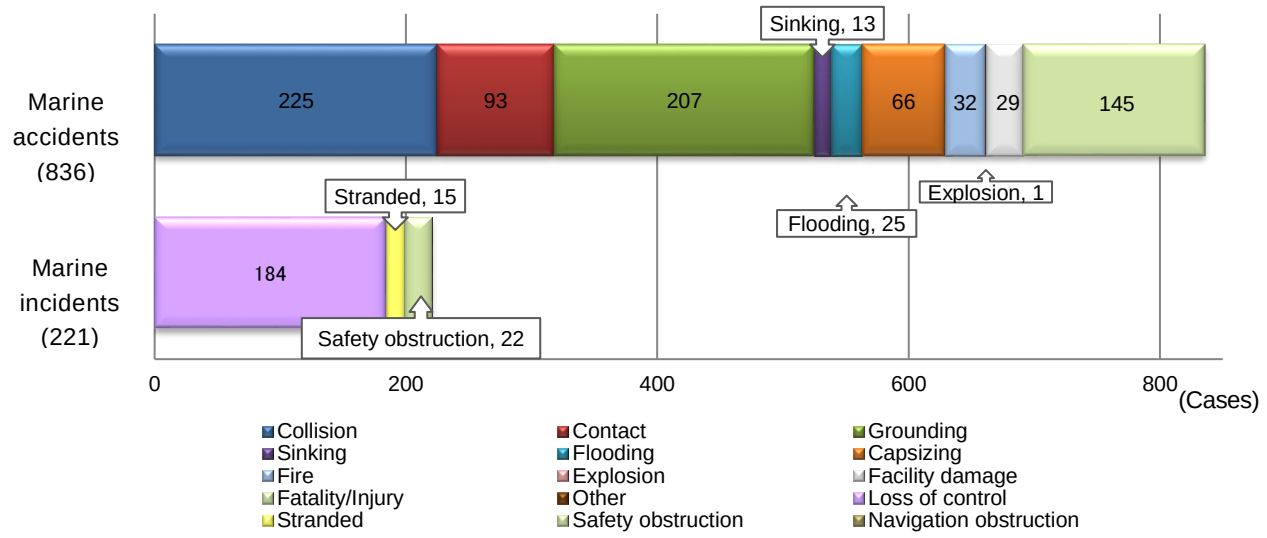
Note 3: The column “Transferred to Tokyo Office” shows the number of cases where the investigation found out that it was serious and the jurisdiction was transferred from the regional office to the Tokyo Office.

6 Statistics of investigations launched in 2019 (As of end of February 2020)

(1) Types of accidents and incidents

The breakdown of the 1057 investigations launched in 2019 by type of accidents and incidents is as follows: The marine accidents included 225 cases of collision, 207 cases of grounding, 145 cases of fatality/injury (not involved in other types of accidents), and 93 cases of contact. The marine incidents included 184 cases of loss of control, 22 cases of navigation obstruction, and 15 cases of stranded. The objects of contact were breakwaters in 20 cases, quays in 18 cases, and piers in 12 cases.

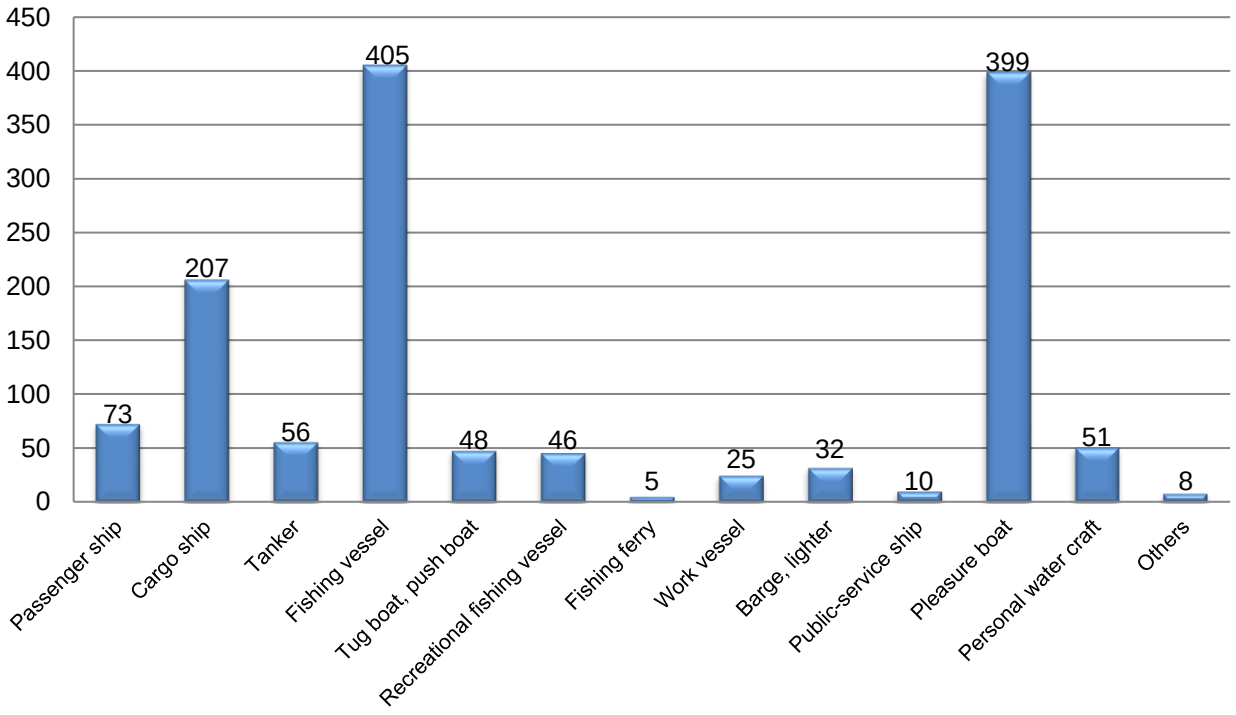
Number of investigated marine accidents and incidents by type in 2019



(2) Types of vessels

The number of vessels involved in marine accidents and incidents was 1,365. By type of vessel, they included 405 fishing vessels, 399 pleasure boats, 207 cargo ships, 73 passenger ships, and 56 tankers.

Number of vessels involved in marine accidents and incidents by type in 2019



The number of foreign-registered vessels involved in marine accidents and incidents was 56, and they were classified by accident type as follows: 31 vessels in collision, eight vessels in contact and seven vessels in grounding. As for the flag of vessels, 16 vessels were registered in Panama, 10 vessels in Republic of Korea, six vessels in Bahamas.

Number of foreign-registered vessels by flag

(Vessels)

Panama	16	Belize	4	Singapore	2
Republic of Korea	10	Sierra Leone	4	Marshall Islands	2
Bahamas	6	Antigua and Barbuda	3	Others	9

(3) Number of casualties

The number of casualties was 548, consisting of 99 deaths, 24 missing persons, and 425 injured persons. By type of vessel, 171 persons in passenger ships, 166 persons in fishing vessels and 107 persons in pleasure boats. By type of accident, 419 persons in contact, 145 persons in fatality/injury, 100 persons in collision, 30 persons in grounding, and 28 persons in capsizing.

With regard to the number of persons dead or missing, 77 persons were involved in fishing vessel accidents, 20 persons in cargo ship accidents, 20 persons in pleasure-boat accidents, indicating dead or missing cases occurred frequently in fishing vessels.

Number of casualties (marine accident)

(Persons)

2019										
Vessel type	Dead			Missing			Injured			Total
	Crew	Passengers	Others	Crew	Passengers	Others	Crew	Passengers	Others	
Passenger ship	0	0	0	0	0	0	9	156	6	171
Cargo ship	15	0	3	2	0	0	3	0	1	24
Tanker	0	0	0	0	0	0	2	0	0	2
Fishing vessel	55	0	1	20	0	1	86	0	3	166
Tug boat, push boat	0	0	0	0	0	0	4	0	0	4
Recreational fishing vessel	1	1	0	0	0	0	7	17	1	27
Fishing ferry	0	0	0	0	0	0	0	1	0	1
Work vessel	0	0	0	0	0	0	4	0	0	4
Barge, lighter	0	0	1	0	0	0	0	0	1	2
Public-service ship	0	0	0	0	0	0	5	0	0	5
Pleasure boat	9	0	10	1	0	0	26	1	60	107
Personal water craft	2	0	0	0	0	0	13	0	18	33

Others	1	0	0	0	0	0	0	0	1	2
Total	83	1	15	23	0	1	159	175	91	548
	99			24			425			

※ The figures above include accidents under investigation and therefore are subject to change depending on the course of investigations and deliberations.

7 Summaries of serious marine accidents and incidents which occurred in 2019

The serious marine accidents which occurred in 2019 are summarized as follows: The summaries are based on information available at the initial stage of the investigations and therefore are subject to change depending on the course of investigations and deliberations.

(Marine accidents)

1	Date and location	Vessel type and name, accident type
	March 9, 2019 Off the east of Himesaki, Sado City, Niigata Prefecture	Passenger ship GINGA Injuries to persons on board due to collision (floating objects in the water)
	Summary	The Vessel was boarded by the master, the chief engineer, and 2 other crew members. With 121 passengers on board, the Vessel was lifted above the sea surface by the lift of the hydrofoil. While proceeding westward at a speed of about 41.7 knots, the Vessel collided with floating objects in the water, and 108 passengers and one crew member were injured. * This case was investigated as a "particularly serious accident."
	Reference	Major activities in the past year (page 1), Feature 1 (1) (page 5)
2	Date and location	Vessel type and name, accident type
	January 6, 2019 Around 283 ° true, 1,400m from Light Beacon No. 8, West Route, Nagoya Port, Berth T1, Nabeta Wharf, Yatomi City, Aichi Prefecture	Container ship HARRIER (Bahamas) Fatality of a stevedore
	Summary	See "8. Publication of investigation reports " (page 127, No. 15)
3	Date and location	Vessel type and name, accident type
	January 17, 2019 Kikumoto No. 6 Berth, Niihama Port, Ehime Prefecture	Cargo ship ISHIZUCHI (Panama) Fatality of a worker
	Summary	While the ship was unloading cargo at Niihama Port, a worker was hit by a bulldozer in the hold and died.
4	Date and location	Vessel type and name, accident type
	January 20, 2019 Kashii Park Port, Hakata Port, Fukuoka City, Fukuoka Prefecture	Roll-On / Roll-Off Cargo ship CHURASHIMA Fatality of a worker
	Summary	On the vehicle deck during the loading of the container, a worker who was engaged in the guidance work was caught between the container loaded on the deck and the trailer moving backward and died.
5	Date and location	Vessel type and name, accident type
	January 28, 2019 Okinoshima Fishing Port, Omihachiman City, Shiga Prefecture	Passenger ship OKISHIMA Contact with a breakwater
	Summary	The Vessel, with the master, one onboard worker and nine passengers on board, departed from the floating pier at Okinoshima Fishing Port, and collided with the Ichimonji-tsutsumi in same fishing port. The one passenger, the master and the onboard worker on the Vessel were seriously injured, and seven passengers were slightly injured, and the bow section of the Vessel had hole.

6	Date and location	Vessel type and name, accident type
	March 11, 2019 Sea area east of Kinjo wharf in Nagoya Port	Oil tanker and chemical tanker EOS (Vessel A, Republic of Korea) Cargo ship AISHO NO. 8 (Vessel B) Collision
	Summary	While Vessel A was proceeding southward and Vessel B was proceeding northward, both vessels collided.
7	Date and location	Vessel type and name, accident type
	March 21, 2019 Off the southeast of Yokohama Route, Yokohama Area, Keihin Port	Container ship APL GUAM (Vessel A, USA) Container ship MARCLIFF (Vessel B, Antigua and Barbuda) Container ship HANSA STEINBURG (Vessel C, Liberia) Collision
	Summary	While Vessel A was proceeding northward and Vessel B was proceeding southward, both vessels collided. After that, Vessel B collided with Vessel C, which was anchoring.
8	Date and location	Vessel type and name, accident type
	March 27, 2019 Around 176.5 ° true, 1,140m from Kosuge third triangulation point, right bank of Arakawa River, Yanagihara, Adachi-ku, Tokyo	Houseboat HAMADAMARU No. 18 Fire
	Summary	See "8. Publication of investigation reports" (page 127, No. 14)
9	Date and location	Vessel type and name, accident type
	May 26, 2019 Off the south of Inubosaki, Chiba Prefecture	Cargo ship SENSHOMARU (Vessel A) Cargo ship SUMIHOMARU (Vessel B) Collision
	Summary	Vessel A and Vessel B collided off the south of Inubosaki, Chiba Prefecture
10	Date and location	Vessel type and name, accident type
	June 10, 2019 Tokyo No.3 Area, Keihin Port	Cargo ship PANSTAR GENIE (Vessel A, Republic of Korea) Tugboat DAITOMARU (Vessel B) Collision
	Summary	Vessel A and Vessel B collided.
11	Date and location	Vessel type and name, accident type
	June 26, 2019 Sea about 1,500m northeast of the north end of Koneshima, Onomichi City, Hiroshima Prefecture (Aoki-seto)	Cargo ship JK III (Vessel A) Minesweeper NOTOJIMA Collision
	Summary	While Vessel A was proceeding northeastward and Vessel B was proceeding southward, both vessels collided at Aoki-Seto.
12	Date and location	Vessel type and name, accident type
	July 22, 2019 Shallows near the west side of Nakatoshima, Imabari City, Ehime Prefecture	Cargo ship AZUL CHALLENGE (Panama) Grounding
	Summary	While the Vessel was navigating in the Nakasuido of the Kurushima Kaikyo Traffic Route under the guidance of the pilot, the Vessel grounded on the shallows near the west side of Nakatoshima.
13	Date and location	Vessel type and name, accident type
	August 11, 2019 Off the northwest of Nakagamijima Island, Misumi-machi, Uki City, Kumamoto Prefecture	Recreational fishing boat KOMPIRAMARU No. 3 Fishing boat EBISUMARU Collision
	Summary	See "8. Publication of investigation reports" (page 132, No. 23)

14	Date and location	Vessel type and name, accident type
	September 2, 2019 In Akashi Kaikyo Traffic Route	Car carrier GLOVIS COMPANION (Vessel A, Marshall Islands) Fishing vessel HIGASHIDAMARU (Vessel B) Collision
	Summary	Vessel A and Vessel B collided in the Akashi-Kaikyo Traffic Route.
15	Date and location	Vessel type and name, accident type
	September 9, 2019 Minamihonmoku Hama Road, Yokohama Area, Keihin Port	Cargo ship BUNGO PRINCESS (Panama) Contact with a bridge
	Summary	The Vessel collided with Minamihonmoku Hama Road.
16	Date and location	Vessel type and name, accident type
	September 9, 2019 Kita Wharf, Maizuru Port, Maizuru City, Kyoto Prefecture	Cargo ship FIRST AI (Republic of Korea) Fatality of a crew member
	Summary	While the Vessel was berthed at Kita Wharf in Maizuru Port, the boatswain was injured when his head was caught while the hatch was being closed, and he was confirmed to be dead at the hospital to which he had been transported.
17	Date and location	Vessel type and name, accident type
	September 17, 2019 About 610 km off the east of Cape Nosappumisaki, Nemuro City, Hokkaido Prefecture (the place of finding)	Fishing vessel KEIEIMARU No. 65 Capsizing
	Summary	The Vessel capsized after the loss of contact.
18	Date and location	Vessel type and name, accident type
	October 12, 2019 Off the Higashiogishima, Kawasaki City, Kanagawa Prefecture	Cargo ship JIA DE (Panama) Sinking
	Summary	The Vessel was anchored off the coast of Higashiogishima, Kawasaki City, but it was confirmed that it had sank to the sea bed on October 13.
19	Date and location	Vessel type and name, accident type
	October 24, 2019 Shimizu Port, Shizuoka City, Shizuoka Prefecture	Container ship SITC BANGKOK (Vessel A, Hong Kong) Container ship RESURGENCE (Vessel B, Bahamas) collision
	Summary	Vessel A and Vessel B collided in the Shimizu Port.
20	Date and location	Vessel type and name, accident type
	November 2, 2019 Off Matsuyama Port, Matsuyama City, Ehime Prefecture	Recreational fishing boat KAZUMARU No.3 Grounding
	Summary	The Vessel grounded on a rock off the coast of Matsuyama Port.
21	Date and location	Vessel type and name, accident type
	November 16 ,2019 Sea around 3 km west-northwest from Wakayama-honko Offshore South Breakwater Lighthouse, Wakayama City, Wakayama Prefecture	Cargo ship ORANGE PHOENIX. Fatality of a crew member
	Summary	A third officer who was working around a lifeboat set up about 5 meters above the deck of the ship that was anchored off the Wakayama Port, died from falling on the deck .
22	Date and location	Vessel type and name, accident type
	December 2, 2019	Passenger ship NANKYU No.10

	Off the Northwest of Nejime Port, Minami-Osumi Town, Kagoshima Prefecture	Injury of a passenger
	Summary	After leaving Nejime Port, the hull of the Vesse was shaken and nine passengers were injured off the northwest coast of the Port.

(Marine incidents)

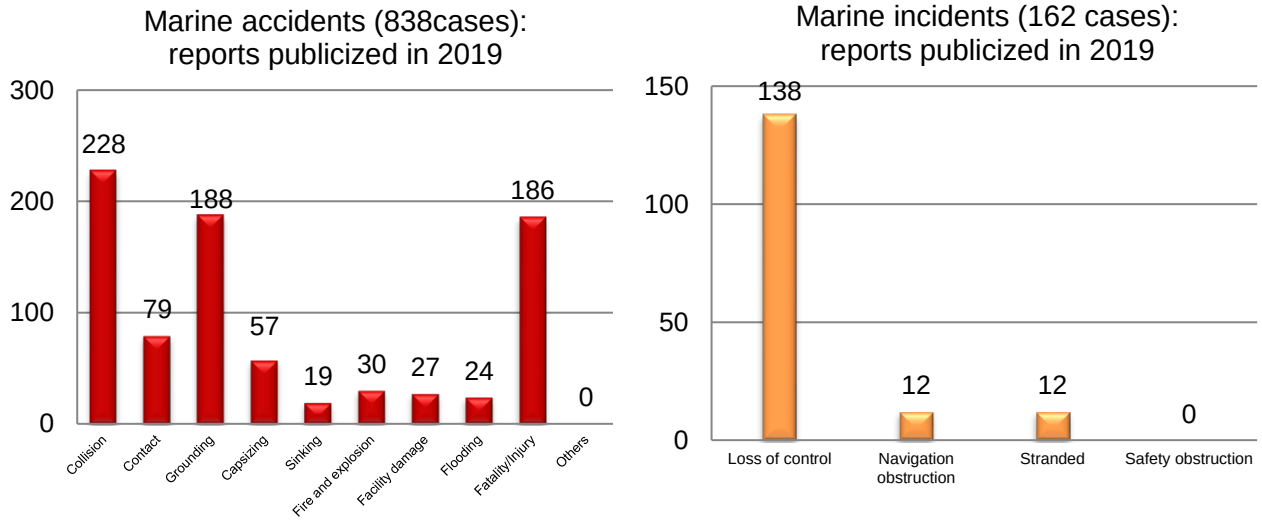
1	Date and location	Vessel type and name, incident type
	April 4, 2019 Sea about 770m east of Port Island, Nagoya Port	Container ship WAN HAI 316 (Singapore) Stranding
	Summary	WAN HAI 316 that was proceeding from the Asuka Wharf of the Nagoya Port toward the Yokkaichi Port stranded on the seabed off the east coast of the Port Island of the Nagoya Port.

8 Publication of investigation reports

The number of investigation reports of marine accidents and incidents published in 2019 was 1000, consisting of 838 marine accidents (among them, 23 were serious) and 162 marine incidents (among them, two were serious).

Breaking them down by type, the marine accidents included 228 cases of collision, 188 cases of grounding, 186 cases of fatality/injury, and 79 cases of of contact. The marine incidents included 138 cases of losses of control, (136 cases of navigational equipment failure, two cases of listing), 12 cases of navigation obstruction, and 12 cases of stranded.

As for the objects of contact, 20 were quays, 11 were breakwaters, and eight were buoy.



The number of vessels involved in marine accidents and incidents was 1,298. Breaking them down by type, the marine accidents involved 369 fishing vessels, 246 pleasure boats, 165 cargo ships, 56 passenger ships and 48 tankers. The marine incidents involved 67 pleasure boats, 35 fishing vessels, 28 cargo ships, and eight passenger ships.

Number of vessels by type involved in marine accidents and incidents for which reports were publicized in 2019

(Vessel)

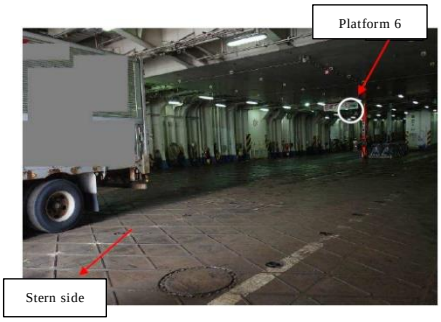
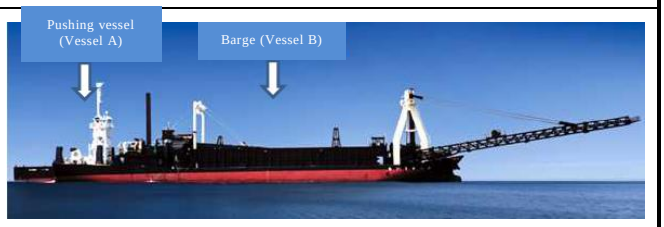
Classification	Passenger ship	Cargo ship	Tanker	Fishing vessel	Tug boat, push boat	Recreational fishing vessel	Fishing ferry	Work vessel	Barge, lighter	Public-service ship	Pleasure boat	Personal water craft	Others	Total
Marine accident	56	165	48	369	56	42	7	14	40	17	246	58	11	1,129
Marine incident	8	28	9	35	8	2	2	3	6	0	67	0	1	169
Total	64	193	57	404	64	44	9	17	46	17	313	58	12	1,298
Composition Ratio %	4.9	14.9	4.4	31.1	4.9	3.4	0.7	1.3	3.5	1.3	24.1	4.5	0.9	100.0

The marine accidents and serious incidents which occurred in 2019 are summarized as follows:

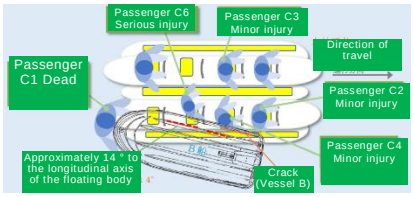
Marine serious accident reports published in 2019

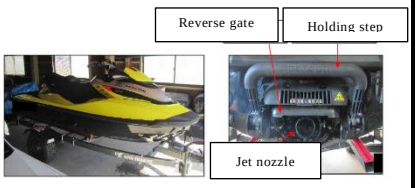
1	Date of Publication	Date and location	Vessel type and name, accident type
	February 28, 2019	April 2, 2018 Keihin port, Tokyo section 3, No. 10-1 Multi-purpose Terminal M-P	Training ship NIPPONMARU Fatality of a cadet
	Summary	While the training ship NIPPONMARU was moored at Keihin port, Tokyo section 3, No. 10-1 Multi-purpose Terminal M-P with the captain, one navigation officer, boatswain, and 49 crew taking 105 cadets onboard, around 14:25, April 2, 2018, during lay aloft training at the foremast, one of the cadets fell from the foremast to the superstructure deck and died.	
	Probable Causes	 It is probable that this accident occurred while the training ship NIPPONMARU was moored at Keihin Port Tokyo section 3, during lay aloft training at the foremast, a cadet who declared intent to abandon climbing from the top board to the gallant-top (gern board) was not equipped the life line and harness-typed safety belt which should be used for up/down and in-position works, when Cadet A came down from the top board to the superstructure deck, both of his legs were on the ratline, but both of his hands left the futtock shroud under the top board and he fell backward to the superstructure.at Keihin Port Tokyo section 3, during lay aloft training at the foremast, a cadet who declared intent to abandon climbing from the top board to the gallant-top (gern board) was not equipped the life line and harness-typed safety belt which should be used for up/down and in-position works, when Cadet A came down from the top board to the superstructure deck, both of his legs were on the ratline, but both of his hands left the futtock shroud under the top board and he fell backward to the superstructure. It is probable that the reason why a harness-typed safety belt for up/down and works in a position was not used is that the Japan agency of Maritime Education and Training for Seafarers and NIPPONMARU did not expect that they let a cadet declaring ceasing of lay aloft training down by himself. It is somewhat likely that the reason why both hands of the Cadet had left the futtock shroud is that the futtock shroud is an overhang, thus his arms were overworked However, since the Cadet died in this accident, it was not possible to establish a clear reason.	
	Report	http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0003e.pdf	
2	Date of Publication	Date and location	Vessel type and name, accident type
	February 28, 2019	September 18, 2018 Mitsubishi Naoshima wharf, Naoshima-cho, Kagawa Prefecture	Cargo vessel ERIK Fatality of a crew member

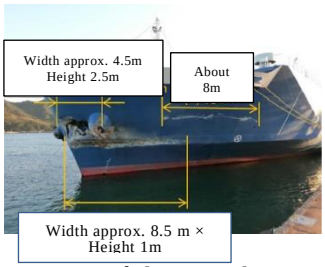
	Summary	While the vessel was moored at the Mitsubishi Naoshima wharf, with the master and 14 crew members on board, 4 crew members were performing the cleaning work of the upper hatch coaming of the cargo holds after unloading cargo, and an able seaman fell from the upper deck to the bottom floor of the cargo hold and dead. 	
	Probable Causes	It is considered probable that this accident occurred because Crew Member A who was working while being in an unstable posture on the Ladder fell forward and fell from the upper deck to the bottom of the cargo hold bottom when he doing the cleaning work while the vessel was moored at Mitsubishi Naoshima wharf. It is considered probable that the vessel carried out the cleaning work by the methods that differed from the Ladder guidelines of the CSWP, and that because there was nothing to support his upper body on the Ladder, Crew Member A was performing the cleaning work while being in an unstable posture on the Ladder. It is somewhat likely that Company A was insufficient in monitoring that the crew members clearly understood the Ladder guidelines of the CSWP and then applied and performed the Ladder guidelines in the cleaning work, because the vessel carried out the working methods being different from the Ladder guidelines in everyday work.	
	Report	http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0014e.pdf	
	Reference	Case Studies (page 156)	
3	Date of Publication	Date and location	Vessel type and name, accident type
	February 28, 2019	October 4, 2018 Off the north of Oshima, Munakata City, Fukuoka Prefecture	Recreational fishing boat SEIRYOMARU Fatality of a Fishing passenger
	Summary	While the Vessel was returning to Konominato Fishing Port, Munakata City, with one master and four passengers on board, one of the passenger fell into the water and died.	
	Probable Causes	It is probable that this accident occurred when the Vessel was shaken by the waves from the portside while returning to Konominato Fishing Port at night, Passenger A, who was not wearing a life jacket, fell into the water from the starboard side edge and drown due to the difficulty to keep his face above the water. 	
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-2-3_2018tk0018.pdf	
4	Date of Publication	Date and location	Vessel type and name, accident type
	February 28, 2019	April 5, 2018 Nishi-ku, Niigata Port, Niigata Prefecture	Passenger Ferry YUKARI Injury of a crew member
	Summary	While the Vessel, with the master and 31 other crew members on board, was loading vehicles on the south side quay of Yamanoshita Wharf, Nishi-ku, Niigata Port, Niigata City, Niigata Prefecture, the second officer, who was in charge of the working instruction on the vehicle deck, was injured seriously such as compartment syndrome of both lower legs because his feet was run over by the right rear wheel of a reversing trailer (with the head (vehicle towing the chassis) and the chassis connected).	

	Probable Causes	It is probable that this accident occurred as follows ; At night, while the Vessel was loading vehicles on the lower vehicle deck at the south berth at the Yamanoshita Wharf, the second officer, who was in charge of the working instruction, approached the rear of the Trailer, which was waiting near the stern gate, with his back facing up, and as the Trailer started to go astern, the second officer hit his feet on the right rear wheel of the Trailer.  It is probable that the reason why the second officer approached the rear side of the Trailer with his back facing up was that the second officer, who was the work leader, was not aware of the Trailer because he could not grasp the entire work while he was carrying out the ballast adjustment in progress of the loading work, and that he did not pay attention to the Trailer which was waiting near the stern gate because he was concerned about the truck being guided to Platform 4 and was moving while watching the truck. It is probable that the reason why the Trailer started moving backward was that the Driver thought that the Trailer had started to be guided when he saw the crew near Platform 6 and heard the whistle, although the crew had not started to guide the Trailer at the time of the accident, because Company A did not thoroughly instruct the crew to follow the Safe Operation Manual, such as guiding the vehicle using both the whistle and the hand signal at an appropriate distance from the vehicle, and some crew members started to guide the vehicle at a distance where the hand signal could not be confirmed by the driver.	
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-2-4_2018tk0017.pdf	
5	Date of Publication	Date and location	Vessel type and name, accident type
	March 28, 2019	August 22, 2017 Off the north-northeast of Yokoshima Island, Hirado City, Nagasaki Prefecture	Pushing Vessel AOIMARU No. 6 (Vessel A) Barge AOIMARU No. 8 (Vessel B) Sinking
	Summary	Vessel A, with the master and five other crew members were on board, formed a row of pushers (row of Vessel A) with Vessel B and anchored. During the salt removal work, the row of pushers leaned to the starboard side and sank. Three crew members of Vessel A died.	
	Probable Causes	It is probable that this accident occurred at night off the north-northeast of Yokoshima Island, while the row of Vessel A was anchored with its bow trimmed while carrying fine sand and salt-free water on board.  While the rows of Vessel A were carrying out salt-free work, bilge accumulated and Vessel A listed to starboard, which increased the list to starboard, overturned, lost buoyancy, and sank.	
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-3-1_2017tk0012.pdf	
6	Date of Publication	Date and location	Vessel type and name, accident type
	March 28, 2019	March 24, 2018 Off the south-southwest of Cape Ashizuri, Tosashimizu City, Kochi PrefectureOff the south-southwest of Cape Ashizuri, Tosashimizu City, Kochi Prefecture	Cargo ship GENIUS STAR VIII (Vessel A, Panama) Cargo ship TOKUHOMARU No. 11 (Vessel B) Collision

	Summary	Vessel A was drifting off the south-southwest of Cape Ashizuri, Tosashimizu City, Kochi Prefecture, with the master, the officer and 16 crew members on board. Vessel B, on the other hand, was proceeding east-northeast toward Tokyo Area, Keihin Port, with the master B and 4 crew members on board. Vessel B collided with Vessel A off the south-southwest of Cape Ashizuri. Vessel A had a hole, etc. on the port side rear hull and Vessel B suffered a collapse on the bow. There were no casualties on both ships.	
	Probable Causes	It is probable that in this accident, while Vessel A was drifting off the south-southwest of Cape Ashizuri for the purpose of time adjustment and Vessel B was proceeding east-northeast by autopilot, Master B, who was on the bridge watch alone, fell asleep Vessel B collided with Vessel A. It is probable that the reason why the Master B fell asleep was that the level of awareness was lowered because he had accumulated fatigue during the long-term boarding, because there were few ships around the Vessel, because he sat on a chair and was on duty with autopilot, and because he thought that the alarm would be activated even if he fell asleep. It is somewhat likely that the Bridge Navigational Watch Warning System of Vessel B detected the movement of the body and legs of Master B, who fell asleep, and therefore the alarm did not work. It is probable that this fact contributed to the occurrence of the accident.	
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-3-2_2018tk0019.pdf	
7	Date of Publication	Date and location	Vessel type and name, accident type
	March 31, 2019	April 8, 2018 Off the southeast of Kunisaki Port, Kunisaki City, Oita Prefecture	Chemical tanker GOLDEN SUNNY HANA (Republic of Korea) Explosion (cargo oil tank)
	Summary	While the Vessel with a master and 14 crew members on board, was proceeding southeast off the southeast of Kunisaki Port, Oita Prefecture, conducting cleaning work in a cargo oil tank, an explosion occurred in the cargo oil tank. Two of the Vessel's ordinary seamen were injured and her cargo oil tanks had holes and other damage.	
	Probable Causes	It is probable that the accident occurred when, as the Vessel was conducting the Circulation Work in the No. 2 port cargo oil tank and the No. 2 starboard cargo oil tank during cargo oil tank cleaning work while off the southeast of Kunisaki Port, Oita Prefecture, an explosion occurred in the No. 2 port cargo oil tank because steam was injected into the No. 2 port cargo oil tank under conditions in which a combustible gas mixture of vaporized pyrolysis gasoline and air in the explosive range was present. It is probable that the presence of the combustible gas mixture of vaporized pyrolysis gasoline and air in the No. 2 port cargo oil tank was not noticed because the gas concentration in the No. 2 port cargo oil tank was not measured prior to cleaning of the cargo oil tanks. It is somewhat likely that the combustible gas mixture was within the explosive range because flushing of the cargo lines and cargo oil tank bottoms was conducted under conditions in which ventilation and other measures were not implemented even though the gas concentration measurement taken after unloading was within the explosive range and approximately 30 liters of pyrolysis gasoline subsequently remained in both the No. 2 port cargo oil tank and the No. 2 starboard cargo oil tank, and the vaporized pyrolysis gasoline was not expelled outside, its gas concentration increased further with the passage of time, and it became mixed with air. It is probable that steam was injected into the No. 2 port cargo oil tank with the intention of raising the temperature of the seawater used in the work of repeatedly pumping up liquid collected on the cargo oil tank's bottom with a pump installed in the cargo oil tank and then spraying the liquid with the Cleaning Machine.	
	Report	http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0023e.pdf	
	Reference	Case Studies (page 153)	

<table>
<tr><td rowspan="4">8</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td>March 28, 2019</td><td>August 5, 2018
Off the west of Hokudan Murotsu Beach, Awaji City, Hyogo Prefecture</td><td>Personal water craft SJK Towed Floating Body (Vessel A)
Personal water craft No. 8 (Vessel B)
Collision</td></tr>
<tr><td>Summary</td><td colspan="2">While Vessel A, with a master and a watchman on board, was cruising for fun by towing a floating body called a 8-seater banana boat with seven passengers on board, and Vessel B, with a master on board, was cruising for fun , Vessel B and the floating body which was towed by vessel A collided off Hokudan Murotsu Beach, Awaji City, Hyogo Prefecture.
Among the person on board of the floating body, one person was killed, one person was seriously injured, and three persons were slightly injured. Scratch marks were produced on the right aft part of the floating body. In addition, the master of Vessel B was slightly injured, and cracks were produced on the gunnel part on the starboard aft part of Vessel B.</td></tr>
<tr><td>Probable Causes</td><td colspan="2"> 

In this accident, it is probable that while Vessel A was proceeding southwestward after towing a floating body called a 8-seater banana boat, while Vessel B was proceeding southwestward, the master of Vessel B turned to the left at a speed of about 40km/h and approached the floating body called a 8-seater banana boat in order to spray water, so that Vessel A and the floating body called a 8-seater banana boat were in front of Vessel B, and it was not possible to avoid though the control handle of Vessel B was turned full to the left, and Vessel B collided with the floating body called a 8-seater banana boat, off the west of Hokudan Murotsu Beach.</td></tr>
<tr><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-3-4_2019tk0005.pdf</td></tr>
<tr><td rowspan="4">9</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td>March 28, 2019</td><td>September 2, 2018
Off the east of Nihonmatsu Swimming Beach, Nagahama City, Shiga Prefecture (the northern part of Lake Biwa)</td><td>Personal water craft RXT-X260RS
Injury of passenger</td></tr>
<tr><td>Summary</td><td colspan="2">While the Vessel with one captain and two passengers(on the back seats) on board, was cruising back, a passenger who was sitting rear side of the back seats fell into the water toward the stern. She was recieved the jets of water discharged from the jet nozzle on the stern in the lower body opening, and she suffered serious injuries such as rectal injury.
 
</td></tr>
<tr><td>Probable Causes</td><td colspan="2">In this accident, while the Vessel was returning at a speed of about 60km/h with two passengers, who were wearing only swimsuits and life jackets without wearing wet suit bottoms, etc., on the rear seats off the east of Nihonmatsu Swimming Beach, Nagahama City, Shiga Prefecture, one pleasure boat and one personal watercraft passed across the bow of the Vessel from the right to the left, and when a sailing wave with a wave height of about 0.3m occurred ahead of the Vessel, the master thought that the Vessel would not be shaken so much even if the Vessel was climbing over the waves at the same speed, and the Vessel overcame the waves at a speed of about 60km/h. Therefore, the Vessel was shaken up and down. It is probable that the accident occurred when the passenger who was sitting fell into the water toward the stern and received the jets of water discharged from the jet nozzle on the stern in the lower body opening.</td></tr>
<tr><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-3-4_2019tk0005.pdf</td></tr>
<tr><td rowspan="2">10</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td>April 25, 2019</td><td>November 8, 2018 Mizushima Port, Kurashiki City, Okayama Prefecture</td><td>Cargo ship JFE VENUS
Collision (Breakwater)</td></tr>
</table>

	Summary	While the Vessel, with the master, chief engineer, and nine other crew members on board, was proceeding east-southeast in Mizushima Port, Kurashiki City, Okayama Prefecture, the diesel motor of the main power generator stopped, and the Vessel became uncontrollable due to a blackout (power failure). The Vessel collided with the Mizushima Port West No. 1 Breakwater. Although the hull of the bow of the Vessel was breached, no crew members were injured. The breakwater superstructure of the Mizushima Port West No. 1 Breakwater was collapsed. 
	Probable Causes	In this accident, it is probable that the Vessel collided with the Mizushima Port West No. 1 Breakwater with the steering device stopped and forward and reverse clutches of the main engine decelearator disengaged, because the diesel motor of the main power generator stopped and a blackout occurred while the Vessel was proceeding east-southeast in the Mizushima Port at night. It is probable that the reason why the diesel motor of the main power generator stopped and the blackout occurred was that the fuel oil in the service tank containing water was used without checking the condition of the drain by draining from the drain valve of the service tank for A heavy oil during the inspection before departure, and that this caused combustion failure or misfire in the cylinder of the diesel motor.
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-4-1_2018tk0021.pdf
11	Date of Publication	Date and location / Vessel type and name, accident type
	April 25, 2019	September 4, 2018 Kansai International Airport Access Bridge, Senshu Port, Osaka Prefecture Oil tanker HOUNMARU Collision (Bridge)
	Summary	When Typhoon No. 21 was approaching the Seto Inland Sea, including Osaka Bay, and a maritime typhoon warning was issued, the Vessel, with the master and 10 crew members on board, was anchored off the southeast of the Senshu Port. The Vessel was struck by strong wind which increased with the approach of the typhoon and being drifted to the north dragging the anchor pushed by the strong winds and waves. As a result, the vessel collided with Kansai International Airport Access Bridge. The deck on the starboard bow of the Vessel was crushed, and the road girder of Kansai International Airport Access Bridge was bent, broken, and scratched. The railway girder was collapsed, the rail was warped, and the gas pipe was broken. However, no crew members were injured.
	Probable Causes	In this accident, the Vessel continued single anchoring at the east side of the Oil Tanker Berth (hereinafter referred to as "the Anchorage") located on the southwest side of the Senshu Port in Osaka Prefecture, where Kansai International Airport Access Bridge is located about one nautical miles north of the southeast of the' Kansai International Airport First Stage Airport Island' (hereinafter referred to as "the Kanku Island") for the purpose of typhoon evacuation, under the condition that the Typhoon No. 21 was approaching and the maritime typhoon warning was issued in the Seto Inland Sea including Osaka Bay. In addition, the Vessel continued to anchor at the Anchorage due to the strong wind and waves caused by the approaching typhoon.Besides, once the drifting stopped by using the main engine so the master continued to hold the joystick in 

		the HOVER position as a ressult the Vessel was forced to drift down again and collided with Kansai International Airport Access Bridge under the condition that there was no sufficient distance to control the Vessel. It is probable that the reason why the Vessel anchored at the Anchorage, which is located about one nautical miles north of the southeast of the Kanku Island, was that the master thought that Typhoon No. 21 would pass the east side of the Anchorage and the left semicircle of the typhoon would enter the Anchorage, that the typhoon was traveling at a high speed and that strong wind would not blow for a long time, that the area was surrounded by the shore, that the seabed material was mud and the anchor would be highly effective, that other vessels were anchoring at the time of typhoon evacuation, that the next loading was planned to be carried out in the Sakai-Senboku Area of the Hanshin Port, and that he did not know the 2011 leaflet "Let's Prevent Anchor Dragging Maritime Accident ." and did not recognize to anchor avoiding the sea area within three nautical miles from the Kanku Island. It is probable that the reason why the Vessel kept single anchoring at the Anchorage was that the master thought that the double anchoring would be entangled when the wind direction changed and the mooring force would decrease, and that the master had the experience of using the main engine to cope with the typhoon wind. It is probable that the master set the joystick in the HOVER position because he thought that the anchor was stopped when the GPS speed over the ground indicated on the radar became zero, and that the Vessel would move forward if the joystick was in the forward position. It is probable that the reason why the Vessel was drifted down again that, under the situation where the forward thrust was lost due to the dispersion of the propeller thrust while the joystick was kept in the HOVER position, the anchor chain left the seabed with the increase of the water depth due to the high tide, the mooring force decreased, and the wind pressure on the hull and the wave drifting force increased. It is somewhat likely that Hinode Shipping Co., Ltd. and Tsurumi Sunmarine Co., Ltd. were involved in the occurrence of this accident because they did not provide the master with confirmation of the rough anchoring, information on the typhoon and information on the anchorage, and did not discuss the safe operation.
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-4-2_2018tk0013.pdf http://www.mlit.go.jp/jtsb/ship/p-pdf/MA2019-4-2-p.pdf (Explanatory Material)
	Reference	Major activities in the past year (page 2), Feature 1 (3) (page 7) Chapter 1 (page 21), Case studies (page 154)
12	Date of Publication	Date and location / Vessel type and name, accident type
	June 27, 2019	March 18, 2018 The Kantama South Light Buoy, west of the Akashi Strait Passage Passenger ferry FERRY FUKUOKA II Collision (Light buoy)
	Summary	The Vessel, with the master and 21 other crew members and 487 passengers on board, collided with the Kantama South Light Buoy while drifting in the western sea area at the west exit of the Akashi Strait Passage for the purpose of handing over the sudden illness that had occurred on board to the patrol craft of the Japan Coast Guard. The starboard propeller blades of the Vessel fell off, but no one was injured. The floating structure of the south light buoy of Kantama caused a broken hole, etc.
	Probable Causes	In this accident, it is probable that the Vessel, in the sea area west of the west exit of the Akashi Strait Passage, drifted to carry out the work of passing over the one passenger (hereinafter referred to as "the Patient"), who were lying in a state of stupor due to convulsions, to the Japan Coast Guard Patrol Craft NUNOBIKI (hereinafter referred to as "the Passing Work") at night, and while the Japan Coast Guard Patrol Craft NUNOBIKI was trying to go to the portside, the Vessel was drifted to the vicinity of the Kantama South Light Buoy due to the current, and collided with the Light Buoy because the Vessel could not secure a safe distance to pass the 

<table>
<tr><td></td><td></td><td colspan="2">Light Buoy.
It is probable that the reason why the Vessel could not secure the distance to safely pass the Kantama South Light Buoy when the Vessel was pushed down toward the vicinity of the buoy by the tidal current was as follows :
(1) The master of the Vessel was not able to continuously confirm the relative position between the Vessel and the Kantama South Light Buoy, and he did not notice the change in the direction in which the Vessel was being drifted, because he paied attention to the Passing Work. Therefore, he thought that the Vessel might pass through the south side of the Light Buoy, although he was concerned about the proximity to the Light Buoy.
(2) The master of the Vessel had been anxious to disembark the Patient as soon as possible because the time had passed since the occurrence of the sudden illness patient, and he was thinking of continuing the Passing Work as much as possible.
(3) When the master of the Vessel decided to operate the wing angle in order to obtain forward thrust in order to secure the distance from the Kantama South Light Buoy, he operated the wing angle step by step, because he had concerned about the influence of the rapid operation of the wing angle on the Japan Coast Guard Patrol Craft NUNOBIKI.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-6-1_2018tk0002.pdf</td></tr>
<tr><td>13</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td></td><td>June 27, 2019</td><td>May 4, 2018
South off Hanshin Port, Kobe Area</td><td>Container vessel NYK VENUS(Vessel A ,Panama)
Container vessel SITC OSAKA(Vessel B, Hong Kong)
Collision</td></tr>
<tr><td></td><td>Summary</td><td colspan="2">While Vessel A, with the Master, 26 other crew, three other persons and a pilot on board, was turning toward the south entrance of Rokko Island East Coast of Kobe Area of Hanshin Port from the north-eastward under guide by the Pilot, container Vessel B, with the Master and 17 other crew on board, was proceeding toward in the direction of north west for the south entrance of Kobe Chuo Passage. Both vessels collided in the vicinity of Kobe Rokko Island East Waterway Central Floating Lighted Buoy.
Vessel A caused damage at the starboard side bow, and Vessel B caused damage at the accommodation spaces on the port side stern, but there were no casualties in both vessels.</td></tr>
<tr><td></td><td>Probable Causes</td><td colspan="2">It is probable that the accident occurred because, while Vessel A was traveling northeastward and turning left toward the south entrance of East Waterway and Vessel B was traveling northwestward toward the south entrance of the Kobe Chuo Passage, Pilot of Vessel A thought that Vessel A was able to to pass by the stern side of Vessel B and thus continued to navigate while turning left, while Master of Vessel B, thinking that Vessel B was able to pass by the bow side of Vessel A, continued to proceed northwestward, as a result of which both vessels collided.
 
 
It is probable that the Pilot thought that Vessel A was able to pass by stern side of Vessel B and continued to navigate while turning left because, Vessel A was slowing down even though turning left, in addition, by observing the relative orientation of Vessel A and B with his eyes,the Pilot overestimated that Vessel A would be able to pass by Vessel B's stern side and was not aware of the risk of collision with Vessel B.
It is probable that Master of Vessel B continued to proceed northwestward, thinking that the Vessel B would be able to pass by the bow side of Vessel A because, by observing Vessel A'straveling direction and from the radar’s predicted course, he thought Vessel A would maintain the course of travel.
It is probable that the fact that Vessel A and B were not communicating information by VHF in early stage of the encounter, for example letting each other know the course their own vessel was taking, contributed to the occurrence of this accident.
It is considered somewhat likely that the fact that the Pilot and Vessel A's crew were not having verbal communication in regard to maneuvering their own vessel and the movement of the other vessel and Master of Vessel A did not keep to lookout because of focusing his attention</td></tr>
</table>

		on the meeting about entering the port, also contributed to the occurrence of the accident.	
	Report	http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0004e.pdf	
14	Date of Publication	Date and location	Vessel type and name, accident type
	June 27, 2019	March 27,2019 Right bank of the Arakawa River in Yanagihara, Adachi-ku, Tokyo	Houseboat HAMADAMARU No. 18 Fire
	Summary	While the Vessel was moored at a mooring facility on the right bank of the Arakawa River in Yanagihara, Adachi-ku, Tokyo, with a master and three employees on board, a fire occurred from the kitchen. One employees of the Vessel suffered minor injuries and the hull was burnt (total loss).	
	Probable Causes	 It is probable that this accident occurred as follows : While the Vessel was moored at a mooring facility on the right bank of the Arakawa River and preparing for night operations, tempura oil, which left after the food materials had been deep-fried in an aluminum alloy pan (hereinafter referred to as "the Pan"), continued to be heated by a commercial gas stove on the portside of the kitchen (hereinafter referred to as "the Stove"), and the oil reached the ignition temperature, and the fire spread from the kitchen to the bow of the Vessel. It is probable that the reason why the tempura oil, which had left after deep-frying the food materials in the Pan, continued to be heated on the Stove was that the employee in charge of cooking felt sleepy after the completion of cooking on the Stove and wanted to take a break as soon as possible, and that the fire on the Stove was hidden in the Pan and the gas cock was hidden in the simple cooking table, and so that the employee was not conscious of extinguishing the fire on the Stove and left the kitchen.	
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-6-3_2019tk0010.pdf http://www.mlit.go.jp/jtsb/ship/p-pdf/MA2019-6-3-p.pdf (Explanatory Material)	
15	Date of Publication	Date and location	Vessel type and name, accident type
	July 25, 2019	January 6, 2019 T1 berth of Nabeta wharf, Yatomi City, Aichi Prefecture	Container ship HARRIER (Bahamas) Fatality of a stevedore
	Summary	While the Vessel was moored at the T1 berth of Nabeta wharf, with the master and 17 crew members on board, 7 stevedores were loading containers to the vessel, and a stevedore who was serving as assistant wireless signal person and communicating the conditions of unloading and loading containers by radio apparatus got caught between two containers and dead.	
	Probable Causes	 The accident occurred when a 20 ft container (hereinafter referred to as "the Container") was moored at the berth. It is probable that the accident occurred as follows : After the Container was loaded and landed on the Vessel by gantry crane (the GC) of Quay 1 of Unit 2, and the Container was wound up at a speed of 3 notches without being separated from the spreader. As a result, the Container swung to the stern and then to the bow due to the impact of the Container being suddenly pulled out of the midlock, and Stevedore A was caught between the Container and another container loaded on the bow. It is probable that the gantry crane operator A, when the Container was loaded on the Vessel and landed on the Vessel at the GC, did not notice that the spreader that the spreader had not been separated from the Container and rolled up the spreader, because the Operator A, having received the radio communication, was conscious of the work contents of the next process. It is somewhat likely that Stevedore A, when the Container was loaded and landed on the Vessel, heard it by radio and approached the bow side of the Container because he had a role	

<table>
<tr><td></td><td></td><td colspan="2">to operate the twist lock at the bottom of the Container on the bow side, and when the Container swung to the bow side, Stevedore A was caught between the containers loaded on the bow side.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2019tk0007e.pdf</td></tr>
<tr><td>16</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td></td><td>July 25, 2019</td><td>June 20, 2018
Off the east of Inubosaki, Choshi City, Chiba Prefecture</td><td>Fishing vessel KORYOMARU No. 68
Flooding</td></tr>
<tr><td></td><td>Summary</td><td colspan="2">While the Vessel was proceeding westward toward Kesennuma Port, Miyagi Prefecture, with the master, the chief fisherman, and 16 other crew members on board, a large wave continued to be received on the portside bow, and the bow warehouse flooded.
The chief engineer and two deck members were injured.</td></tr>
<tr><td></td><td>Probable Causes</td><td colspan="2">It is probable that this accident occurred at night while the Vessel was sailing westward in the sea off the east of Inubosaki, where a marine storm warning was issued and there were winds and waves from southwest to west and waves from south to southwest, the portside bow was continuously subjected to large waves and seawater accumulated on the upper deck of the portside bow,and so that the bow subsided and the bow of portside became more inclined to the left, and the port bow as submerged and the bow warehouse was flooded from the entrance.
  </td></tr>
<tr><td></td><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-7-2_2018tk0005.pdf</td></tr>
<tr><td>17</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td></td><td>August 29, 2019</td><td>June 17, 2017
Off the southeast of Irozaki, Minamiizu Town, Shizuoka Prefecture</td><td>Container ship ACX CRYSTAL (Vessel A, Philippines)
Missile destroyer warship USS FITZGERALD (Vessel B, USA)
Collision</td></tr>
<tr><td></td><td>Summary</td><td colspan="2">The Vessel A, with a master, a second officer, an able seaman and 17 crewmen on board, proceeding to northeast in the southeast off Irouzaki, Minamiizu town, Shizuoka Prefecture for Tokyo zone of Keihin port, and the Vessel B, with a commanding officer, three watch officers, an able seaman, and 288 crewmen on board, proceeding to south in the southeast off Irouzaki, collided.
 

Seven crews died and three crews were injured on board the Vessel B, which was flooded as a result of having holes and other damage in the starboard midship front shell, and the Vessel A had curve and other damage in the port bow bulwark.</td></tr>
<tr><td></td><td>Probable Causes</td><td colspan="2">It is probable that in this accident, at night, in the southeast off Irouzaki, while the Ship A was navigating for the northeast and the Vessel B was navigating for the south, the Vessel B navigated while keeping the course and speed without proper lookout for the Vessel A because the attention was paid to an ocean-going container ship, which navigated parallel in the north of the Vessel A, and the Vessel A navigated while keeping the course and speed, and therefore this accident was caused by the collision of the both vessels.
It is somewhat likely that Vessel B, because the fact that the ocean-going container ship approached the starboard bow side of the Vessel B and Radar information of the Vessel A were not surely obtained, paid attention to the ocean-going container ship, which navigated parallel in the north of the Vessel A, and was not properly on the lookout for the Vessel A.
It is probable that the Vessel A, because daylight signalling lamp were emitted to theVessel B and it was expected that the Vessel B would recognize them and avoid the Vessel A, navigated</td></tr>
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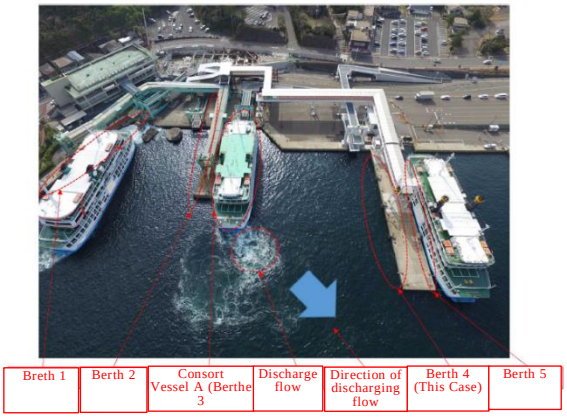
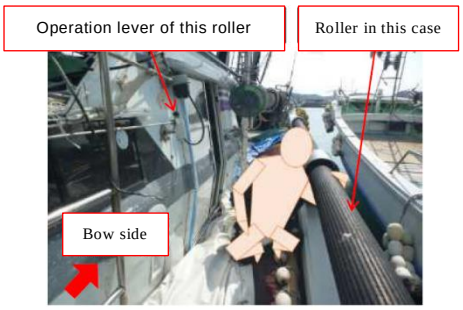
<table>
<tr><td></td><td></td><td colspan="2">while keeping the course and speed.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2017tk0009e.pdf
http://www.mlit.go.jp/jtsb/ship/p-pdf/MA2019-8-1-p.pdf, (Explanatory Materials)</td></tr>
<tr><td rowspan="4">18</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td>August 29, 2019</td><td>July 28, 2018
Sakurajima Port, Kagoshima City, Kagoshima Prefecture</td><td>Passenger Ferry SAKURAJIMAMARU No. 18
Collision (quay)</td></tr>
<tr><td>Summary</td><td colspan="2">The Vessel, with the master and 8 crew members, carrying 171 passengers and 55 vehicles on board, collided with the northeast end of Berth No.4 at the Sakurajima Port Ferry Terminal in Kagoshima City, Kagoshima Prefecture, while approaching the Berth No.4.
Two passengers were seriously injured, 15 passengers and two onboard salespersons were slightly injured, and the fender structure on the starboard bow of the Vessel was dented.
The Berth No.4 had a defect at the northeast end.</td></tr>
<tr><td>Probable Causes</td><td colspan="2">In this accident, it is probable that, while the Vessel was approaching Berth No.4 of the Sakurajima Port Ferry Terminal under the circumstance where discharging flow caused by propellers of the Consort Vessel at the Berth No.3, flowed from left to right on the course of the Vessel, the bow of the Vessel was pushed to the right by the water flow therefore the master set the propellers on both sides fully astern, but the starboard bow collided with the northeast end of Berth No.4 because he could not stop the coasting of Vessel.
 

It is probable that the reason why the bow of the Vessel was pushed to the right was that the Consort Vessel was pushing herself against the Berth No.3 by running the propellers on both sides, and the strength of the discharging flow generated from the propellers on the Consort Vessel was stronger than the discharging flow generated only from the propeller on one side, which is the usual way.
It is probable that the reason why the Vessel could not stop the force to move her forward was that the master kept the Vessel close to Berth No.4 at a speed faster than the standard speed.
It is somewhat likely that the reason why the master kept the Vessel close to Berth No.4 at a speed faster than the standard speed was that the master was accustomed to maneuvering the Vessel to approach Berth No.4 at a speed faster than the standard speed.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-8-2_2018tk0010.pdf</td></tr>
<tr><td rowspan="3">19</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td>August 29, 2019</td><td>September 14, 2018
Off the west of Oshima Island, Amakusa City, Kumamoto Prefecture</td><td>Fishing vessel SEIRYOMARU No.3
Injury of a crew member</td></tr>
<tr><td>Summary</td><td colspan="2">While the vessel with the chief fisherman, the master and 3 other crew members on board, was anchoring off the west of Oshima Island, Amakusa City, Kumamoto Prefecture and was hauling the net, the chief fisherman was caught in a side roller and was seriously injured.</td></tr>
</table>

<table>
<tr><td></td><td>Probable Causes</td><td colspan="2">It is probable that this accident occurred while the Vessel was anchoring off the west of Oshima Island, Amakusa City at night, hauling the net by adjusting the winding of the net with the bow side and the stern side roller for gathering a school of the fish to the bow side and making the bottom of the net flat, the chief fisherman who wore rubber gloves tried to fix the net to the stern side roller while the stern side roller was rotating, and so that the fingertips of the rubber gloves on the left hand were caught between the hauling net and the stern side roller, and then the left arm was got caught in the stern side roller.
 

It is probable that the reason why the chief fisherman tried to fix the net to the stern side roller by himself was because the lifting of the net was proceeding by the stern side roller rather than the bow side roller, and because the bow side of the net became heavy due to the uneven distribution of the fish in the net therefore the crew members except the chief fisherman, who were working to lift the net into the ship by pushing the net to the top of the side roller rotating toward the stern side at the most aft work position, had moved toward the net with the bow side roller.
It is probable that the reason why the chief fisherman wore rubber gloves and tried to fix the net to the stern side roller while the stern side roller was rotating was that he was impatient because he wanted to return to the port as soon as possible and secure a pier with good conditions for landing because of good fishing and prolonged operation time, and that he was used to the work.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-8-3_2019tk0016.pdf</td></tr>
<tr><td></td><td>Reference</td><td colspan="2">Case Studies (page 156)</td></tr>
<tr><td>20</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
<tr><td></td><td>October 31 2019</td><td>May 5, 2018
Off the west of the Koshikijima Islands, Satsumasendai City, Kagoshima Prefecture</td><td>Fishing vessel SHOTOKUMARU No. 87
Sinking</td></tr>
<tr><td></td><td>Summary</td><td colspan="2">While the Vessel, with the master and seven crew members on board, was proceeding northeast toward the Mie Area of Nagasaki Fishing Port, Nagasaki City, Nagasaki Prefecture, the Vessel listed to the right in the sea area off the west of the Koshikijima Islands, Satsumasendai City, Kagoshima Prefecture and sank.
All eight crew members were rescued, but one was slightly injured.</td></tr>
<tr><td></td><td>Probable Causes</td><td colspan="2">In this accident, it is probable that while the Vessel was proceeding north-eastward off the western coast of the Koshikijima Islands with a full load of catches under the strong sea wind warning was issued at night, the sea water entered the icebreaker room as the cover plate came off due to the launching wave, resulting the state trimmed by bow, and the water accumulated on the deck due to the launching wave under the state of the stability of the Vessel was degraded caused the upper end of the bulwark on the starboard side of the bow became submerged in the sea surface and sea water came into the Vessel, and the Vessel sank due to the loss of buoyancy.
 
It is probable that the accumulated water on the deck due to the launching wave was generated because the cover plate of the icebreaker room came off due to the launching wave and seawater flowed into the same room, resulting the trimmed by bow.
It is probable that the cover plate of the icebreaker room came off because it was not fixed by a cover cloth, crosspiece, wedge or other fasteners and was not tightly sealed.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-10-1_2018tk0007.pdf</td></tr>
<tr><td>21</td><td>Date of Publication</td><td>Date and location</td><td>Vessel type and name, accident type</td></tr>
</table>

	October 31 2019	October 22, 2018 Oshima Bridge which spans Obatake Seto, Yamaguchi Prefecture	Cargo ship ERNA OLDENDORFF Collision (Bridge)
	Summary	The Vessel was proceeding east in Obatake Seto toward a privately-operated berth in Etajima City, Hiroshima Prefecture, with a master, a second officer and 19 other crewmembers aboard when she collided with Oshima Bridge. The Vessel received dents and other damage to three of her four cranes as well as a bent damage to her aft mast; however, there were no fatalities or injuries on the Vessel. Oshima Bridge suffered cracks, dents, and other damage to its girders; an inspection passage that was installed under its girders was broken and fell, and a water pipe was severed, causing a water outage that lasted for forty days affecting almost all of Suo-Oshima Town, Yamaguchi Prefecture; power cables, communication cables and others were severed as well.	
	Probable Causes	 It is probable that the accident occurred when, while the Vessel was proceeding east in Obatake Seto at night, she collided with Oshima Bridge because she proceeded under a bridge that she was unable to pass through at 'the heights above the water line at the time of the accident to the top of each cargo crane and the aft mast' (hereinafter referred to as "the height of crane and mast"). It is probable that the Vessel proceeded under Oshima Bridge which she was unable to pass through at the height of her cranes and mast because the Master of the Vessel approved the voyage plan, including the route from Onsan to Etajima by way of Obatake Seto, which was prepared by the Second Officer, without being aware of the height of Oshima Bridge, and the Master continued navigating while feeling uncertain about the bridge's height after getting close to the bridge. It is probable that the Master approved the voyage plan, including the route from Onsan to Etajima by way of Obatake Seto, which was prepared by the Second Officer, without being aware of the height of Oshima Bridge because the Master did not check the details of the route assuming that the former master had already checked it. It is probable that the Master continued navigating while feeling uncertain about the bridge's height after getting close to the bridge because he waited for a report from the Second Officer after the Master ordered the Second Officer to check the height of the bridge, and the Master was concerned that the Vessel would be pushed toward shore by the westerly current in the situation that the navigable width became narrower after she turned to starboard off the west of Kasasa Shima. It is somewhat likely that although the Company A specified the procedures of voyage planning, etc. in the Safety Management Manual, etc., the Master and the Second Officer were insufficiently aware of the importance of complying with them, a situation that contributed to the occurrence of this accident.	
	Report	http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0020e.pdf http://www.mlit.go.jp/jtsb/ship/p-pdf/MA2019-10-2-p.pdf (Explanatory Materials)	
	Reference	Case Studies (page 157)	
22	Date of Publication	Date and location	Vessel type and name, accident type
	December 19, 2019	October 1, 2018 Kawasaki section, Keihin Port, Kanagawa Prefecture	Cargo ship MARINA (Belize) Collision (Seawall)

	Summary	Under the situation where Typhoon No. 24 was approaching, while being anchored at an anchorage in Yokohama section, Keihin Port, a cargo ship, MARINA, with 12 crew members, including the master, dragged the anchor and drifted toward to the northeast, and collided with the seawall at Ogishima, Kawasaki section. MARINA suffered dents, etc. to her starboard stern. The seawall suffered collision damage, etc. 
	Probable Causes	It is probable that in the accident, while being anchored in ballast at Anchorage Y1 at the Keihin Port for the purpose of evacuating from the typhoon under the situation where, during nighttime, Typhoon No. 24 was approaching and a typhoon warning had been announced for the northern part of the waters of the Kanto Section, including Tokyo Bay, the vessel dragged anchor when wind waves caused by the typhoon increased because she continued riding at single anchor and that the master set the main engine to full ahead but the vessel could not achieve sufficient forward thrust and drifted toward and collided with the seawall.
	Report	http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0015e.pdf

23	Date of Publication	Date and location	Vessel type and name, accident type
	December 19, 2019	August 11, 2019 Off the north-northwest of Nakagamijima Island, Misumi-machi, Uki City, Kumamoto Prefecture	Recreational fishing boat KONPIRAMARU No. 3 (Vessel A) Fishing boat EBISUMARU (Vessel B) Collision
	Summary	Vessel A, with the master and five fishing passengers on board, was drifting for recreational fishing off the north - northwest coast of Nakagamijima Island, Misumi-machi, Uki City, Kumamoto Prefecture. On the other hand, Vessel B, with the master and a deckhand on board, was heading north to the fishing ground, off coast of Nakagamijima Island. Both vessels collided with each other. In Vessel A, one of the fishing passengers was killed, the master and four fishing passengers were injured, the starboard bulwark was damaged, the starboard side wall of the bridge was fractured, etc., and in Vessel B, the master was injured, and the hull of the portside bow was scratched, etc.	
	Probable Causes	In this accident, it is probable that, while Vessel A was drifting for recreational fishing off the north-northwest of Nakagamijima Island, Vessel B was heading north to the fishing ground, Vessel A was late in noticing Vessel B approaching Vessel A, and Vessel B continued navigating toward Vessel A while turning to the left, causing both vessels to collide.  It is probable that although Master A was keeping a lookout on the bow because he was aware that the fishing passengers were starting fishing on the bow deck, he did not look at the starboard stern and was late in noticing Vessel B approaching while turning to the left. It is probable that Master B did not notice that Vessel B was approaching Vessel A while turning to the left, because he was navigating, taking his hand off the steering wheel and facing the stern for work on the stern deck.	
	Report	http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-12-2_2019tk0018.pdf	

Marine serious incident reports published in 2019

1	Date of Publication	Date and location	Vessel type and name, incident type
	March 28, 2019	June 30, 2018 Off the north of Ainoshima Island,	Oil tanker TENSHOMARU No. 2 Loss of control (no fuel supply)

		Shingu-machi, Fukuoka Prefecture	
	Summary	While the Vessel, with the master and seven crew members on board, was proceeding east-northeast off the northern coast of Ainoshima Island, Shingu-machi, Fukuoka Prefecture, the diesel motor of the power generator was stopped and the Vessel's power supply was lost. As a result, the Vessel became unable to operate the main engine, and the Vessel became loss of control.	
	Probable Causes	 It is probable that this incident occurred at night when the Vessel was navigating east-northeast off the northern coast of Ainoshima Island, Shingu-machi, and the liquid level in the A heavy oil service tank dropped to the A heavy oil outlet. As a result, air was sucked into the fuel oil system of the diesel motor of the power generator and the supply of fuel oil became impossible, the diesel motor of the power generator stopped and the Vessel's power supply was lost, and the main engine could not be operated. It is probable that the reason why the liquid level of the A heavy oil service tank dropped to the outlet of the A heavy oil was that the lower part of the acrylic window on the liquid level indicator came off the frame of the liquid level indicator cover and the gap with the liquid level indicator plate became small, the indicator needle did not drop, the start switch of the A heavy oil transfer pump and the read switch for the low liquid level warning did not work, and the transfer pump did not start automatically. It is probable that the read switch for the low-level alarm did not work because it was interlocked with the indicator needle on the liquid level indicator and did not work in the same way as the switch for starting the A heavy oil transfer pump; therefore, it is probable that the crew was not informed of the abnormally low level of the A heavy oil service tank by the alarm.	
	Report	http://www.mlit.go.jp/jtsb/ship/rep-inci/2019/MI2019-3-1_2019tk0003.pdf	
2	Date of Publication	Date and location	Vessel type and name, incident type
	March 28, 2019	July 12, 2018 Takamatsu Port, Takamatsu City, Kagawa Prefecture	Passenger Ferry KONPIRA No.2 Loss of control
	Summary	While the Vessel was proceeding northward in Takamatsu Port, Takamatsu City, Kagawa Prefecture, with the master, 11 crew members, 46 passengers, and 49 vehicles on board, the air circuit breaker of the main switchboard operated and shut down, causing a blackout. The main engine stopped, and the air circuit breaker could not be turned on again, and the Vessel became loss of control. There were no casualties among the passengers and crew members of the Vessel, and there was no damage to the hull.	
	Probable Causes	In this incident, while the Vessel was proceeding northward in Takamatsu Port, there was a short circuit between the wiring of the electric circuit on the starboard side and the electric circuit on the portside of the receptacle for the refrigerater vehicle, in the connecting box on the vehicle deck. When a short circuit current flowed into both electric circuits and the molded case circuit breaker for the starboard side wiring of the receptacle for the refrigerater vehicle on the main switchboard operated and became disconnected, two of the branch line of bus bar for the copper band connected to the molded case circuit breaker for the refrigerater vehicle on the vehicle deck was broken and jumped off, and the short circuit between the phases that came into contact with the branch line of the bus bar for the copper band of the receptacle for the refrigerater vehicle on the vehicle deck and the ground fault with the wall surface of the main switchboard caused excessive damage to the bus bar of the main switchboard. It is probable that the air circuit breaker of the main switchboard operated and shut down, causing a blackout, the main engine stopped, and the air circuit breaker could not be turned on again. It is highly probable that the reason why there was a short circuit between the wiring in the	

		connecting box of the electric circuit on the starboard side and the electric circuit on the port side of the receptacle for the refrigerater vehicle was that the wiring was not secured, the wiring was rubbed in the connecting box of both electric circuits, the wiring coating was broken, and the lead wires contacted each other. It is probable that, when the molded case circuit breaker for wiring on the starboard side deck of the receptacle for the refrigerater vehicle on the vehicle deck was cut off, the two of the branch of bus bar that had been connected to the receptacle for the refrigerater vehicle on the vehicle deck were broken and jumped off because of a short circuit between the phases of the branch line of the bus strip that had been connected to the power supply side, which caused melting and bending due to electromagnetic repulsion, because an arc was generated inside the molded case circuit breaker for wiring on the starboard side deck of the receptacle for the refrigerater vehicle on the vehicle deck that had been cut off due to the flow of short-circuit current several times in the past.
	Report	http://www.mlit.go.jp/jtsb/ship/rep-inci/2019/MI2019-3-2_2018tk0008.pdf

9 Actions taken in response to recommendations and opinions in 2019

None was notified in 2019.

10 Provision of factual information in 2019 (marine accidents and incidents)

The JTSB provided factual information on three cases (marine accidents) to relevant administrative organs in 2019. The details are as follows.

(1) Provision of information concerning the prevention of fatal and injury accidents caused by trucks, forklifts, etc., on the vehicle deck

(Information provided on February 28, 2019)

1. Introduction

According to the accident investigation report released by the Japan Transport Safety Board from October 2008 to February 2019, there were 10 cases (10 vessels) of fatal and injury accidents involving trucks and forklifts on the car decks of passenger and cargo ferries. Five people were died, and five people were seriously injured when they were run over by large vehicles or caught between containers and side walls.

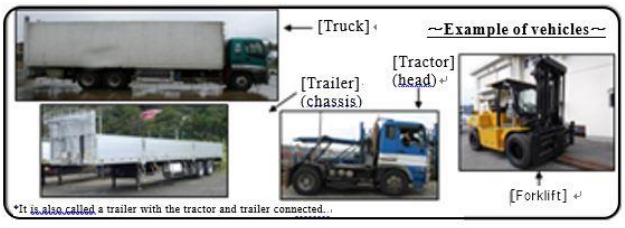
(The fatal accident in January 2019 in which a worker guiding a trailer was caught between the trailer and the container is under investigation.)

In order to load and unload vehicles in the following environments and in a short period of time, the vehicle deck may be equipped with a mixture of workers and vehicles, such as by guiding trucks, tractors, trailers, or moving forklifts.

(1) Many blind spots

(2) There is a sound.

(Noise from Vehicle Running, Air Blower, Truck Refrigerator, etc.)



(3) Parking spaces have structures (pillars, engine casings, etc.) and narrow.

(4) There is a shear (* 1) on the deck.

Also, the conditions for repeated daily work are always different due to the combination between workers and drivers, and changes in the environment.

By the way, according to the " Heinrich's law", "The 29 minor accidents and 300 incidents are behind one serious accident." In order to prevent the occurrence of serious accidents, let's check accidents that occurred in the past and near-miss incidents that did not lead to accidents, and strive to ensure safety.

* 1 :The shape of the deck warped upward in the longitudinal direction of the ship to improve wave resistance and drainage, and increase strength.

1

2. SHIPS, ACCIDENTS AND CASUALTIES

(1) Vessels: seven Passenger Ferries and three Cargo ships;

The gross tonnage is about 18,000 tons (the number of vehicles loaded: about 150 heavy-duty trucks and about 60 passenger cars) to about 1,000 tons, and the total length is about 200m to about 80m.

(2) Situation at the time of the accident:

On the driver's side: four cases while trucks, tractors and trailers were in operation, four cases while forklifts were in operation, etc.

Worker side: four cases while moving, one case while cargo handling, checking the loading condition, cleaning work, guiding, etc.

(3) Casualties: seven crew members and each of one passenger, stevedore and driver;

Accident date	Type	Gross tonnage(t)	Length over all(m)	Width (m)	Situation at the time of the accident		Casualty			
					Driver's side	Operator's side				
April, 2018	Passenger	18,229	199.9	26.5	Trailer moving backward	Moving	Navigator	Serious injury	Both lower leg compartment syndrome, fibula fracture, etc.	※ Refer to page 6 of the case studies
December, 2016	Cargo	2,502	121	16.5	Forklift moving forward	Moving	Navigator	Dead	Severe chest trauma	※ Refer to page 8 of the case studies
March, 2016	Cargo	13,950	173.34	26.6	Tractor moving backward	During cargo handling work	Stevedore	Serious injury	Renal trauma, lumbar spinous process fracture, etc.	
December, 2013	Cargo	999	89.52	13.5	Forklift moving forward	Checking the load	Navigator	Serious injury	Wrist fracture	
November, 2012	Cargo	13,539	182.29	27	Tractor moving backward	Moving	Deck member	Dead	Brain contusion	
May, 2012	Passenger	5,373	131.9	21	Other ※2		Passenger	Dead	Blood loss due to severe general injury	※2 A passenger suspected of having dementia of the Alzheimer's type, who was in the lower part of the vehicle, was hit by the vehicle when the freight vehicle was unloaded.
April, 2012	Passenger	1,867.80	79.76	14.3	Forklift moving backward	Washing moving	Deck member	Serious injury	Open lower leg fracture	
January, 2012	Passenger	3,555	86.01	15	Other ※3		Driver	Dead	Pelvic fracture	※3 When the chassis was unloaded, the driver who tried to return to the driver's seat of the trailer, which had started moving, was caught between the head and the sidewall.
November, 2010	Passenger	1,798	105.62	17	Forklift moving forward	Guiding	Navigator	Dead	Died by pressure(Injuries such as liver injury and thoracic transverse process fracture)	
January, 2009	Passenger	7,005	128.44	21	Track moving forward	Moving	Deck member	Serious injury	Pubis / ischium / sacral fracture	

3. Accident Causes, Factors, Examples and Preventive Measures

Let's look at the causes, factors, accident cases, and preventive measures for accidents during truck, tractor, and trailer operations and forklift operations, which were common conditions for accidents.

The causes of accidents include safety checks by workers and drivers, and actions related to communication between workers and drivers.

2

3-1. (1) Causes of accidents during operation of trucks, tractors and trailers

Main causes of accidents during operation of trucks, tractors and trailers.

○Items related to safety checks by workers and drivers

A guide is in a blind area of the vehicle, or the driver does not check the rear of the tractor when the vehicle is going backward.

○Matters related to communication between workers each other and between workers and drivers

The guide members did not take over the vehicle guidance, or driver started to move backwards when he or she heard the whistle, misunderstanding that the guide had started.

* Details are as shown in the table below.

Relevant person	Cause of accidents
Worker	The guide does not follow the instruction in the Safe Operation Manual, such as belows, The guide shall always pay attention to the movement of the surrounding vehicles; and the guide shall never enter the vicinity of a stopped or moving vehicle; as the guide shall guide the vehicle using both whistle and hand signals at an appropriate distance from the vehicle.
	Induction workers and cargo handling workers are in the blind spot of the vehicle and near the temporary storage space for the truck.
	The guides have not confirmed each other that they are in a safe place for the vehicle, and have not taken over the vehicle guidance by clearly indicating a signal such as a guide light.
	Some guides may start to guide the vehicle at a distance where the driver cannot confirm the hand signal.
	The work leader cannot hear the alarm sound (back buzzer) generated when the trailer moves backward due to the noise in the ship.
	The guide is not blinking the light emitting belt.
Driver	The driver misunderstands that guide has started when the driver hear the whistle, and start to move backward.
	The driver is paying attention to the proximity to the loaded vehicle while the vehicle is in reverse.
	When the driver leaned out from the right window of the tractor driver's seat and looked to the left rear of the tractor, the left side was the blind spot.
	The driver does not look back in reverse and does not use a rear-view mirror to check the rear of the tractor.
	The driver has not opened the window curtain at the rear of the tractor.

3

3-1. (2) Background of the Accident

Main background factors for accidents during truck, tractor, trailer operation and forklift operation.

○Matters related to safety management to be addressed by the entire organization

Operating company manuals, working environment, etc.

* Details are as shown in the table below.

Relevant Person	Cause of accidents
Operating company	The operator's manual is not strictly observed by stevedores.
	Training of newcomer stevedores on board is not provided.
	The speed limit on the vehicle deck was not specified in the figures such as the speed limit per hour, and it was indicated as "slow speed" on the inside wall.
Worker	Ship crew and shore workers are in charge of cargo handling, and shore workers are in charge of operation. In many cases, each one belongs to a different company.
	A single person may undertake multiple tasks, and multiple tasks may be performed in parallel. (Example 1 : The work leader was performing ballast adjustment; Example 2 : The moving work of the forklift truck and the cleaning work on the deck were carried out in parallel.)

	The stevedore was a newcomer on board.
	The crew of the ship were working on behalf of the shore workers, who are usually commissioned to handle cargo, on holidays when they do not come to the ship.
Driver	The driver doesn't know that there is a shear on the driver deck.
Working environment	There are many blind spots.
	There is noise. (Noise from Vehicles, Blowers, Truck Freezers, etc.)
	The sound is blocked. (The warning sound (back buzzer) of the tractor which goes backward by the earphone attached to one ear, etc. cannot be clearly heard.)
	The parking space is narrow with structures (pillars, engine casing, etc.).
	There is a shear on the deck.

4

3-1. (3) Accident prevention measures during operation of trucks, tractors and trailers

Operating company etc. [Safety management]

- ○Ensuring and Reviewing Compliance with Various Manuals
- ○Mutual understanding and information sharing between Workers and Drivers in Different Positions (Example：A Guide on the Front Passenger Seat of a Tractor, Experie the Sound of the Whistle and the Blind Spot of Public Relations)
- ○Instruction on Prohibition of from Crossing Near to the Front and Ba
- ○Sharing near miss events
- ○Education of New workers
- ○Setting and Display of Speed Limit on the Vehicle Deck
- ○Painting for Easy Identification of Structures
- ○Response for noise
- ○Education of New Workers
- ○Dissemination of the Safety Confirmation Map

Worker

[Safety check]
- ○Stay away from the vehicle
- Check the safety of the surroundings during wh
- l, such as being careful not to jump out.
- Equipment
- ○Guidance in a Safe Standing Position
- worsens

- ○Do not enter or create blind spots
- ○Approach to a Position Where Driver
- ○Clear Signals, ,combined use of Whistles and Guide Lights
- ○Recognition of Vehicle Deck Conditions (Noise, Blind Spot, Shear, etc.)
- ○Succession of Vehicle Guidance between Guides
- ○Operator Wearing a Light Emitting Vest Belt, Always Flashing

[Communication]
- ○Operator's Carrying of Radio

Replace as soon as sensitivity

Driver

[Safety check]
- ○Safety check driving conditions such as vehicle surroundings and direction of travel
- ○Operation at a Speed That Can Be Stopped Immediately and Safely
- ○Open the Driver's Seat Window and Check the Guide Whistle
- ○When moving backwards on the tractor, open the window curtain at the rear of the driver's seat and check the rear.

- ○The driver can make eye contact with the guide and start after confirming that the guidance has started.
- ○Clear signal, combined use of whistle and guide lights
- ○Checking the condition of the vehicle deck (noise,

[Communication]

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3-1. (4) Accident case Guidance of trailer

Occurred around 22:15, April 5, 2018

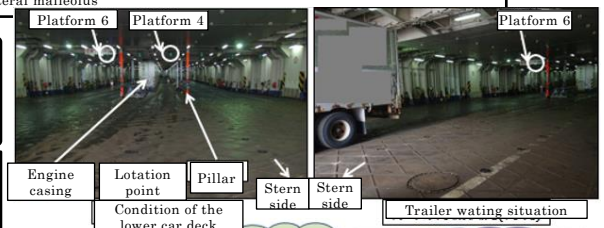
Ship Particulars：Gross Tonnage 18,229 tons, Length Over All × Width 199.90m × 26.50m
Summary of the accident：While the passenger ferry was loading a vehicle at the quay, the officer in charge of the operation was hit by the right rear wheel of the trailer moving backward with his legs.
Damage：Hospitalization for about 2 months due to compartment syndrome of both lower legs, peeling of right medial collateral ligament attachment, fracture of left fracture of fibula trunk and both fibula lateral malleolus

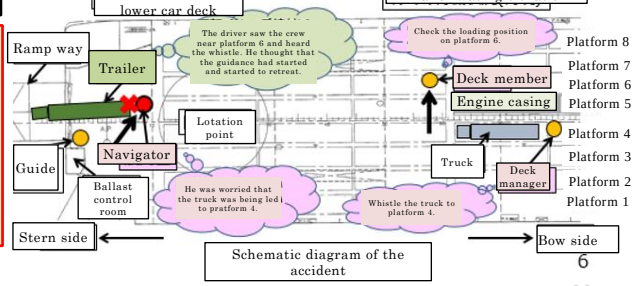
・Although the Officer had been instructed by the operating company not to enter the close range of the stopped vehicle, he was concerned about the truck leading to the Line 4 with the pillars and the engine casing after leaving the ballast control room. He was moving while looking at the truck. He did not pay attention to the waiting trailer, and approached the rear of the trailer while turning his back.
・The deckhands intended to approach and guide the trailer, and did not perform the whistle or hand signal, and did not start to guide the trailer.

・The driver knew that both a whistle and a hand signal were used to guide the vehicle. However, at the operating company, compliance with the Safe Operation Manual when guiding the vehicle was not thoroughly done to the crew members. Some crew members started to guide the vehicle at a distance where the driver could not confirm the hand signal. Therefore, the driver usually did not pay attention to the hand signal.

～Major Preventive Measures～
- ○A signal for starting guidance of a vehicle shall be given by using both a whistle and a guidance light (blue). [Safety check and communication]
- ○The crew members approached the driver to the point where they could make eye contact with him, and started to guide him using both a whistle and a guide light.。 [Safety check and communication]
- ○The driver started the vehicle after he was able to make eye contact with the crew and started the vehicle after the guide started using both a whistle and a guide light. [Safety check and communication]
- ○Instruct all onboard workers, including crew members, to prohibit vehicles from crossing near the front and back. [Safety management]
- ○In addition to work commanders and land guides, all crew members who carry out vehicle loading work are required to carry wireless devices to strengthen information sharing. [Communication]

※The operator took measures to prevent recurrence after the accident.





Schematic diagram of the accident

6

6

3-2. (1) Causes of accidents while operating forklifts

Major cause of accidents during forklift operation

○Safety Confirmation for Workers and Drivers

The guide is guiding the forklift from a position that is not visible to the forklift driver, the driver is not following the speed limit, etc.

○Communication between Workers and Drivers

The safety confirmation by the guide and the forklift operator is not done by the signal, etc.
※Details are as shown in the following table.

Relevant person	Cause of accidents
Worker	Stevedores do not understand the movement of the forklift and the blind spot from the driver's seat.
	The guide and the forklift operator did not check the safety of each other until the loading of the container was completed.
	The guide always guided the truck from a position not visible to the forklift operator.
	The guide always guided him by his voice without using the whistle.
Driver	A forklift has a dead angle due to a mast and a frame even when it is not loaded with cargo.
	The movement of the 10-feet container does not sufficiently visible ahead.
	The driver and the guide did not check the safety by the signal until the completion of the loading of the container.
	The driver is not following the speed limit.
	The driver did not notice the cargo handling work and the brake operation was delayed.

※See page 4 for background factors of the accident.

●The accident prevention measures during forklift operation are the same as the "accident prevention measures during truck / tractor / trailer operation" on page 5, and the specialized measures are "install a yellow rotating light behind the forklift driver's seat" (Operating company, etc. [Safety management]).

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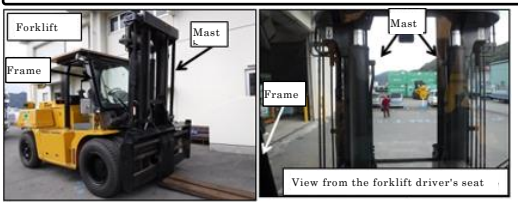
3-2. (2) Case of accident Loading and unloading of forklift

Occurred around 07:30, December 10, 2016

Ship Particulars : Gross Tonnage 2,502 tons, Length Over All × Width 121.00m × 16.50m
Summary of the accident : While the cargo ferry was unloading at the quay, Officer B jumped out of the sidewalk area near the air blower and contacted the moving forklift.
Damage : Officer B died of severe chest trauma.

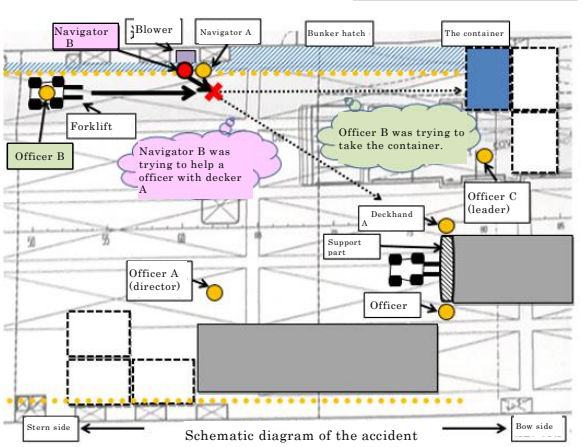


・Officer B did not understand that the movement of the forklift and existence of the blind spot from the driver's seat because he was about one month after he got on board.
・The vessel borrower did not provide appropriate education as stipulated in the regulations.
・Officer B did not notice that the forklift was approaching due to the noise from the air blower and other equipment.

・Although Worker B noticed that Officer B was near the air blower, Officer B entered the blind spot of the forklift and was traveling at a speed of about 17km/h. He did not notice that Officer B had jumped out of the sidewalk area, and the brake operation was delayed.

～Major Preventive Measures～
○The crew members shall, in principle, walk on the sidewalk area of the vehicle deck during the loading and unloading work using the forklift. They shall also accurately grasp the surrounding conditions and shall not protrude from the shadows of the cargo.
[Safety check]
○The forklift operator shall operate the forklift at a speed at which it can be stopped immediately when the forklift operator is travelling on the vehicle deck where a person is present. [Safety check]

※After the accident, the vessel's borrower and stevedores took measures to prevent recurrence.



Schematic diagram of the accident

8

4. Introduction of good job examples

Four companies, including Hankyu Ferry Co., Ltd. and Taiheiyo Ferry Co., Ltd., cooperated in the questionnaire regarding efforts to prevent accidents during cargo handling work.

(1) What items do you think are particularly important in order to prevent accidents?

① **Communication between the guide and the driver.** Accidents are reduced by common understanding of guidance signals and the location of inboard protrusions, etc., verbally or by movement.
② All crew members shall carry out all cargo handling work under the common recognition, and the workers shall use their five senses to predict danger. When they feel danger, they shall immediately share information and endeavor to prevent accidents.
③ Compliance with the manual
④ (i) Signals for guidance and stop by the whistle (the driver does not hear or not heard by the driver), (ii) Types of guide light by the guide (some are easy to see and others are difficult to see), (iii) Skills of the guide and the driver (There is a difference depending on skills)

(2) Are there opportunities for ship crews and shore workers to share accident cases and near miss events?

① Each near miss event shall be promptly reported to the Operation Manager and shared with relevant departments and companies. (Examples in which all employees, including crew members, are allowed to view information on the company LAN)
② Prior to the busy season (multi - customer season) in summer and winter, it shall be conducted between workers (ship crew and ground workers) and between workers and the company.

(3) Please inform us of the safety measures taken for cargo handling work.

① Information on the past contact of vehicles with onboard structures, etc. was compiled into a single "map" and distributed and shared to workers. Visually check the location of occurrence and problems.
② Safety cargo patrol by top management.

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4. Introduction of good job examples

(3) Please inform us of the safety measures taken for cargo handling work. (Examples of Hankyu Ferry Co., Ltd.)

① Vehicle guidance training on board
・Participation of a guide (ship crew) and a driver
・A guide sat in the front passenger seat of the tractor and experienced how to hear the whistle, and confirmed the blind spot in the rear (Photo A).
・The guide and the driver check the sway-width of the rear of the chassis (Photo B).
・Confirmation of the stopping distance of the vehicle (Photo C)


(A)


(B ①)


(C guided simultaneously)

(B ②)

②Painting the pillars on the vehicle deck
・Remodeling with coloring to make it easier for drivers to check.


Before


After

10

There have been 10 fatal and injury accidents involving trucks and forklifts on the vehicle deck since October 2008. Five of them were died and five were seriously injured. Eliminate accidents by implementing the following preventive measures.

〔Worker, Driver〕
○Operators are prohibited from crossing near the front and rear of the vehicle!
○Operators shall wear a light - emitting vest and the lamp shall flash continuously so as to be visible to the driver.
○The guide and the driver communicate with each other through eye contact, etc. The driver must start after confirmation and comply with the speed limit.
○A guide shall use a guide light in addition to a hand signal and a whistle to clearly guide.
〔Operating companies, etc.〕
○Mutual understanding and information sharing between workers and drivers in different positions
⇒ Example :A guide enters the front passenger seat of the tractor and experiences the sound of the whistle and the blind spot at the rear.
⇒ Example :Workers sit in the forklift driver's seat and experience the view
○Painting for easy identification of structures.
○Collect past unsafe information, create a safety confirmation map, and share information.

Some shipping companies have already implemented efforts to prevent accidents. It is hoped that the working environment will be improved by referring to the efforts of other companies.
～You can prevent "traffic accidents in a ship" by following the manual and "always check safety". Safe!～

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*Publication of this information is detailed on the website of JTSB.

http://www.mlit.go.jp/jtsb/iken-teikyo/s-teikyo15_20190228.pdf

(2) Provision of information on blackouts (loss of onboard power) that occur suddenly

(Information provided on April 25, 2019)

1. Introduction

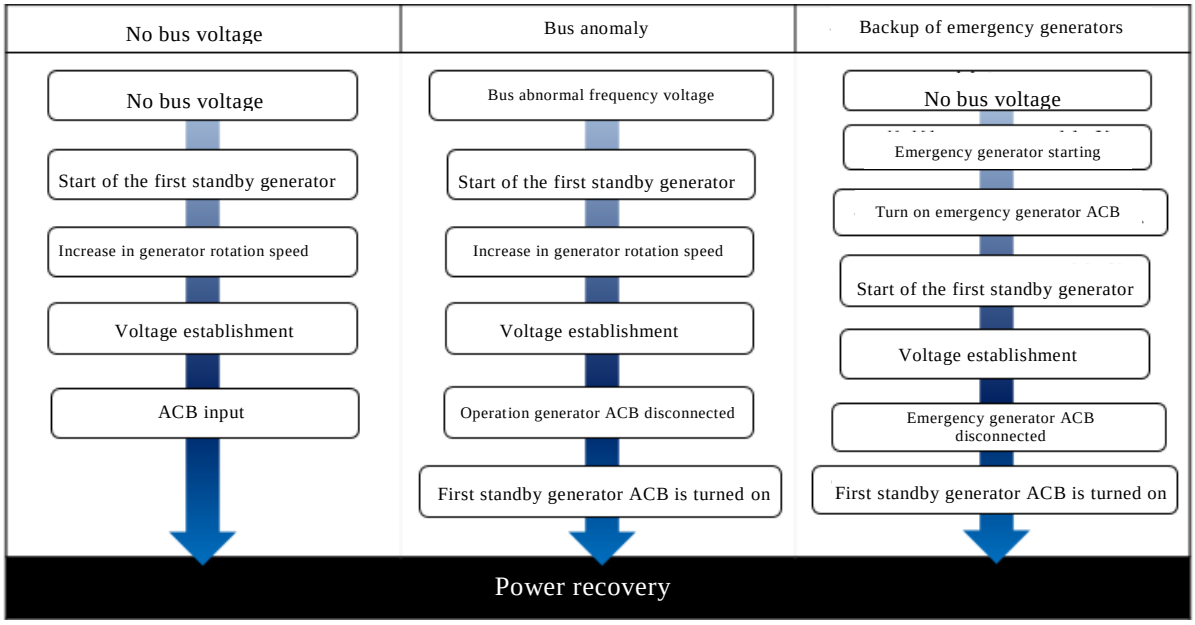
A loss of power on board a vessel (hereinafter referred to as "blackout") may occur suddenly, causing important equipment such as steering equipment to stop in a moment, resulting in a dangerous situation in which the vessel becomes uncontrollable, and then causing a collision, grounding, etc.

In the event of a blackout, at first, we should consider how to secure the onboard power supply and to restore the main engine and important auxiliary equipment in order to prevent the occurrence of accidents, rather than investigate the cause of it.

If there is a generator automation system, the standby generator is automatically started after the blackout and the onboard power supply is restored (see slide 3). However, there have been cases in the past investigations of Japan Transport Safety Board, could not immediately restore the onboard power supply or could not restore the onboard power supply at all due to a malfunction of the engine or system.

In this case, it is necessary to guide the ship to a safe place and to stop it, and it is important to check the equipment and train the crew on a daily basis.

When a blackout occurs, the system to restore the power supply in the ship will operate.



2. Statistical Data on Blackouts in Marine Accidents, etc.

The JTSB issued the following marine accident and incident investigation reports between October 2008 and November 2018.

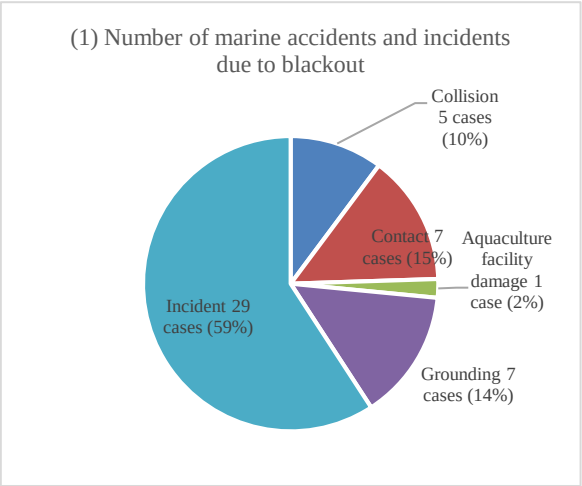
- Collision: 12 cases
- Grounding: seven cases
- Aquaculture facility damage : one case
- Incidents (engine failure, inability to supply fuel, navigation obstruct, etc.) : 29 cases

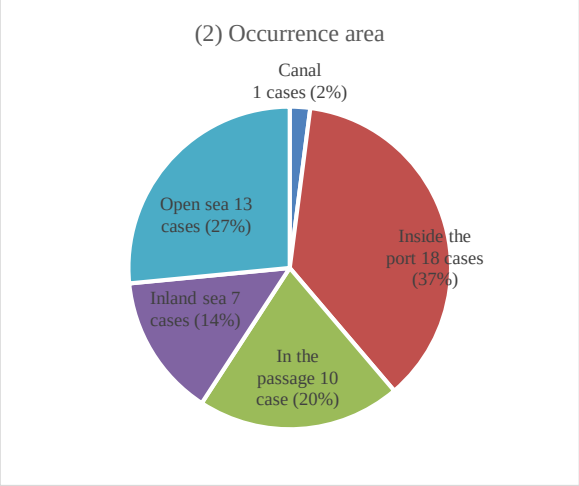
Characteristics and Risks of Blackouts

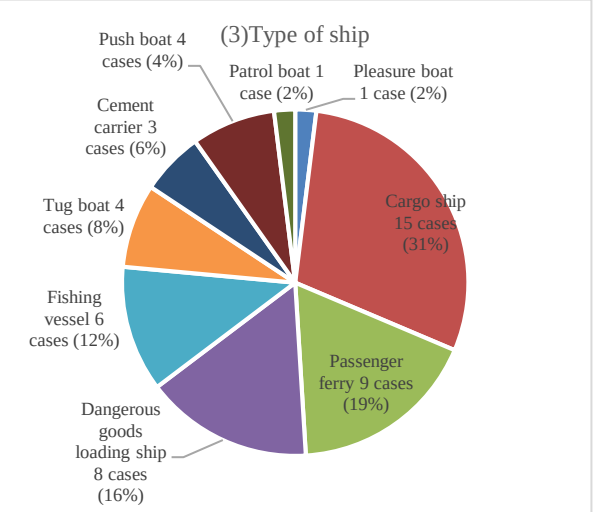
(1) There are various causes.

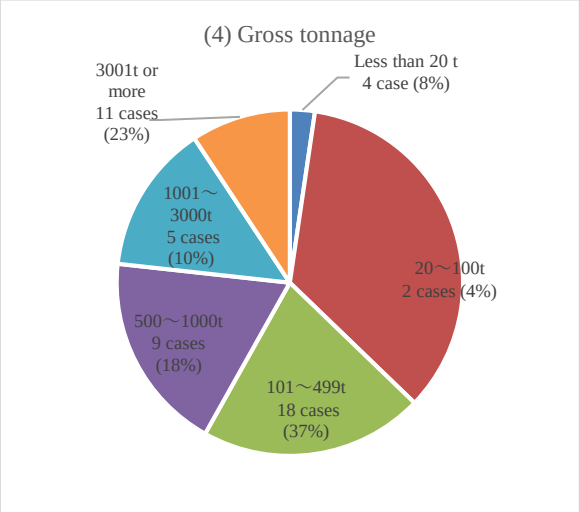
(2) It is difficult to predict when and where it will occur.

(3) If the accident occurs in the vicinity of a berth, shallow, or other vessel, it may cause an accident such as collision or landing.





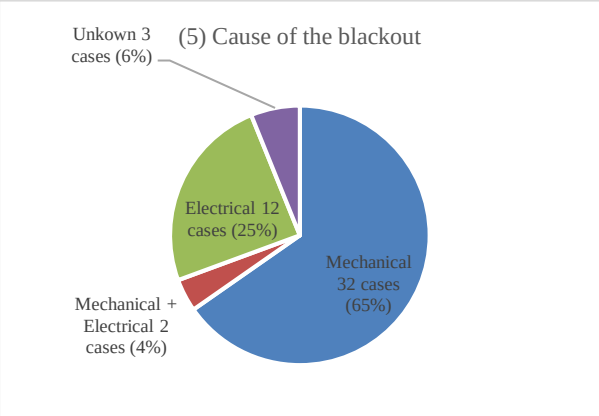


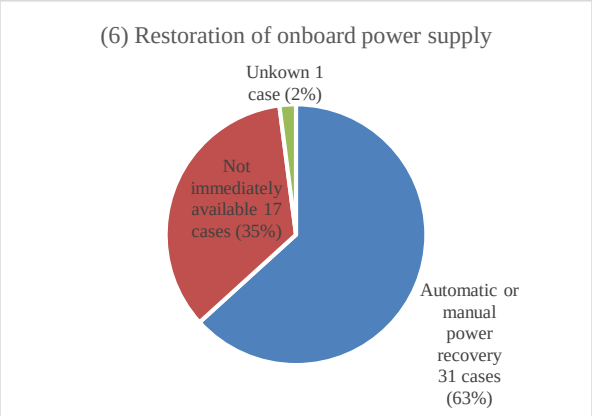


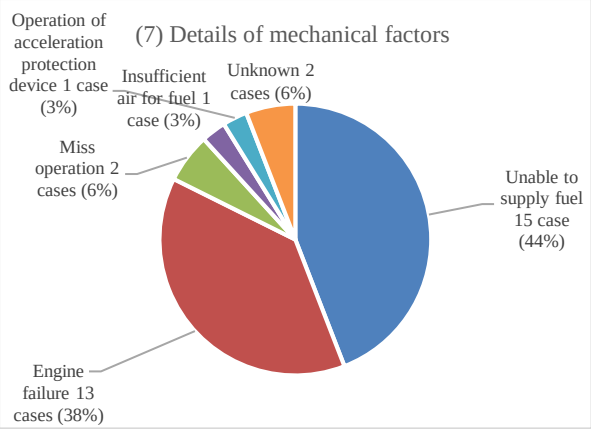
3. Classification of causes leading to blackouts

The causes of blackouts can be broadly divided into mechanical causes such as an abnormal stop of a generator motor, and electrical causes such as an air circuit breaker (ACB) trip.

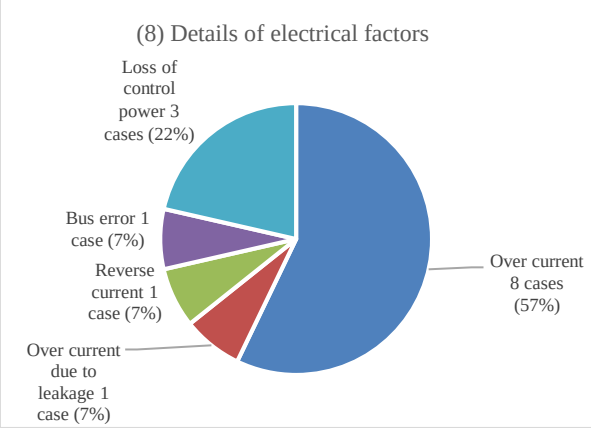
Abnormal stop of the generator motor	ACB trip
1. Activation of the prime mover protective device (emergency stop) (1) Overspeed (2) Oil pressure drop (3) Increase in cooling fresh water outlet temperature (4) Manual trip button operation 2. Fuel oil system failure (1) Fuel oil out (2) Fuel oil system pipe rupture (3) Blockage of Main Valve and Intermediate Valve (4) Contamination with a large amount of water (5) Strainer blockage 3. Malfunction of the moving part (1) Damage to the motor (2) Seizure of Rotating Parts and Sliding Parts	1. Activation of the ACB protective device (1) Overcurrent (Instantaneous, Short - limit, Long Time Limit) (2) Reverse power 2. Incorrect operation at ACB input 3. No bus voltage 4. Bus error (1) Voltage drop (2) Voltage rise (3) Frequency reduction (4) Frequency increase



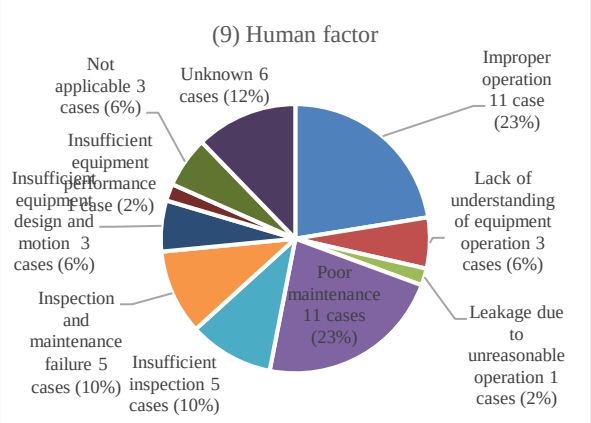




Characteristics of mechanical factors
① Fuel oil system factors (water contamination, sludge, valve closure, etc.) were the most common, and the onboard power supply could not be restored immediately.
② Among the engine failures, the failure of the shaft generator was caused by the power reduction of the generator, the combustion failure of the main engine, the abnormality of the coupling joint, etc.



Examples of electrical factors
① There are many cases where an overcurrent (short circuit, overload, etc.) flows and the air circuit breaker is disconnected.
② Loss of power supply due to out - of - synchronization caused by mode selection error during generator parallel operation.
③ Even when the generator started, there was a case in which control became impossible because the control power supply from the battery and 24 VDC was lost.



Example of human factors
① Overload due to excessive driving of winch
② Release the mode of the generator in the standby state in the route and clean the strainer.
③C Heavy oil is mixed into the A heavy oil tank due to erroneous operation of the valve (the check valve does not operate).
④ Connect the broken O-ring and use it in a strainer to inhale air.

4. Examples of blackouts

(1) The following is a case in which the onboard power supply could not be restored immediately after the blackout.

Oil tanker A (749 tons)

Incident: non - fueling drifting

① Location : Off the north of Fukuoka Prefecture (Shikanoshima Island)

② Operation status: Underway

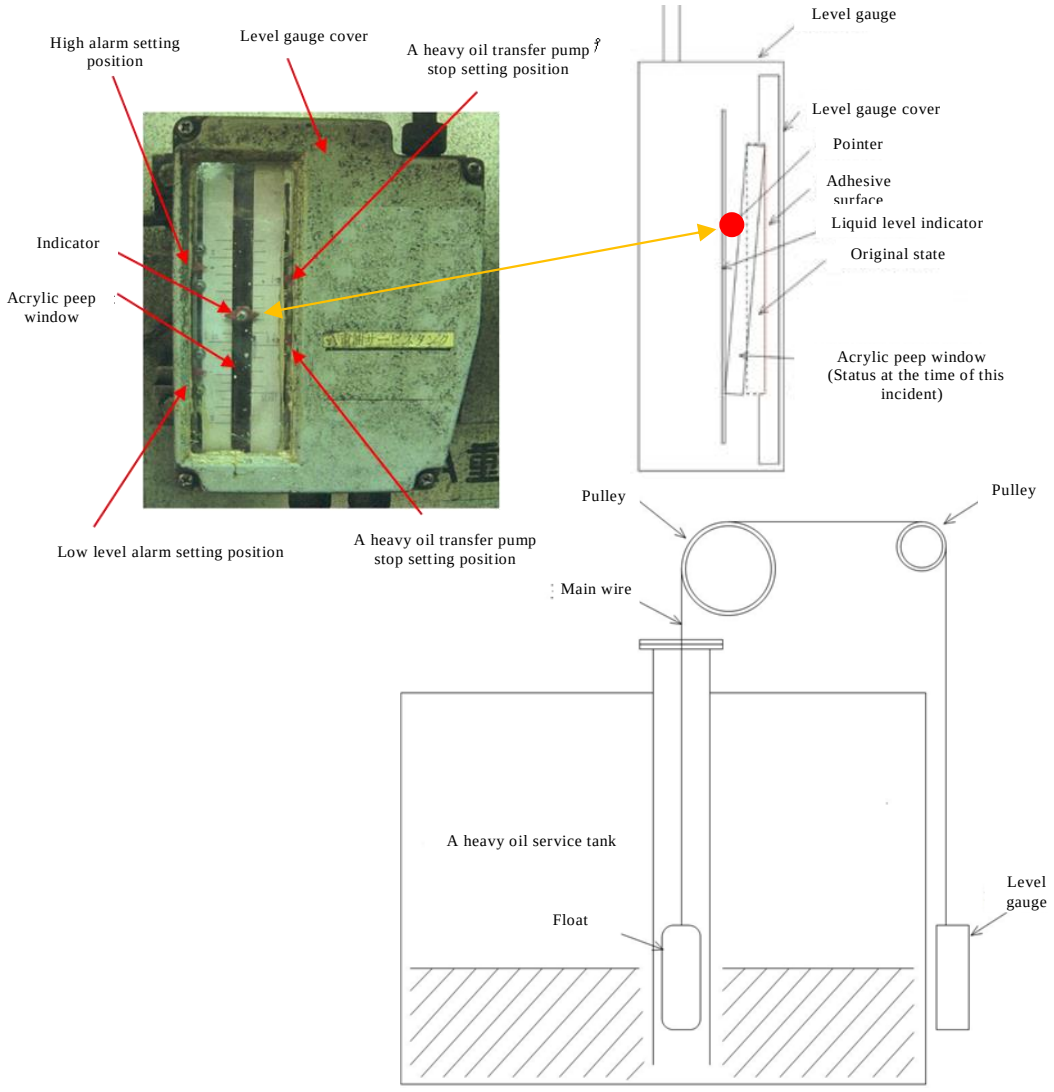
③ Cause of shutdown of the generator

The acrylic cover of the liquid level gauge came off and contacted the liquid level detection mechanism, and the liquid level down could not be detected. As a result, the fuel oil transfer pump did not start automatically, and the oil level in the fuel oil service tank decreased, and fuel supply became impossible.

④ Preventive measures

➢ Acrylic cover installed outside

➢ level indicator installed independently of pump and alarm



(2) The following is a case in which the onboard power supply could not be restored immediately after the blackout.

Passenger ferry B (3,633 tons)

Incident : Loss of power, emergency anchor

① Place of occurrence : Takamatsu Port, Kagawa Prefecture

② Operation status: Immediately after departure

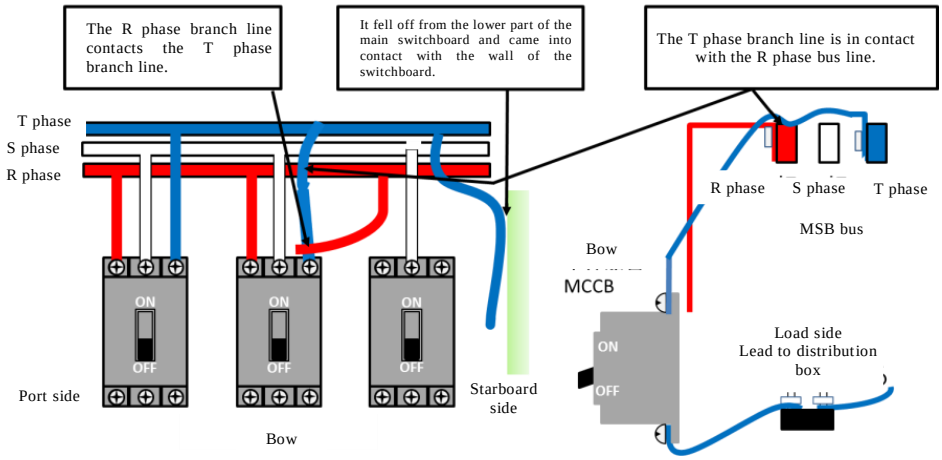
③ The reason why ACB could not be reinjected:

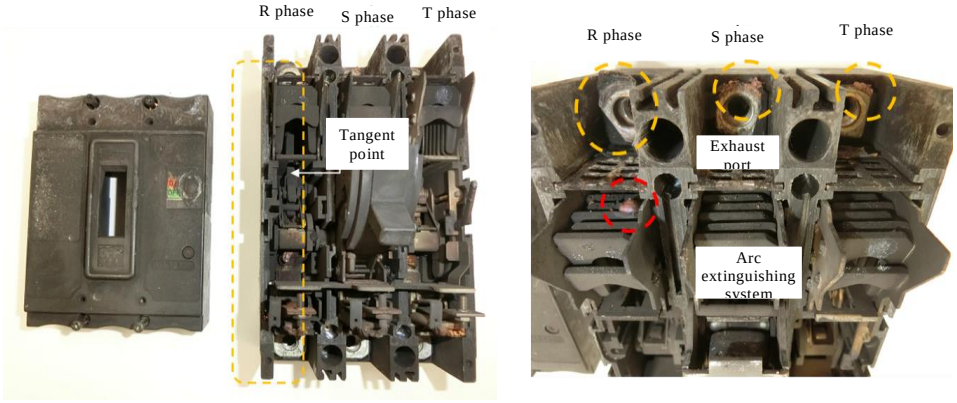
Arc gas was discharged from the molded case circuit breaker for wiring of the main switchboard which had a history that short - circuit current flowed several times due to failure on the load side and short - circuit of the electric circuit, and the bus copper band branch line was blown and jumped off, and the branch line was short - circuited to a branch line of different phase and grounded to the hull.

④ Preventive measures

➢ MCCB Update

➢ Review of insulation resistance measurement methods for electric circuit





(3) The following is a case in which the onboard power supply could not be restored immediately after the blackout.

Cargo ship C (9,378 tons)

Accident: collision (breakwater)

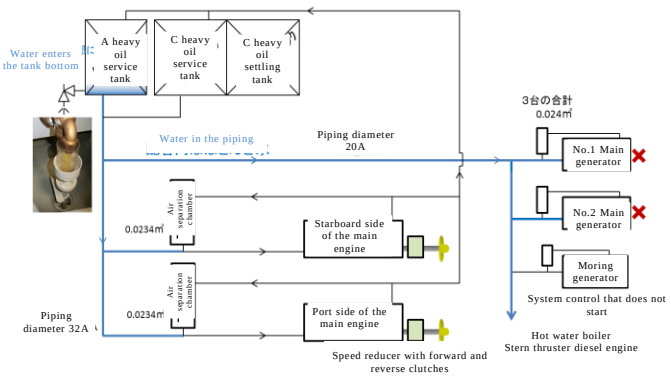
① Place of occurrence: Mizushima Port, Okayama Prefecture

② Operation status: After departure

③ Cause of shutdown of the generator:

Water was mixed in the fuel oil service tank, and water was mixed in the fuel oil piping of the generatormotor, which caused poor combustion.

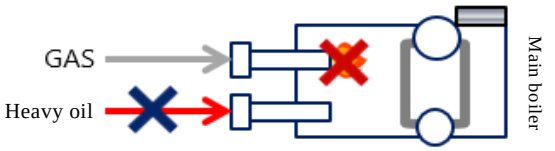
④ Preventive measures:
➢Confirmation of drain discharge from fuel oil service tank during pre - departure inspection
➢Check the condition of the sample oil at the time of supply
➢Preparation of response procedures in the event of a blackout



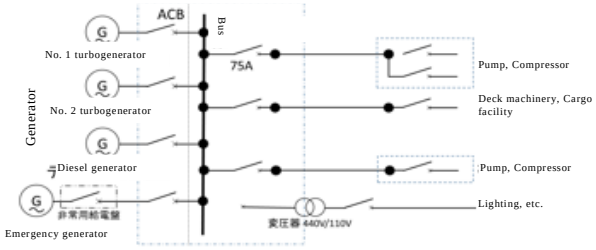
Sounding tape and Oil bottom water detecting agent

(4) The following is a case in which the onboard power supply could not be restored immediately after the blackout.
LNG carrier D (95,084 tons)
Incident: loss of power, towed
① Place of occurrence : Kawasaki Area, Keihin Port
② Operation status: Berthing
③ Cause of the generator becoming inoperable:
The turbine generator was unable to continue operation due to an misfire in the main boiler, the performance of the diesel generator was degraded due to contamination of the air cooler, and the emergency generator was unable to supply ACB due to an electrical system failure.
④ Preventive measures:
➢ Reliable use of gas and heavy oil mixed combustion mode when entering and leaving
➢ Proper maintenance operation and maintenance of diesel and emergency generators

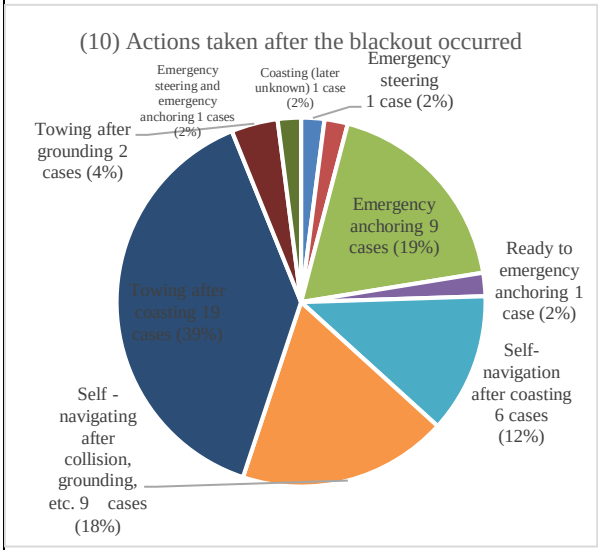
The flame of the gas - fired burner of the main boiler is extinguished.

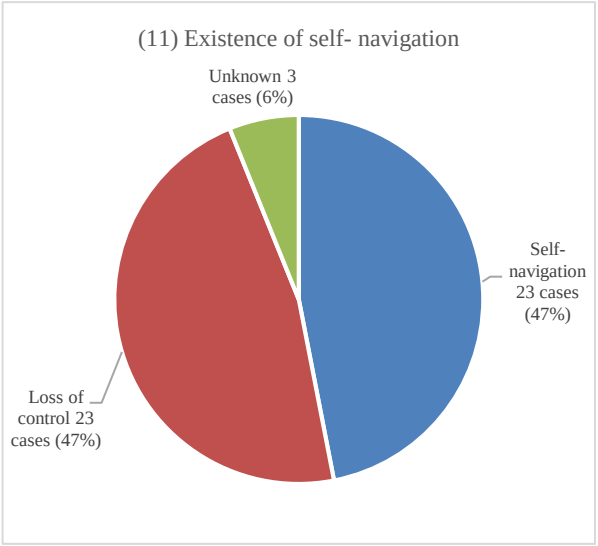


✓ Turbo generator cannot be used due to reduced steam pressure
✓ Performance degradation of the auxiliary diesel generator
✓ Inability to back up emergency generators

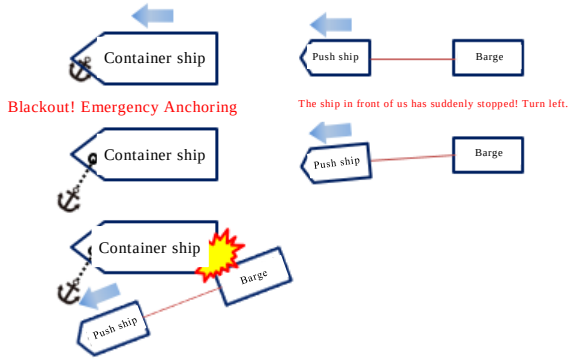


5. Post Blackout Actions
(1) Results of statistical data





Findings on post blackout responses
① There were two cases of emergency steering and 11 cases of emergency anchoring, and there were cases where these measures failed.
② 3/4 is coasting after the occurrence
* Emergency anchoring shall be carried out confirming the surrounding conditions.
Here's an example.



(2) Response guidelines
1. Grasp of the situation around the vessel
2. Informing surrounding parties and related organizations
3. Restoration of onboard power supply
・Automatic starting of the standby generator
4. Confirmation of sequential start of important auxiliary equipment
5. Main engine operation preparation and restart
6. In the event of imminent danger, the emergency steering operation shall be announced and the emergency steering shall be conducted in the steering gear room.
・Manual steering by manual pump;
・Direct operation of the solenoid valve for changing the oil pressure by the backup power supply from the emergency power generator, etc.;
7. In areas where anchoring is possible, emergency anchoring
・Removing the chain stopper
・Release the clutch of the windlass, loosen the brake and drop the anchor.

6. Routine checks in preparation for blackouts

1. Informing the surrounding
Let's check the emergency contact on the route of the voyage plan.
Vessel Traffic Service Center, Port Radio
Let's check the lighting of the lights or the hoisting of the shapes of the vessels with limited operation.

2. Restoration of onboard power supply
Make sure that the standby and emergency generators are on standby.
(1) Mode select of power generator on the main switchboard is set to AUTO.
No alarm for the main switchboard and the power generator motor
(2) Selection of 1 st and 2 nd standby generators
The standby indicator lights of the 1 st reserve unit, the 2 nd reserve unit, the emergency generator, etc. are turned on.
(3) Establishment of standby conditions for generator motors
Fuel handle RUN position, supply of starting air, predetermined position of turning bar.
(4) Support (for anchoring)
Maintenance operation of emergency generators (high load operation if possible)

3. Emergency steering
Let's practice switching from remote steering to emergency steering.
Switching operation of manual valve of hydraulic system
Manual operation of the solenoid valve

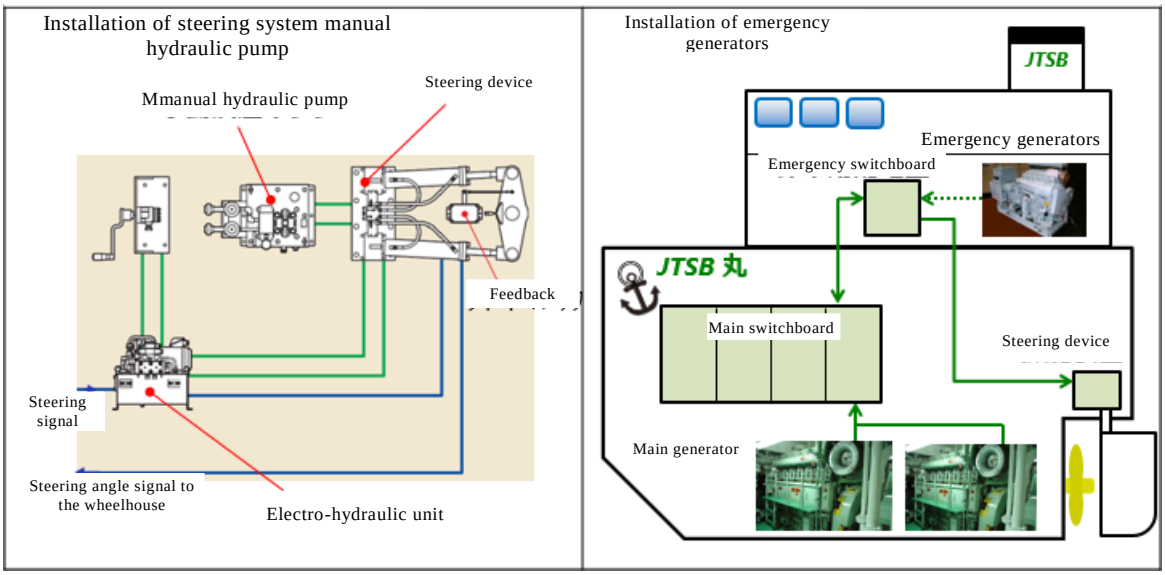
4. Emergency anchoring
Let's keep the anchor on standby when, entering and leaving port, the route, the narrow channel, etc.
Remove the chain stopper of the anchor chain.
Condition in which the clutch of the windlass can be disengaged and the brake can be loosened

Recommendations for routine inspection and maintenance
Effectiveness test
In some cases, power could not be restored automatically after a blackout occurred.
It is recommended to conduct an effectiveness test to check the operation state of the electric equipment periodically in daily operation or in a dry dock.
Action items to be confirmed in the effectiveness test (example)
① Automatic synchronous input and load sharing of the generator
② [Maintenance] operation of emergency generators and standby generators, and automatic power supply
Automatic supply of emergency batteries
③ Automatic start - up of the standby generator with no bus voltage
④ Operation check of the generator protection device
Overcurrent relay, reverse power relay, and priority cutoff device

Some ships are not required to install equipment such as emergency generators and manual pumps for steering systems. Therefore, there are cases in which any action cannot be taken respond to the loss of onboard power supply at all.
Daily vessel operations shall be carried out in accordance with the Navigational Watch Standards (Notification No. 704 of the Ministry of Transport), and the following daily inspections and maintenance shall be required in order to prevent blackouts or to ensure that onboard power supply even if blackouts occur.

Equipment	Items of inspection and maintenance (examples)
Fuel oil supply system	Cleaning the strainer and checking the operation of the flow meter Checking fuel oil status by draining fuel tank before departure
Molded case circuit breaker	Inspection, replacement based on the number of operations and ageing
Shaft generator	Confirmation of drive unit, connecting unit and joint
Electrical equipment	Prevention of erroneous operation by keeping things in order Mounting of the malfunction prevention cover Cleaning inside and around electrical equipment

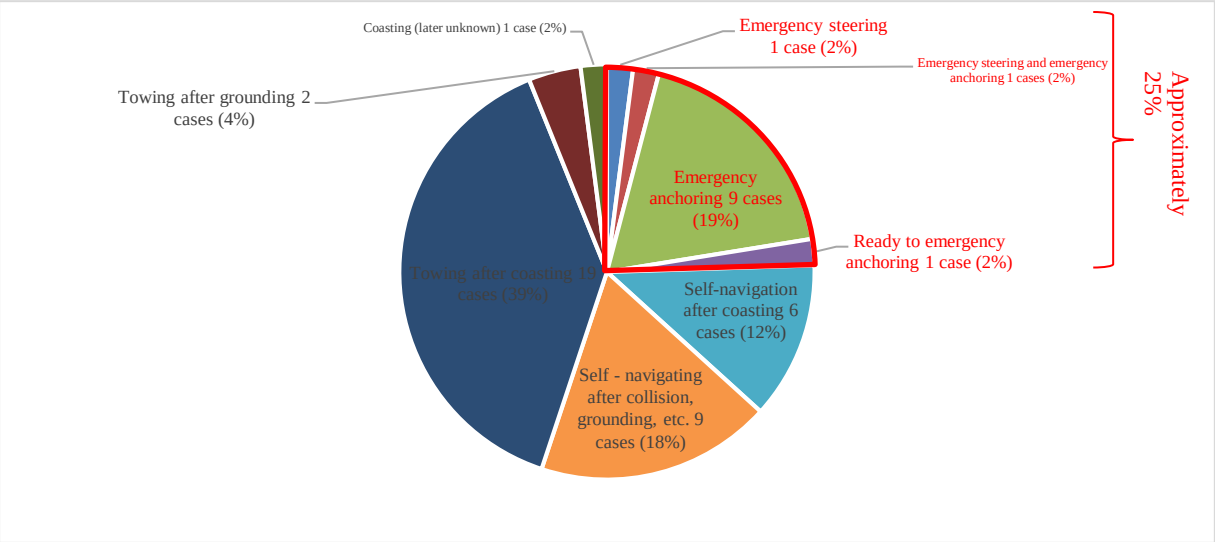
The installation of equipment to guide the ship to a safe place by piloting the ship temporarily is also effective when the main onboard power is not supplied by the blackout.



7. Prepare for a sudden blackout!

A blackout is a sudden engine trouble that is difficult to predict when and where due to various causes. According to past statistical data, as shown in the graph below, about 25% of the cases involved emergency anchoring after a blackout occurred. Even if emergency measures were taken, there were cases where accidents could not be avoided and resulted in grounding, etc., but the damage would be reduced.

Therefore, it is important to take action after the blackout occurs.



Therefore, it is considered to be effective to prepare a manual or a response procedure based on "5. (2) Response Guidelines" assuming that a blackout would be occurred and to train crew members.

It is important for ship crews to understand the components, piping, and automated equipment of their own power generation equipment.

In addition, it is important to investigate the cause of the blackout after the power supply in the ship recovers from the blackout, and to prevent similar problems from occurring again in both hardware and software aspects.

* The relevant information is posted on the website of JTSB. http://www.mlit.go.jp/jtsb/iken-teikyo/s-teikyo16_20190425.pdf

(3) Measures for preventing anchor dragging accidents in the event of a very strong typhoon

(Information provided on April 25, 2019)

Points of preventing anchor dragging accidents in the event of a very strong typhoon!

Take the following measures to prevent anchor dragging accidents in the event of a very strong typhoon.

1. To prevent anchor dragging, you should adopt a **double-anchoring method in principle**. Take the best possible measures, such as **extending the anchor chain as long as possible and ensuring sufficient amounts of holding and mooring power using the anchor and anchor chain**.
   Each vessel should determine the method of anchoring and the extension of the anchor chain depending on the situation of the vessel (size, shape, type, cargo) , the environment of the anchorage (traffic congestion, nature of the seabed, water depth).

2. Even if you choose the best anchoring method and anchor chain extension, there may still be a risk of anchor dragging in strong wind if you rely only on the holding and mooring power available from the anchor and anchor chain.
   Stand by the engine and use its power depending on the quickly changing wind directions and speeds to prevent anchor dragging. Precisely control the output of the engine depending on the changes in the environment.

3. Even if you take all the measures described in 1. and 2. above, still consider the risk of anchor dragging. **Select an anchorage where there are no critical facilities in the downwind direction, and there is enough distance between other vessels.**

4. When a typhoon is passing, wind directions and speeds will change quickly. You need to **obtain the latest information on weather and sea conditions (of the typhoon)** and accurate forecasts. **It is crucial to consider the exact timing in implementing each measure.**

* The relevant information is posted on the website of JTSB.

http://www.mlit.go.jp/jtsb/iken-teikyo/s-teikyo17_20190425.pdf

Column

Looking back at the Oshima Ohashi Bridge Collision Accident

Marine Accident Investigator

At around 0 : 27 a.m. on October 22, 2018, the Maltese Cargo ship collided with the bridge girder of the Oshima Ohashi Bridge between Yanai City and Suo-Oshima Town, Yamaguchi Prefecture. The water pipe installed under the bridge girder was broken, and water supply was cut off for about 40 days in almost the whole area of Suo-Oshima Town. (See page 131 for details of the accident)

It is said that 9,046 households, 14,590 residents and local industries were affected by the suspension of water supply. The JTSB conducted an investigation as an accident that had a particularly serious social impact (serious accident).

Investigators were dispatched to the site from the day after the accident occurred. In addition to the investigation of the hull of the cargo ship, interviews of the crew members, and the collection of voyage data, an initial investigation was carried out to determine the extent of damage to the Oshima Ohashi Bridge. Information on the facts found (height of the mast of the cargo ship and Oshima Ohashi Bridge, track of the cargo ship, extent of damage, etc.) was published in November of the same year.

In March 2019, JTSB published a interim report summarizing factual information found through subsequent research (such as the status of the preparation of a voyage plan by crew members). With regard to the interim report in particular, almost the full text of the progress of the accident was published in the local newspaper, indicating a high level of social interest in the accident.

The Final report released in October 2019 indicated that one of the causes of this accident was that the crew of the cargo ship made a voyage plan going under the bridge without knowing the height of the Oshima Ohashi Bridge. By the time the voyage plan was completed, there were many opportunities to grasp the height of the Oshima Ohashi Bridge. For example, the navigation officer had collected and confirmed the information of the sea area to be navigated using charts and hydrography, etc., the planned route was drawn on the chart and whether there were any problems with it, and the master had confirmed and approved the planned route made by the officer. However, the height of the bridge was not confirmed in any of the situations. As a background, it has been revealed that a route automatically created by using computer software, and that the function of the Electronic Chart Display and Information System (ECDIS) to check dangerous places on the route was not properly used. Therefore, navigation

instruments using IT in recent years should be used properly after fully understanding the function.

This time, the accident resulted in a serious social impact due to the basic error of not confirming the height of the bridge on the planned route. Though it is necessary that each crew member performs daily confirmation appropriately, I felt through the investigation that the operators who manage the crew members are required to provide detailed follow - up, such as the development of manuals and education and training that are easy for the crew members to understand on the spot, based on the situation that navigation instruments and computer software used on the ship are becoming more sophisticated and diverse.

In the publication of the final report, the JTSB requested the relevant organizations to cooperate in disseminating this report so that operators who employ foreign seafarers who are not familiar with the sea areas in Japan can provide guidance based on the recurrence prevention measures of this accident investigation report.

We hope to contribute to preventing the recurrence of similar accidents in the future.

Instrument (ECDIS) screen

11 Summaries of major marine accident and incident investigation reports (case studies)

Cargo oil tank exploded during cleaning operation

Chemical Tanker GOLDEN SUNNY HANA　Explosion (Cargo oil tank)

< Summary of the Accident > At around 10:05 on April 8, 2018, as the chemical tanker GOLDEN SUNNY HANA (2,990 tonnes), with a master and 14 crew members on board, was proceeding southeast off to the southeast of Kunisaki Port, Oita Prefecture, while conducting cleaning work in a cargo oil tank, an explosion occurred in the cargo oil tank.

Two of GOLDEN SUNNY HANA's ordinary seamen were injured and her cargo oil tanks had holes and other damage.

At around 23:00 on April 4, 2018, the Vessel left Pyeongtaek Port, Republic of Korea, for Yeosu Port, Republic of Korea, with approximately 2,000 tons of pyrolysis gasoline.

The Vessel entered Yeosu Port at around 12:25 on April 6, completed unloading her entire cargo of pygas at around 09:10 on April 7, and left port in ballast condition for Chiba Port, Chiba Prefecture at around 15:55 on the same day.

After flushing the cargo lines and tank bottoms, the Vessel decided to conduct cleaning of the cargo oil tanks in preparation for cargo loading at Chiba Port without ventilating the cargo oil tanks using ventilation equipment. She began cleaning with normal temperature seawater using cleaning machines which are installed in No.2 Port tank(the tank in this case) and No.2 starboard tank from around 18:00 and then conducted the Cleaning Work with seawater heated to approximately 75℃ before closing the hatch covers and halting work at around 02:25 on April 8.

The Vessel decided to resume the Cleaning Work using the Cleaning Machine at around 08:00. The seawater to be used in the Cleaning Work was heated to approximately 60℃ in preparation for work: and then approximately 2.6 tons of heated seawater and approximately 180 liters of cleaning agent were sent into the Tank and equal amounts of both were sent into No. 2 starboard tank. For the purpose of starting the Circulation Work, Navigation Officer A started said pump at around 10:00.

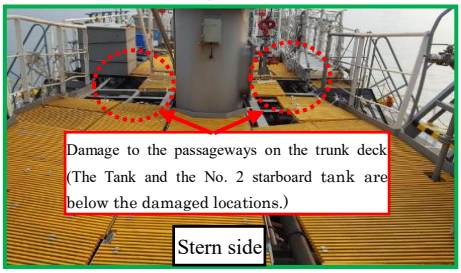
Navigation Officer A decided to inject steam into the Tank and the No. 2 starboard tank for the purpose of raising the seawater's temperature. He instructed Ordinary Seaman C to open the No. 2 starboard tank's steam valve and Ordinary Seaman A to open the Tank's steam valve and Ordinary Seaman A and Ordinary Seaman C opened their respective steam valves at around 10:05.

Cargo oil tank exploded at around 10 : 05.
Ordinary Seaman B and C received burns.

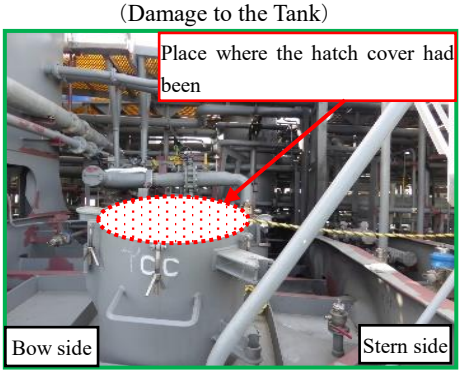
(Analysis of explosion in a cargo oil tank)

It is considered probable that the concentration of the gas mixture in the Tank was in the range of explosion because the Vessel did not ventilate the tank with the ventilation system.
It is considered probable that, as seawater heated to a temperature of 60 ° C was injected into the Tank, all of the 30 ℓ of liquid PY gas remaining in the Tank was vaporized, and the concentration increased after unloading, and the combustible gas mixture existed in the Tank at a concentration higher than the lower limit of the explosion range.
It is considered somewhat likely that the Tank was in a situation where highly charged steam existed as space charge because steam at a temperature of about 120 ° C and a pressure of about 0.7 MPa was injected into the Tank, and that this charge was discharged directly to the protruding objects in the Tank generating sparks.
It is considered somewhat likely that the combustible gas mixture was ignited by sparks discharged in the tank and exploded.

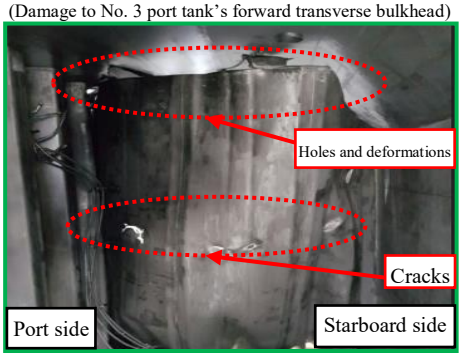
(Damage looking from the top of No. 3 tank toward the bow)



(Damage to the Tank)



(Damage to No. 3 port tank's forward transverse bulkhead)



Probable Causes (excerpt): It is probable that the accident occurred when, as the Vessel was conducting the Circulation Work in the No. 2 port cargo oil tank and the No. 2 starboard cargo oil tank during cargo oil tank cleaning work while off to the southeast of Kunisaki Port, Oita Prefecture, an explosion occurred in the No. 2 port cargo oil tank because steam was injected into the No. 2 port cargo oil tank under conditions in which a combustible gas mixture of vaporized pyrolysis gasoline and air in the explosive range was present.

For details, please refer to the accident investigation report. (Published on March 28, 2019)
http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0023e.pdf

JTSB had made recommendations to HNCC CO., LTD. for preventing the recurrence of similar accidents and reducing damage.
For details, please see Chapter 1 "Summary of recommendations and opinions issued in 2019" (page 32).

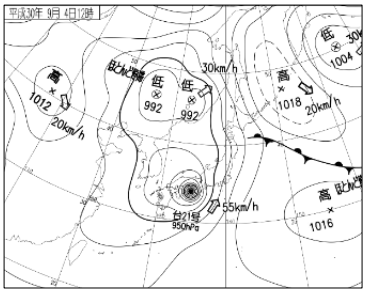
Drugging unchor due to strong winds and waves caused by the typhoon and collided with the Airport Access bridge.
Oil tanker HOUNMARU collision (bridge)

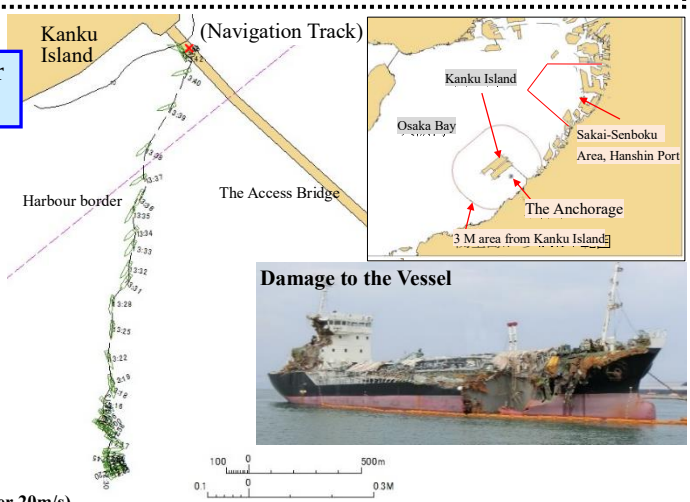
< Summary of the Accident >The oil tanker HOUNMARU (2,591 tonnes), with the master and 10 crew members on board, was anchored off the southeast of the Senshu Port under the situation where Typhoon No. 21 was approaching and a maritime typhoon warning was issued in the Seto Inland Sea including Osaka Bay, was struck by the strong winds which increased with the approach of the typhoon, and being drifted to the north dragging the anchor pushed by the strong winds and waves. As a result, the Vessel collided with Kansai International Airport Access Bridge at around 13:40 on September 4, 2018. The Vessel caused the deck of the starboard bow to be crushed, and Kansai International Airport Access Bridge caused the bridge of the road girder to be bent, broken, scratched, etc., the railway girder to be collapsed, the rail to be warped, the gas pipe to be broken, etc., but there were no casualties among the crew members.

(Ship operation and Weather condition)

The Vessel started single anchoring at the anchorage for the purpose of typhoon evacuation.

Surface weather chart at around 12:00 on September 4





Damage to the Vessel

Around 12:30

(northeast to east-northeast wind, maximum instantaneous wind velocity over 20m/s)

At around 12:30, the master set the main engine to slow ahead and set the joystick to the HOVER position (the rudder angle at which forward and backward thrust is lost).

Around 13:00 (southeast wind, maximum instantaneous wind velocity 27.0m/s)

The master could not confirm the Vessel moved when he was informed by the MARTIS of the anchor dragging around 13:00.

The master noticed anchor dragging, set the main engine to full ahead and operated the joystick to turn the bow upwind.

The master set the main engine to half ahead and the joystick to the HOVER position because the anchor dragging was stopped.

The master noticed that the Vessel drifted toward to leeward side again and operated the joystick to turn the bow upwind with increasing the engine output.

Around 13:31 (south wind, maximum instantaneous wind velocity 48.4m/s)

Around 13:38 (south-southwest wind, maximum instantaneous wind velocity 58.1m/s)

The master instructed all crew members to evacuate from the bridge of the Vessel because he saw the Access Bridge near the starboard stern and thought that the bridge would collide with the Access Bridge.

Damage to the Access Bridge

(Analysis of Selection of the Anchorage)

- The master thought that the typhoon would pass through the east side of the anchorage and the left semicircle of the typhoon would enter the Anchorage.
- The master thought that the typhoon was proceeding at a high speed and that strong wind would not blow for a long time.
- It was surrounded by the shore, the seabed was mud and the anchor would be highly effective, and other ships were anchored at the time for typhoon evacuation.
- The next loading was scheduled to take place in Sakai-Senboku Area, Hanshin Port.
- The master did not know the 2011 leaflet "Let's Prevent Anchor Dragging Maritime Accident" and did not know to anchor avoiding the sea area within 3 nautical miles from Kanku Island.

(Analysis of Anchoring Method)

- The master thought that if both anchors were used, when the wind direction changed, anchor-holding power would decrease because the anchor and the anchor chain tangled.
- The master had the experience of using the main engine to cope with the wind of typhoon.

Collision (at around 13:40)

Probable Causes (excerpt): In this accident, while Typhoon No. 21 was approaching and a maritime typhoon warning was issued in the Seto Inland Sea including Osaka Bay, the Vessel continued single anchoring at the east side of the oil tanker berth located on the southwest side of the Senshu Port, Osaka Prefecture where Kansai International Airport Access Bridge is located about one nautical miles north of the southeast of the Kansai International Airport First Stage Airport Island (Kanku Island), for the purpose of typhoon evacuation, and the Vessel started to drift dragging the anchor pushed by the strong winds and waves with the approach of the typhoon. The master tried to stop anchor dragging using the main engine and it seemed the drift was stopped. He thought that he succeeded to stop anchor dragging so he kept the joystick HOVER position. As a result, the Vessel was again drifted and collided with Kansai International Airport Access Bridge in a situation where there was no sufficient distance to control the Vessel.

For details, please refer to the accident investigation report. (Published on April 25, 2019)
http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-4-2_2018tk0013.pdf

JTSB had made recommendations to Tsurumi Sunmarine Co., Ltd. for preventing the recurrence of similar accidents and reducing damage.
For details, please see Chapter 1 “Summary of recommendations and opinions issued in 2019” (page 21).

Injured by being caught in a side roller during hauling net
Fishing vessel SEIRYOMARU No.3 Injury of crew member

< Summary of the Accident >At around 04:30 on September 14, 2018, while the Fishing Vessel SEIRYOMARU No. 3 (9.7 tonnes), boarded by the chief fisherman, the master and three other crew members, was anchoring off the west of Oshima Island, Amakusa City, Kumamoto Prefecture, the chief fisherman was caught in a side roller and was seriously injured.

At around 03:30, after the third casting net, all the crew members finished hauling most of the net.

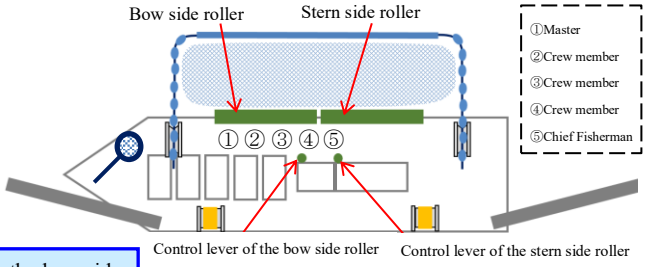
It was decided to carry out preparatory work for fish drawing (work to flatten the bottom of the net by adjusting the hoisting of the net with side rollers on the bow side and the stern side (hereinafter referred to as "rollers") and bringing the fish group to the bow of the net).

As the lifting of the net was proceeding by the stern side roller rather than the bow side roller, it was decided to lift the net with the bow side roller by fixing the stern side roller. The master and 3 crew members were on the bow side roller and the chief fisherman was on the strern side roller.

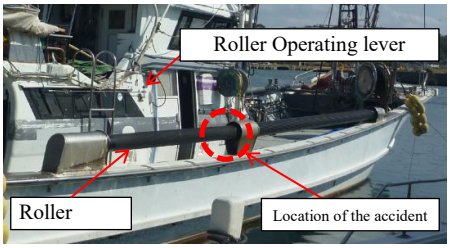
The chief fisherman tried to fix the net to the rotating stern side roller by inserting his left hand into the gap between the roller and the bulwark.

The fingertip part of the rubber glove of the chief fisherman was caught between the net during hauling and the rotating stern side roller, and then the left hand and the left arm was caught and injured (around 04:30).)

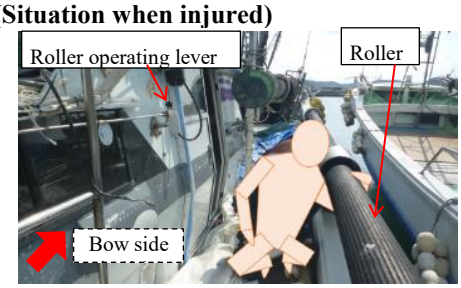
(Image of staffing situation during work)



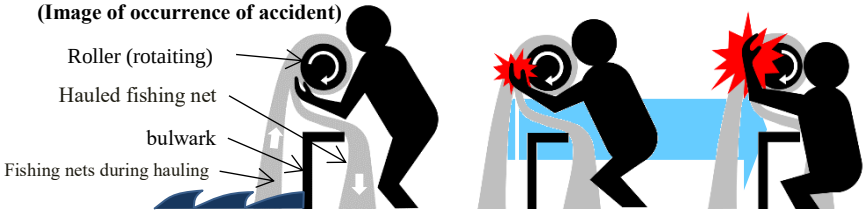
(Roller Position)



(Situation when injured)



(Image of occurrence of accident)



(Analysis of Occurrence of Accident)

A school of fish was unevenly distributed on the bow side, requiring manpower for hauling with the bow side roller, and the chief fisherman independently fixed the net to the stern side roller.

He wore rubber gloves and tried to fix the net to the rotating stern side roller, because he was anxious about returning to the port as soon as possible due to good fishing, and because he was used to the work.

Measures to Safety Actions (Excerpt)

- The hem and the cuff of crew jackets should be tightened to prevent them from being caught in the rollers.
- A person in charge of the lever operation of the roller shall be attached and the work status shall be monitored by the person at all times.
- When fixing the net, the roller should be stopped once, and the operator who fixes the net and the operator in charge of the operating lever should work in cooperation.
- Remove gloves when fixing the net.
- It is desirable to introduce an emergency stop device for rollers.

Probable Cause (excerpt): It is probable that this accident occurred while the Ship was anchoring off the west of Oshima Island, Amakusa City at night, hauling the net by adjusting the winding of the net with the bow side and the stern side roller for gathering a school of the fish to the bow side and making the bottom of the net flat, the chief fisherman who wore rubber gloves tried to fix the net to the stern side roller while the stern side roller was rotating. As a result, the fingertips of the rubber gloves on the left hand were caught between the hauling net and the stern side roller, and then the left arm was got caught in the stern side roller.

For details, please refer to the accident investigation report. (Published on August 29, 2019)
http://www.mlit.go.jp/jtsb/ship/rep-acci/2019/MA2019-8-3_2019tk0016.pdf

JTSB had stated opinions to the Director-General of the Fisheries Agency.
For details, please see Chapter 1 “Summary of recommendations and opinions issued in 2019” (page 28).

A crew member fell from a height of about 11.5m while cleaning in the cargo hold of a cargo ship
Cargo ship ERIK Faitality of a crew member

< Summary of the Accident > At around 17:26 on September 18, 2018, while the cargo vessel ERIK (9,618 tonnes) was moored at the Mitsubishi Naoshima wharf, with the master and 14 crew members on board, 4 crew members were performing the cleaning work of the upper hatch coaming of the cargo holds after unloading cargo, and an able seaman fell from the upper deck to the bottom floor of the cargo hold and dead.

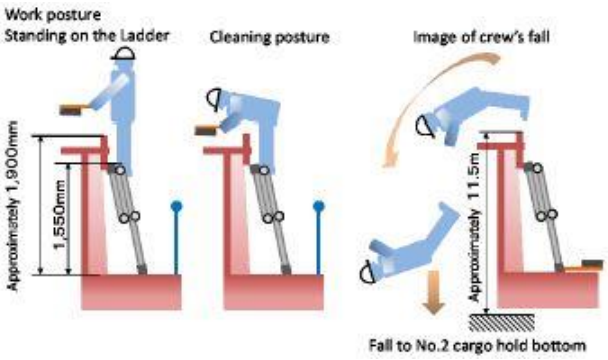
The Vessel completed unloading around 17:20 on the 18th.

The four crew members (Boatswain, able seaman A ,able seaman B,ordinary seaman) started “the cleaning work of the upper hatch coaming of the cargo holds on the upper deck”

The cleaning work was an item of routine works taking about 30 minutes, with the aim of maintaining the watertightness of the cargo hold. To prevent water invasion between the hatch cover of the cargo hold and the hatch coaming, the crew members were sweeping cargo mineral dust using portable ladders and cleaning brushes after the cargo unloading operation. At the time of the accident, the cleaning work was being carried out in the same way as usual.

When doing the cleaning work, Crew Member D, who was at the aft starboard side of the No. 2 cargo hold, saw that Crew Member A’s upper body from his thigh was higher than the top of the hatch coaming on the upper deck starboard side of the No. 2 cargo hold, and that he was doing the cleaning work utilizing the cleaning brush (See Figures and Photo).

(Work posture on the Ladder and situation of fall)



Crew Member D looked at Crew Member A, who came to be in an unstable posture and fell forward, then twisted his body and tried to clutch at the upper hatch coaming of the No. 2 cargo hold with his left hand. However, he fell head-first with his back facing downward to the bottom of the No. 2 cargo hold at around 17:26.

Fell to the bottom of the cargo hold (at around 17: 26)

(Information on Safety Management of Operation Management

A safety management manual based on the International Safety Management Code (ISM Code) was prepared, and a safety work implementation code describing ladder guidelines for handling portable ladders, etc. was designated as a reference document and installed on the Vessel.

Probable Causes (excerpt): It is considered probable that this accident at around 17:26 on September 18 when Crew Member A fell forward and fell from the upper deck to the bottom of the cargo hold bottom occurred because Crew Member A was working while being in an unstable posture on the Ladder when the vessel was doing the cleaning work while the vessel was moored at Mitsubishi Naoshima wharf.

It is considered probable that the vessel carried out the cleaning work by the methods that differed from the Ladder guidelines of the CSWP, and that because there was nothing to support his upper body on the Ladder, Crew Member A was performing the cleaning work while being in an unstable posture on the Ladder.

It is somewhat likely that Company A was insufficient in monitoring that the crew members clearly understood the Ladder guidelines of the CSWP and then applied and performed the Ladder guidelines in the cleaning work, because the vessel carried out the working methods being different from the Ladder guidelines in everyday work.

For details, please refer to the accident investigation report. (Published on February 28, 2019)
http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0014e.pdf

JTSB had made safety recommendations to Krey Schiffahrts GmbH & Co.KG for preventing the recurrence of similar accidents and reducing damage.
For details, please see Chapter 1 “Summary of recommendations and opinions issued in 2019” (page 30).

Collision passing under a bridge lower than the height that a ship can pass
Cargo ship ERNA OLDENDORFF Collision (Bridge)

< Summary of the Accident> At around 00:27 on October 22, 2018, the cargo ship ERNA OLDENDORFF (25,431 tons) was proceeding east in Obatake Seto toward a privately-operated berth in Etajima City, Hiroshima Prefecture, with a master, a second officer and 19 other crewmembers aboard when she collided with Oshima Bridge.

The Vessel received dents and other damage to three of her four cranes as well as a bent damage to her aft mast; however, there were no fatalities or injuries on the Vessel.

Oshima Bridge suffered cracks, dents, and other damage to its girders; an inspection passage that was installed under its girders was broken and fell, and a water pipe was severed, causing a water outage that lasted for forty days affecting almost all of Suo-Oshima Town, Yamaguchi Prefecture; power cables, communication cables and others were severed as well.

The Vessel, Master A boarded the vessel in Qingdao (People's Republic of China) in place of former master, and entered Port of Onsan (Republic of Korea).

The Vessel, with a master and a second officer, and nineteen other crewmembers aboard, left the Port of Onsan for privately-operated berth in Etajima City, Hiroshima Prefecture.

As the Vessel was proceeding north off the west coast of Yashiro Shima, Master A ordered Navigation Officer A1 to check the height of Oshima Bridge.

Navigation Officer A1 attempted to search the information of Oshima Bridge and check the bridge's height using the index at the end of the Sailing Directions but he could not find a part that contained.

After the Vessel began turning to starboard off the west of Kasasa Shima, Master A was concerned that the Vessel would be pushed by the current, which was flowing toward the west, and he continued proceeding east.

Navigation Officer A1 sensed danger when he got sight of Oshima Bridge's entire form just before arriving at the bridge and he immediately shouted "Hard a starboard".

collision (at around 00:27)

(History of Voyage Plan)

Navigation Officer A1 prepared the route including Isabel – Qingdao – Onsan – Etajima and asked the former master to check it about a week and a half before the accident. Although the former master checked the details of the route from Isabel to Qingdao and signed the voyage plan, he only checked the other part of the route roughly.

Navigation Officer A1 did not consult the information concerning Obatake Seto in the Sailing Directions and imported the data of 'the route from Onsan to Etajima by way of Obatake Seto' (hereinafter referred to as "the Route"), which was automatically created by the Software, into ECDIS and then, although he used the route check function, he overlooked the alert for Oshima

While the Vessel was berthing at the Port of Onsan, Master A checked the Route together with Navigation Officer A. However Master A did not check the details of the Route because he thought that the former master would have already checked it.

(Navigation Track)

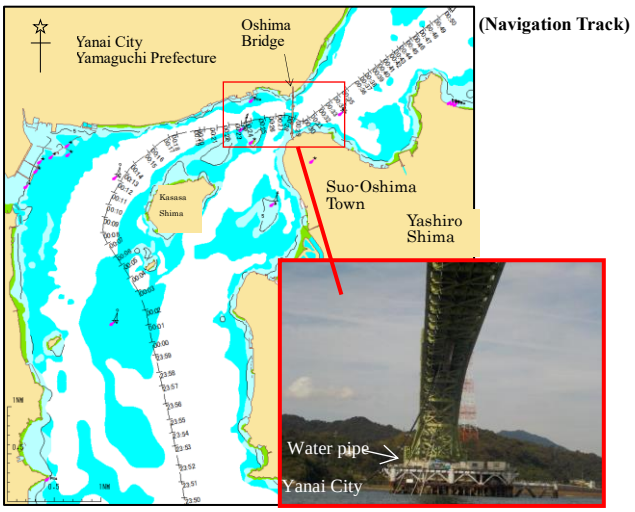


Photo courtesy of the Yanai Engineering Works

Probable Causes (excerpt): It is probable that the accident occurred when, while the Vessel was proceeding east in Obatake Seto at night, the Vessel collided with Oshima Bridge because the Vessel proceeded under a bridge that the Vessel was unable to pass through at the height of crane and mast.

It is probable that the Vessel proceeded under Oshima Bridge which the Vessel was unable to pass through at the height of crane and mast because Master A approved the voyage plan, including the Route which was prepared by Navigation Officer A1, without being aware of the height of Oshima Bridge, and Master A continued navigating while feeling uncertain about the bridge's height after getting close to the bridge.

It is probable that Master A approved the voyage plan including the Route which was prepared by Navigation Officer A1 without being aware of the height of Oshima Bridge because Master A did not check the details of the Route assuming that the former master had already checked it.

It is probable that Master A continued navigating while feeling uncertain about the bridge's height after getting close to the bridge because he waited for a report from Navigation Officer A1 after Master A ordered Navigation Officer A1 to check the height of the bridge, and Master A was concerned that the Vessel would be pushed toward shore by the westerly current in the situation that the navigable width became narrower after the Vessel turned to starboard off the west of Kasasa Shima.

For details, please refer to the accident investigation report. (Published on October 31, 2019)
http://www.mlit.go.jp/jtsb/eng-mar_report/2019/2018tk0020e.pdf

JTSB had made safety recommendations to OLDENDORFF Carriers GmbH & Co. KG and the authorities of the Republic of Malta.
For details, please see Chapter 1 "Summary of recommendations and opinions issued in 2019" (page 33).