

# Chapter 5 Marine accident and incident investigations

## 1 Marine accidents and incidents to be investigated

### <Marine accidents to be investigated>

#### ◎Article 2, paragraph (5), 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 facility other than a ship related to the operations of a ship.
2. Death or injury of the people related to the structure, equipment or operations of a ship

### <Marine incidents to be investigated>

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

“Marine incident” is a situation prescribed by Order of the Ministry of Land, Infrastructure, Transport and Tourism (Article 5 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board), where deemed to bear a risk of Marine Accident occurring.

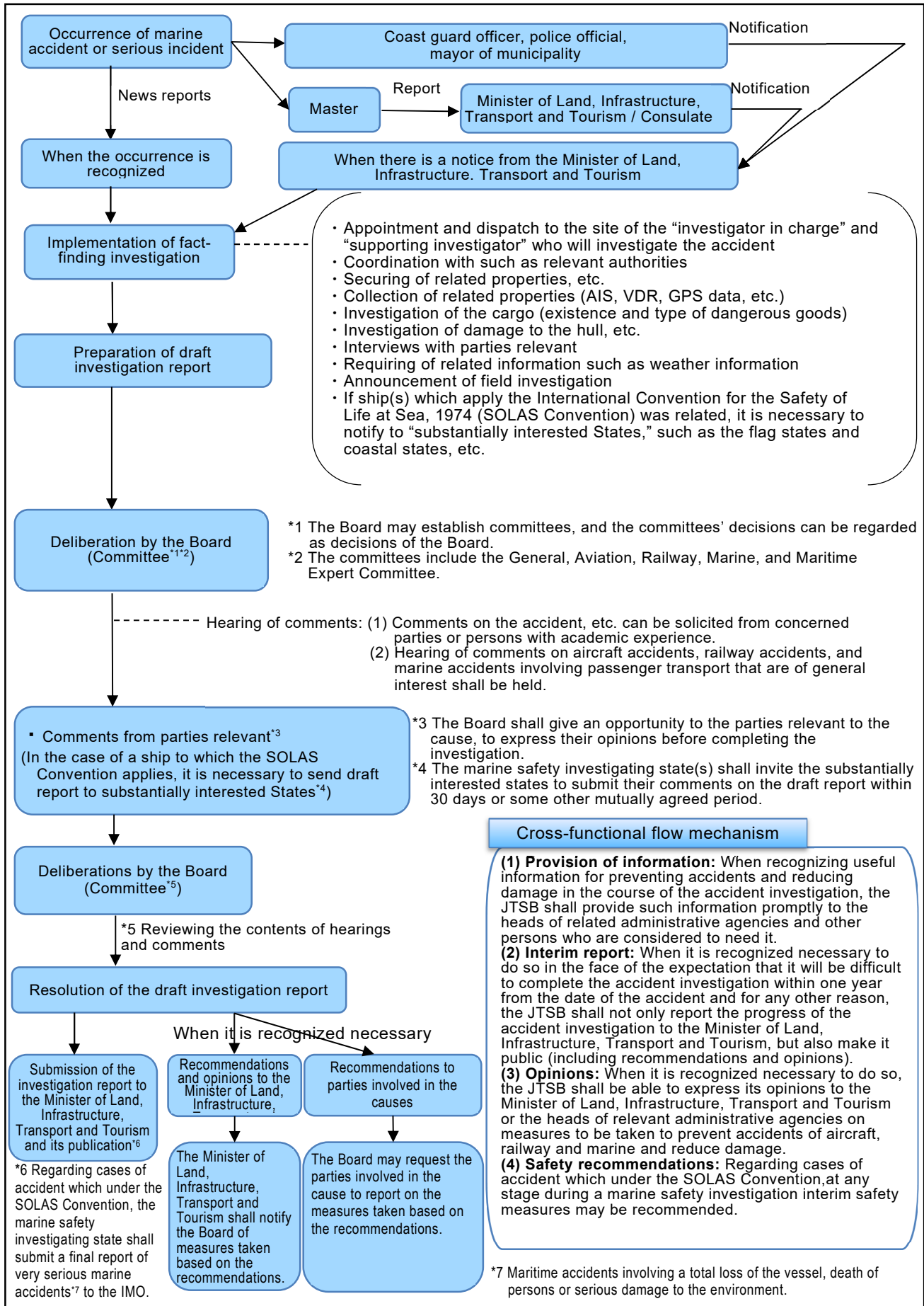
#### ○Article 5 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board

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, Foundering, 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



### 3 Organizations, Committees, etc., in charge of investigations by category of accidents and incidents

“Serious marine accidents and incidents” are investigated by marine accident investigators of the secretariat in Tokyo, and deliberations are conducted at the Marine Sub-Committee. Incidentally, “Particularly Serious Accident\*1” and “Very Serious Accidents\*2” are deliberated at the General Committee, etc.

“Marine accidents and incidents” are investigated by local accident investigators at local offices located in eight locations across Japan, and deliberations are conducted at the Maritime Expert Committee.

\*1 The General Committee is responsible for matters related to the following particularly serious accidents (aircraft accidents, railway accidents, and marine accidents, excluding those deliberated by the Aircraft Committee, the Railway Committee, the Marine Committee, and the Maritime Expert Committee) and matters deemed necessary by the Board (Paragraph 2, Article 1, of the Rules of Management of the Japan Transport Safety Board).

(1) Accident in which 10 or more people were killed or missing (In the case of aviation accidents and marine accidents, only those involving aircraft or ships used for business that transports passengers. The same shall apply to (2).)

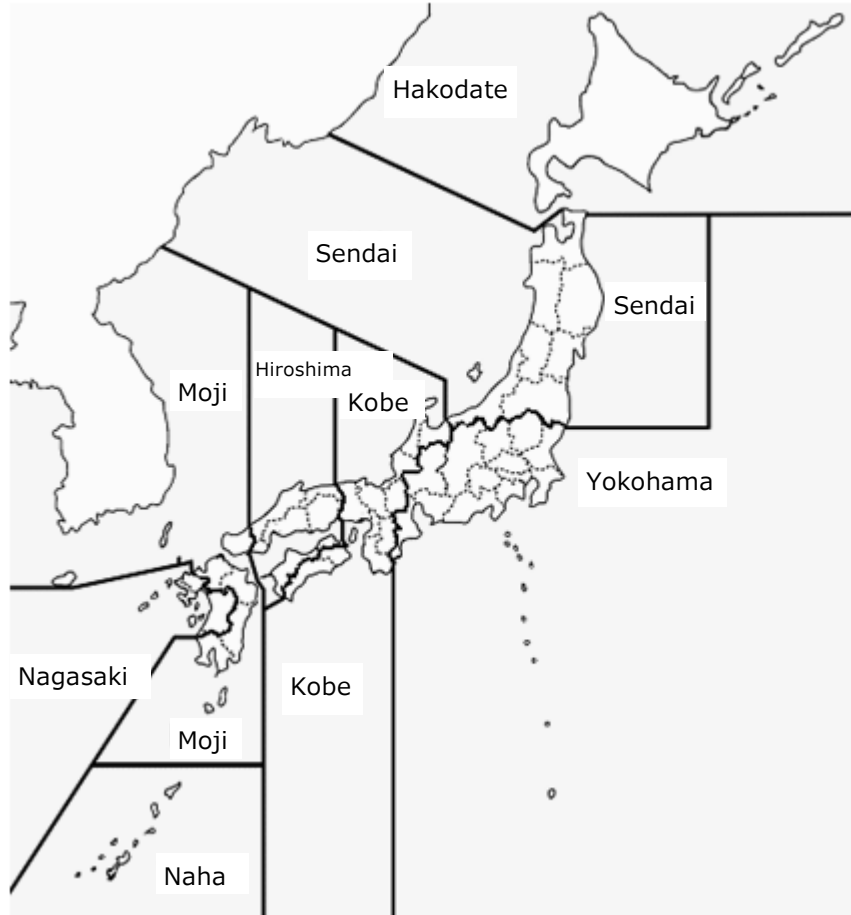
(2) Accident in which 20 or more people were killed, missing or seriously injured.

\*2 The resolution on very serious accidents recognized by the Board and on matters deemed necessary by the Board shall be taken at the Board in consideration of the occurrence situation of damage, social influence and other circumstances (Paragraph 5, Article 2, of the Rules of Management of the Japan Transport Safety Board).

Serious marine accidents and incidents	Office in charge of investigation: Marine accident investigators in the Headquarters Committee in charge of deliberation and adoption: Marine Committee
<p>Definition of “serious marine accidents and incidents” (Article 9, Ordinance on Organization of Secretariat of the Japan Transport Safety Board)</p> <ul style="list-style-type: none"> <li>• accident involving two or more passengers killed, missing or seriously injured</li> <li>• accident involving five or more persons killed or missing</li> <li>• marine accident of a ship*2 engaged in international voyage*1, in which caused total loss of the ship, or which resulted in the death or disappearance of any person.</li> </ul> <p>*1 meaning voyage between a port of one state and a port of another state. *2 excluding vessels used for the business of transportation of goods with a gross tonnage of less than 500 gross tonnage to be used to be used for shipping service of the goods, and also excluding all fishing vessels.</p> <ul style="list-style-type: none"> <li>• accident which caused a serious impact on environment by spilling of oil, etc.</li> <li>• marine accident, etc. or a marine accident as a result of which any unprecedented damage has arisen</li> <li>• in addition to what is listed in the preceding items, the accident determined by the Board to fall under any the following items (a) to (c) inclusive             <ul style="list-style-type: none"> <li>a) accident which had particularly serious influence on the society</li> <li>b) accident the identification of the cause of which is extremely difficult; and</li> <li>c) accident which would teach an important lesson for prevention of marine accident, etc.</li> </ul> </li> </ul> <p>and for alleviating damage in the cases where marine accident takes place.</p>	
Marine accidents and incidents	Office in charge of investigation: Regional investigators in the regional offices Committee in charge of deliberation and adoption: Maritime Expert Committee

#### 4 Jurisdiction of the Offices over Marine Accidents and Incidents

Our jurisdiction covers marine accidents and incidents in the water areas around the world, including rivers and lakes in Japan, and regional accident investigators placed in local offices (8) are in charge of marine accidents other than serious accidents. Marine accident investigators in the Tokyo Office (Headquarters) are in charge of marine serious accidents and incidents.



Local Office Jurisdiction Map

## 5 Statistics of investigations of marine accidents and incidents

(As of end of December 2023)

The JTSB carried out investigations of marine accidents and incidents in 2023 as follows:

In 2023, 636 accident investigations had been carried over from 2022, and 658 accident investigations were newly launched. Besides, 678 investigation reports were published in 2023, and thereby 609 accident investigations were carried over to 2024.

Moreover, 181 incident investigations were carried over from 2022, and 158 incident investigations were newly launched in 2023. Furthermore, 182 investigation reports were published in 2023 and thereby 152 incident investigations were carried over to 2024.

Among the 860 investigation reports published, none was issued with recommendations, and one was issued with opinions.

### Investigations of marine accidents and incidents in 2023

(Cases)

Category	Carried over from 2022	Launched in 2023	Not applicable	Transferred to Tokyo Office	Total	Published investigation reports	(Recommendations)	(Safety recommendations)	(Opinions)	Carried over to 2024	(Interim report)
Marine accident	636	658	-7	0	1,287	678	(0)	(0)	(1)	609	(4)
Tokyo Office (Serious cases)	18	10	0	0	28	12	(0)	(0)	(1)	16	(4)
Regional Offices (Non-serious cases)	618	648	-7	0	1,259	666	(0)	(0)	(0)	593	(0)
Marine incident	181	158	-5	0	334	182	(0)	(0)	(0)	152	(0)
Tokyo Office (Serious cases)	0	0	0	0	0	0	(0)	(0)	(0)	0	(0)
Regional Offices (Non-serious cases)	181	158	-5	0	334	182	(0)	(0)	(0)	152	(0)
<b>Total</b>	<b>817</b>	<b>816</b>	<b>-12</b>	<b>0</b>	<b>1,621</b>	<b>860</b>	<b>(0)</b>	<b>(0)</b>	<b>(1)</b>	<b>761</b>	<b>(4)</b>

Note 1: The figures for “Launched in 2023” includes cases which occurred in 2022 or earlier, and which the JTSB was notified of in 2023 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.

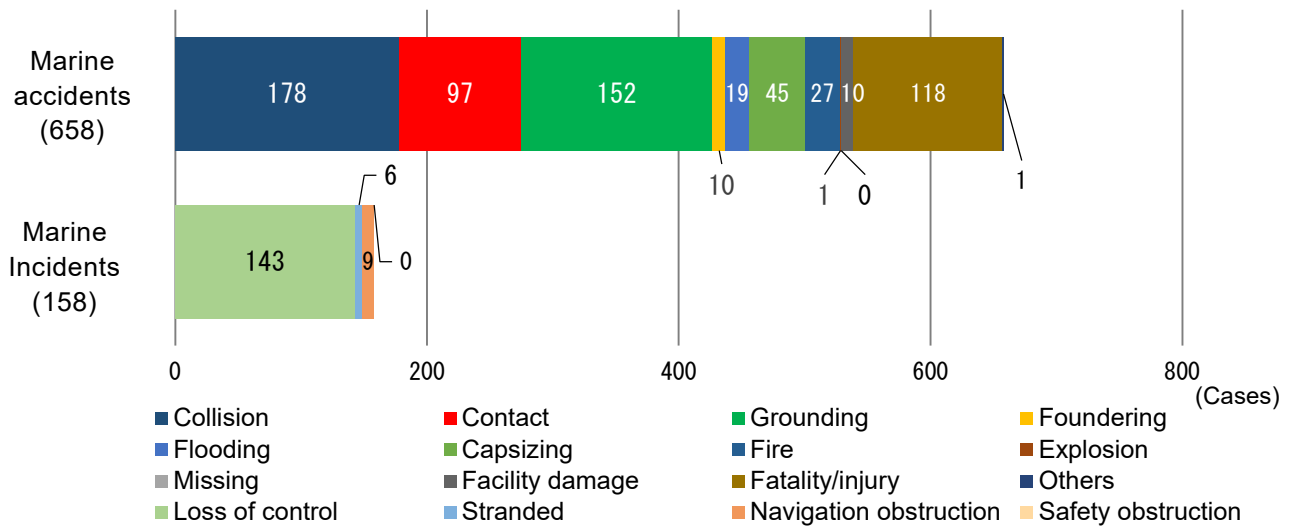
Note 3: The column “Transferred to Tokyo Office” shows the number of cases where the investigation found out that it was serious and the jurisdiction was transferred from the regional office to the Tokyo Office.

**6 Statistics of investigated marine accidents and incidents** (As of end of December 2023)

(1) Types of accidents and incidents

The breakdown of the 816 investigations launched in 2023 by type of accidents and incidents is as follows: The marine accidents included 178 cases of collision, 152 cases of grounding, 118 cases of fatality/injury (not involved in other types of accidents), and 97 cases of contact. The marine incidents included 143 cases of loss of control, nine cases of navigation obstructions, and six cases of stranded. Objects that contacted with ships included quays in 26 cases, breakwaters in 14 cases, and light buoy in 11 cases.

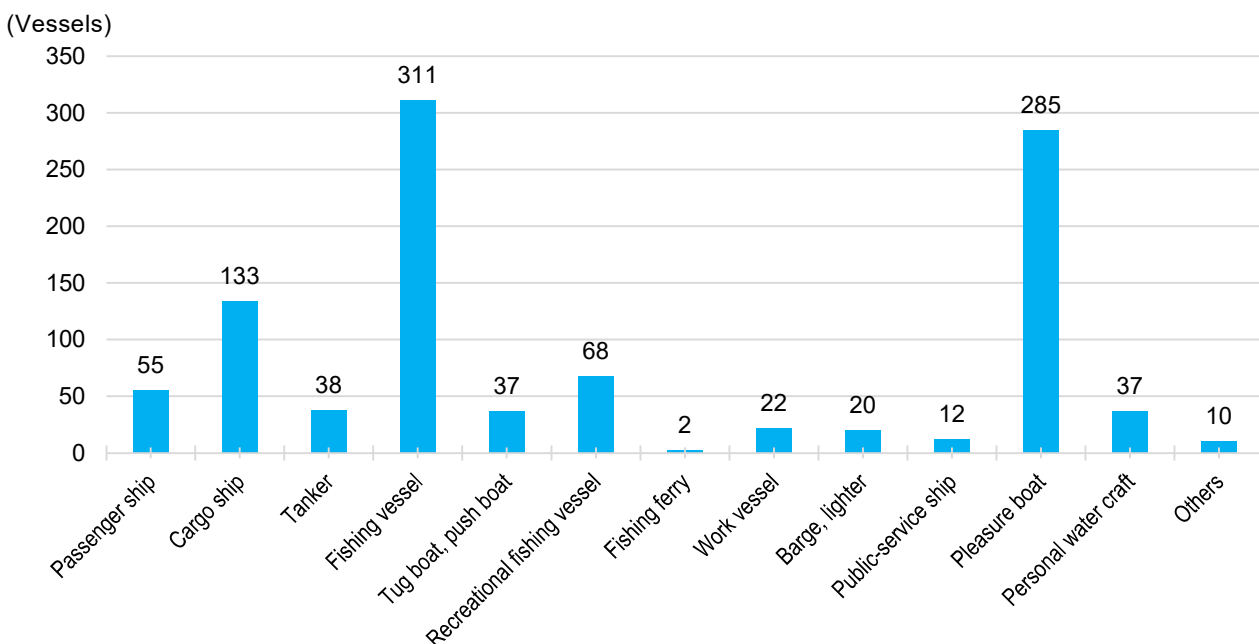
Number of investigated marine accidents and incidents by type in 2023



(2) Types of vessels

The number of vessels involved in marine accidents and incidents was 1,030. By type of vessel, they included 311 fishing vessels, 285 pleasure boats, 133 cargo ships, 68 recreational fishing vessels, and 55 passenger ships.

Number of vessels involved in marine accidents and incidents by type in 2023



The number of foreign-registered vessels involved in marine accidents and incidents was 28, and they were classified by accident type as follows: 18 vessels in collision, five vessels in contact, two vessels in grounding, and two vessels in loss of control. As for the flag of vessels, eight vessels were registered in Panama, seven vessels in Republic of Korea, two vessels in Norway, and two vessels in Belize.

Number of foreign-registered vessels by flag

					(Vessels)
Panama	8	Republic of Korea	7	Norway	2
Belize	2	Others	9		

(3) Number of casualties

The number of casualties was 306, consisting of 57 deaths, 11 missing persons, and 238 injured persons. By type of vessel, 108 persons in fishing vessels, 64 persons in pleasure boats, and 44 persons in recreational fishing vessels. By type of accident, 116 persons in fatality/injury, 79 persons in collision, 57 persons in contact, and 23 persons in capsizing.

With regard to the number of person’s dead or missing, 37 persons were involved in fishing vessel accidents, 13 persons in pleasure boat accidents, and six persons in cargo ship accidents, indicating dead or missing cases occurred frequently in fishing vessels.

Number of casualties (marine accident)

(Persons)										
2023										
Vessel type	Dead			Missing			Injured			Total
	Crew	Passengers	Others	Crew	Passengers	Others	Crew	Passengers	Others	
Passenger ship	2	1	0	0	0	0	6	19	0	28
Cargo ship	1	0	1	4	0	0	6	0	0	12
Tanker	0	0	0	0	0	0	1	0	0	1
Fishing vessel	32	0	0	5	0	0	68	0	3	108
Tug boat, push boat	0	0	0	1	0	0	3	0	2	6
Recreational fishing vessel	1	2	0	0	0	0	4	37	0	44
Fishing ferry	0	0	0	0	0	0	0	0	0	0
Work vessel	3	0	0	0	0	0	4	0	0	7
Barge, lighter	0	0	0	0	0	0	0	0	0	0
Public-service ship	0	0	0	0	0	0	3	0	0	3
Pleasure boat	7	1	4	1	0	0	16	7	28	64
Personal water craft	1	0	0	0	0	0	13	0	13	27
Others	1	0	0	0	0	0	1	0	4	6
Total	48	4	5	11	0	0	125	63	50	306
	57			11			238			

\*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 2023

The serious marine accidents which occurred in 2023 are summarized as follows. The summaries are based on information available at the start of the investigations and therefore are subject to change depending on the course of investigations and deliberations.

(Marine accident)

1	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	January 24, 2023 Off the coast of Hama Island, Taketomi Town, Okinawa Prefecture	Cargo ship XIN HAI ZHOU 2 Grounding
	<b>Summary</b>	The vessel ran aground off the coast of Hama Island, Taketomi Town, Okinawa Prefecture.
2	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	March 15, 2023 Off the coast of Hayase Fishing Port, Mihama Town, Fukui Prefecture	Recreational fishing vessel SHINGYOMARU (Vessel A) Recreational fishing vessel SEA BRAVO (Vessel B) Collision
	<b>Summary</b>	While heading to the fishing grounds, Vessel A collided with Vessel B, which was returning from a recreational fishing trip.
3	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	March 28, 2023 Katsura River, Kameoka City, Kyoto Prefecture	Passenger ship No. 9 Capsizing
	<b>Summary</b>	While descending the river, the vessel struck a rock and capsized. Two skippers on board died.
4	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	April 2, 2023 Off the south coast of Toga Lighthouse, Oga City, Akita Prefecture	Recreational fishing vessel KIMIMARU Fatality
	<b>Summary</b>	During a fishing trip, one angler fell overboard and died.
5	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	April 12, 2023 Inside the canal at Huis Ten Bosch Town, Sasebo City, Nagasaki Prefecture	Sightseeing boat DELFT Fatality
	<b>Summary</b>	The vessel (13 tons, one crew member) was navigating the canal within Huis Ten Bosch with seven passengers on board when Passenger A fell into the canal. Another passenger, hearing a noise, noticed Passenger A was missing and informed the master. The master confirmed one passenger was missing, contacted the operations manager, and searched the vicinity with a small boat. They found Passenger A floating on the water, rescued him, and transported him to the hospital via an arranged ambulance. Passenger A died later. No life jacket was worn.
6	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	May 7, 2023 Off the south coast of Kudaka Island, Nanjo City, Okinawa Prefecture	Recreational fishing vessel SEISHOMARU Injury
	<b>Summary</b>	The vessel (7.9 tons, one crew member) was navigating towards the fishing spot with ten anglers on board when two on the front deck were injured due to the vessel's motion. One sustained an open fracture of the cheekbone, and the other a fracture of the first lumbar vertebra. There was no damage to the boat.
7	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	August 24, 2023 Kii Channel	Container ship CONTSHIP UNO (Vessel A) Cargo ship IZUMIMARU (Vessel B) Collision
	<b>Summary</b>	Vessel A (9,940 tons, 18 crew members, Liberian-flagged) and Vessel B (499 tons, five crew members) collided, resulting in Vessel B capsizing and foundering later. On Vessel B, one crew member died, one went missing, and three were injured.
8	<b>Date and location</b>	<b>Vessel type and name, accident type</b>



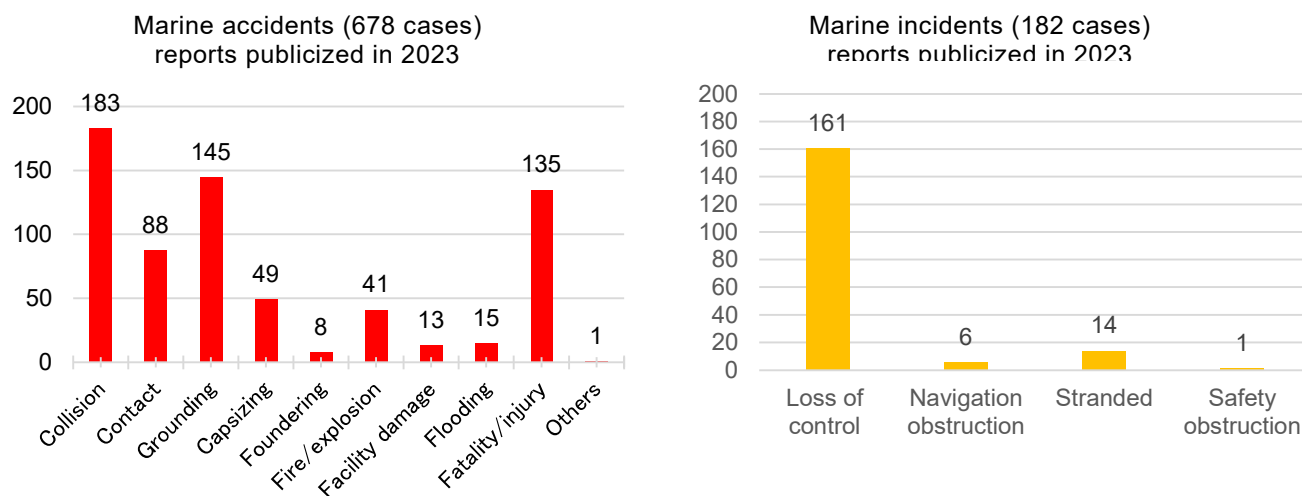
	September 21, 2023 Tokuyama-Kudamatsu Port, Kudamatsu City, Yamaguchi Prefecture	Coal carrier ENERGIA CENTAURUS Fatality
	<b>Summary</b>	While docked, a crew member was crushed between a moving crane and a pillar, resulting in death by asphyxiation.
9	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	November 21, 2023 Off the coast of Matsuyama City, Ehime Prefecture	Roll-on/Roll-off cargo ship SUOU Grounding
	<b>Summary</b>	The vessel ran aground on a rock off the coast of Matsuyama City, Ehime Prefecture.
10	<b>Date and location</b>	<b>Vessel type and name, accident type</b>
	December 6, 2023 Near the mouth of the Oyodo River, Miyazaki City, Miyazaki Prefecture	Recreational fishing vessel GOROKUMARU Capsizing
	<b>Summary</b>	The vessel capsized while navigating near the mouth of the Oyodo River.

### 8 Publication of investigation reports

The number of investigation reports of marine accidents and incidents published in 2023 was 860, consisting of 678 marine accidents (among them, 12 were serious) and 182 marine incidents.

Breaking them down by type, the marine accidents included 183 cases of collision, 145 cases of grounding, 135 cases of fatality/injury, and 88 cases of contact. The marine incidents included 161 cases of losses of control, (153 cases of navigational equipment failure, eight cases of fuel shortages, etc.), 14 cases of stranded, six cases of navigation obstruction, and one case of safety obstruction.

As for the objects of contact, 17 were quays, 15 were breakwaters, and 12 were light buoys.





The number of vessels involved in marine accidents and incidents was 1,098. Breaking them down by type, the marine accidents involved 294 fishing vessels, 228 pleasure boats, 102 cargo ships, 60 personal water crafts, and 52 recreational fishing vessels. The marine incidents involved 99 pleasure boats, 31 fishing vessels, 16 recreational fishing vessels, and 11 cargo ships.



#### Number of vessels by type involved in marine accidents and incidents for which reports were publicized in 2023


Classification	(Vessels)													Total
	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	
Marine accident	45	102	38	294	27	52	3	24	15	12	228	60	13	913
Marine incident	10	11	4	31	4	16	1	0	3	0	99	5	1	185
Total	55	113	42	325	31	68	4	24	18	12	327	65	14	1,098
Composition ratio %	5.0	10.3	3.8	29.6	2.8	6.2	0.4	2.2	1.6	1.1	29.8	5.9	1.3	100.0

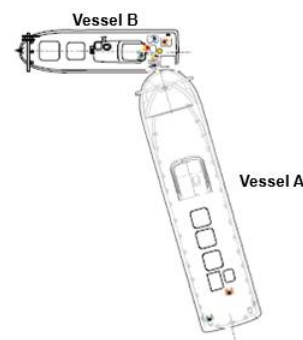
The marine accidents and serious incidents which occurred in 2023 are summarized as follows:


### Marine serious accident reports published in 2023


1	Date of publication	Date and location	Vessel type and name, accident type
	January 19, 2023	February 16, 2020 Kashima Port, Ibaraki Prefecture	Recreational fishing vessel No.27 SAKURAIMARU Contact (with breakwater)
	Summary	<p>With the master and one deckhand, one passenger, and 20 anglers on board, the vessel was heading southwest towards Kashima Port, Ibaraki Prefecture, when it contacted with the northern breakwater at the Second Ship Basin of Kashima Port.</p> <p>As a result, 14 anglers, the master, and the deckhand were injured, and the vessel sustained a rupture on the starboard bow. Additionally, the breakwater sustained damage and scuff marks at its tip.</p>	
	Probable causes	<p>It is probable that this accident occurred when the vessel proceeded southwest at approximately 16 knots towards the Second Ship Basin of Kashima Port. With a blind spot ahead, the master noticed the vessel heading towards the breakwater about 230 meters from the breakwater extending northeast from the opening of the area surrounded by the northern breakwater at the entrance of the Second Ship Basin when the bow of the ship dropped due to the waves and the blind spot disappeared. Upon noticing, he turned the helm to the left to avoid the breakwater, navigating remarkably close to its tip. Due to the influence of the waves, the vessel veered to the right again towards the breakwater, unable to avoid it at a speed of about 16 knots, and collided with the breakwater.</p> <p>The master navigated remarkably close to the breakwater because he usually took a route near it. It is probable that he believed the vessel would clear the breakwater as the heading line on the radar screen pointed to the left, based on his experience.</p>	
	Safety actions	<p>The following measures are necessary to prevent the recurrence of similar accidents:</p> <ol style="list-style-type: none"> <li>(1) Masters should consider the usual wave conditions in the surrounding sea area and the effects of composite waves generated from reflective waves off nearby structures when navigating past obstacles such as breakwaters, ensuring a safe distance from such obstacles and paying careful attention to the chosen navigation route.</li> <li>(2) Masters should decelerate as much as possible when entering the port, considering the channel's wave conditions.</li> <li>(3) Masters should station deckhands at the bow for lookout duties when entering the port.</li> <li>(4) Masters operating vessels with blind spots should use navigational instruments such as radar and GPS plotters to verify the vessel's position.</li> <li>(5) Shipowners should prioritize visibility from the bow as much as possible in designing and constructing new vessels.</li> </ol>	
	Report	<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-1_2020tk0001.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-1_2020tk0001.pdf</a> (Japanese)	
2	Date of publication	Date and location	Vessel type and name, accident type
	January 19, 2023	November 19, 2020 Off northwest of Wasa Island, Sakaide City, Kagawa Prefecture	Passenger ship SHRIMP OF ART Grounding



3	Summary	<p>The vessel, which had the master, one deckhand, and 60 passengers on board, ran aground on a drying rock<sup>*1</sup> while navigating off the northwest coast of Wasa Island, Sakaide City, Kagawa Prefecture.</p> <p>The vessel sank, injuring four passengers, after suffering a breach in the outer bottom plate and flooding.</p> <p>*1. The “drying rock” is a rock that submerges at high tide and becomes exposed at low tide.</p>			
	Probable causes	<p>It is highly probable that this accident occurred off the western coast of Wasa Island when the ship was heading north-northwest towards the Seto Ohashi Bridge. Hearing a passenger teacher explaining the eastern side of Iguro Island to students, the master decided it would be better for the passengers to view the eastern side of Iguro Island. The master checked visually and confirmed that there were no other vessels between the third and fourth bridge piers from the Iguro Island side, concluding that it would be safe to pass between them. However, the master did not notice the presence of a drying rock called Osowai, located to the south of the passage between the piers, approximately 200 cm above the minimum water level, and the ship ran aground on it.</p> <p>It is probable that the master’s failure to notice the drying rock is attributed to the fact that when he glanced at the GPS plotter<sup>*2</sup> screen to confirm the route, he did not enlarge the screen from the 300-meter scale, making the drying rock appear small on display. Additionally, the rock was submerged during the accident and not visible to the naked eye.</p> <p>Despite not usually navigating this area with the vessel, the master had sailed several times a year and believed he was familiar with the rocks and other hazards. Therefore, he did not conduct a waterway survey before departure, contributing to his failure to notice the drying rock.</p> <p>The ship owner had not equipped the vessel with charts marked with standard routes, hazard lines, and other necessary information as specified in the safety management regulations, nor had the safety manager conducted regular safety education on the safety management regulations and related laws. It is probable that this lack of preparation contributed to the master’s failure to conduct a waterway survey before departure.</p> <p>*2. The “GPS plotter” is a device that displays the ship’s position on a map on the screen using information obtained from satellites via the Global Positioning System (GPS) and can plot the ship’s track.</p>			
	Safety actions	<p>The following measures are necessary to prevent the recurrence of similar accidents:</p> <ol style="list-style-type: none"> <li>(1) Masters should conduct a waterway survey of the planned navigation area using charts, nautical reference maps, fishing facility information, and navigational notices before departure and plan the voyage while identifying obstacles that may hinder navigation.</li> <li>(2) Masters should be aware that in some areas, charts, and the information from electronic navigational reference maps on GPS plotters alone may not provide detailed information on obstacles such as drying rocks or the area’s actual coastline features.</li> <li>(3) If a waterway survey of the planned navigation area has not been conducted in advance, masters should not change the planned route impulsively.</li> <li>(4) Masters should appropriately use detailed displays on GPS plotters and other devices to verify the ship’s position and determine the conditions of the maritime area.</li> <li>(5) Domestic irregular route passenger transport operators must keep charts marked with hazard lines as specified in the reported safety management regulations on board.</li> <li>(6) Safety managers must regularly conduct safety education on safety management regulations and related laws for employees of their company.</li> </ol>			
	Report	<p><a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-3_2020tk0012.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-3_2020tk0012.pdf</a> (Japanese)</p>			
3	Date of publication	Date and location	Vessel type and name, accident type		

	January 19, 2023	September 5, 2021 Off the southwest coast of Kansai International Airport, Osaka Prefecture	Fishing vessel UNOHIMARU (Vessel A) Recreational fishing vessel SHOEIMARU (Vessel B) Collision
	Summary	<p>Vessel A was heading north-northwest towards the fishing grounds, while Vessel B was heading west towards the fishing spot when the two vessels collided.</p> <p>In this accident, one angler on Vessel B was seriously injured, while the master and four anglers sustained minor injuries. The stern of Vessel B was severely damaged. One deckhand on Vessel A was slightly injured, and the bulbous bow sustained a breach.</p>	
	Probable causes	<p>It is probable that this accident occurred off the southwest coast of Kansai International Airport during civil twilight before sunrise. Vessel A was heading north-northwest, and Vessel B was heading west. The master of Vessel A, believing no vessels were obstructing his course, continued navigating while preparing for operation with a deckhand, both looking down. Meanwhile, the master of Vessel B was focused on the forward view, resulting in the collision.</p> <p>It is possible that the master of Vessel A thought no vessels were obstructing his course because the bright lights from Kansai International Airport made it difficult to see vessel lights, reducing visibility due to light pollution and glare.</p> <p>It is probable that the master of Vessel B continued navigating with a forward focus, observing multiple fishing vessel mast lights, but did not perceive a collision risk due to the small appearance of the lights.</p>	
	Safety actions	<p>The following measures can help prevent similar accidents:</p> <ul style="list-style-type: none"> <li>• Masters should always maintain proper lookout and awareness of other vessels while navigating without focusing solely on preparatory work.</li> <li>• In areas with bright background lights that make it difficult to spot vessel lights, masters should divert their eyes from the light sources to restore vision and maintain a lookout.</li> <li>• When observing multiple vessel lights, masters should accurately track vessel movements by considering navigation lights as well as mast lights.</li> <li>• Fishing and recreational fishing vessels operating at night should be equipped with radar and simplified AIS to monitor other vessels.</li> </ul>	
	Report	<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-2_2021tk0008.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-2_2021tk0008.pdf</a> (Japanese)	
4	Date of publication	Date and location	Vessel type and name, accident type
	March 30, 2023	June 19, 2020 Honmoku Pier A5 Wharf, Yokohama District, Keihin Port	Cargo ship TIMU (Panamanian-flagged) Casualties
	Summary	<p>With a master and 17 crew members, the vessel was moored at Honmoku Pier A5 Wharf. Three stevedores were handling used trucks and other cargo on the second deck of the No. 2 hold, and three welders were attaching D-rings for cargo securing on the same deck. During these operations, two welders were struck by falling used trucks being handled by a crane, resulting in death and injury.</p>	
	Probable causes	<p>It is probable that this accident occurred while the vessel was moored at the pier. Welders were working near the cargo unloading area in the No. 2 hold (hereinafter referred to as “the unloading area”). As the cargo (hereinafter referred to as “the cargo”) approached the</p>	



		<p>unloading area, the chain sling (hereinafter referred to as “the chain sling”) holding the front gooseneck part of a semi-trailer (hereinafter referred to as “the front part”) broke, causing the trucks to tilt to the port side and fall, hitting two welders.</p> <p>The chain sling in question likely had an insufficient maximum working load*<sup>1</sup> for the maximum working load needed to lift the cargo on the effective side of an asymmetric lift. Additionally, if lateral loads were applied to the chain links on the front part, the links would be subjected to bending stresses exceeding the specified breaking stress for Grade 80 chains under ASTM standards. This could have led to the chain sling breaking under a load smaller than its breaking load*<sup>2</sup>.</p> <p>The stevedoring company did not call the two welders to the pre-operation meeting on the day of the loading/unloading work. They were unaware of the details of the loading/unloading operation. Additionally, the hold supervisor was late in noticing the approaching cargo and failed to communicate this, leading the welders to continue their work facing portside, unaware of the cargo approaching from the starboard side.</p> <p>The work supervisor, finding it difficult to see inside the No. 2 hold surrounded by hatch coaming, believed that loudly communicating the approach of the cargo to the hold supervisor would lead to the evacuation of workers from the unloading area. Despite loudly informing the workers inside the hold, the hold supervisor more likely did not receive the message, and the cargo approached the unloading area.</p> <p>The hold supervisor conversed with the hold workers about tasks, as there was a delay before the cargo would be lifted from the pier. Additionally, he did not hear the loud warning from the work supervisor about the approaching cargo. Consequently, it is probable that the hold supervisor noticed the cargo’s approach late and failed to evacuate workers from the unloading area in time.</p> <p>*1 The “maximum working load” refers to the maximum mass applied to a single chain sling during use. *2 The “breaking load” refers to the maximum load a single chain sling can withstand during a tensile test.</p>	
	Safety actions	<p>The following measures are suggested to prevent the recurrence of similar accidents:</p> <ul style="list-style-type: none"> <li>• The stevedoring company should select slinging gear with sufficient capacity relative to the weight of the cargo, ensuring that the gear can handle the total weight of the cargo, especially on the effective side in asymmetric lifts.</li> <li>• When using slinging gear to lift cargo with rectangular sections like H-beams by looping under the cargo, the stevedoring company should account for the fact that concentrated loads at the ends of the rectangular sections can cause localized high stress. To distribute the stress, materials such as reinforced fabric rubber pads with adequate elasticity, hardness, tear resistance, and abrasion resistance should be used between the slinging gear and cargo.</li> <li>• Before starting loading/unloading operations, the stevedoring company should hold a meeting with the work supervisors and workers at the worksite to explain the following points:             <ol style="list-style-type: none"> <li>① Work plan (schedule)</li> <li>② Work procedures</li> <li>③ Work methods</li> <li>④ Confirmation of communication methods</li> </ol> </li> <li>• Communication between workers during loading/unloading operations should be ensured using portable radios and visual signals such as hand gestures and flags.</li> <li>• The work supervisor should confirm that there are no workers in the cargo’s path before instructing the crane operator to move the cargo.</li> </ul>	
	Report	<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-3-1_2020tk0005.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-3-1_2020tk0005.pdf</a> (Japanese)	
5	Date of publication	Date and location	Vessel type and name, accident type
	April 27, 2023	February 29, 2020 Off the northern coast of Katsumoto Port, Iki City, Nagasaki Prefecture	Fishing vessel TAKAHISAMARU (Vessel A) Recreational fishing vessel


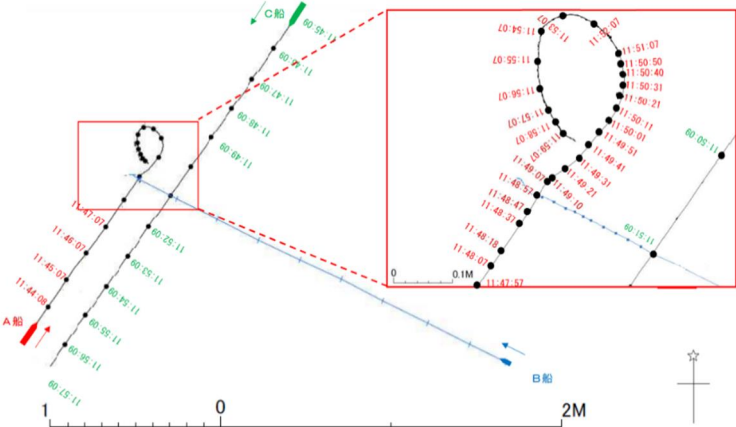
			SHINEIMARU (Vessel B) Collision
Summary		<p>With a master and one deckhand on board, Vessel A was heading north towards the fishing grounds off the coast north of Katsumoto Port, Iki City, Nagasaki Prefecture. Meanwhile, Vessel B, with only the master and five anglers on board, was drifting for recreational fishing purposes off the coast north of the same port when the two vessels collided, causing the capsizing of Vessel B.</p> <p>As a result of this collision, two anglers on Vessel B died, and three anglers and the master were injured. Additionally, the portside midsection of Vessel B sustained cracks and other damages (total loss), while Vessel A sustained cracks in the bow's outer plate.</p>	
Probable causes		<p>It is probable that this accident occurred off the coast north of Katsumoto Port, with Vessel A heading north towards the fishing grounds. The deckhand on Vessel A relied on radar for lookout, which was set in a way that could not detect Vessel B due to a blind spot ahead. Meanwhile, Vessel B, drifting with the bow facing west for recreational fishing, had the master focused on the GPS plotter*<sup>1</sup> and considering changes to the return route, believing no other vessels were approaching. This led to both vessels not noticing each other and the subsequent collision.</p> <p>The deckhand on Vessel A relied on radar for lookout because, typically, when detecting radar targets or recognizing multiple vessels outside the blind spot, they would look out of the left and right windows or sway the bow left and right to visually confirm the presence of other vessels within the blind spot. However, it is probable that just before the accident, no radar targets appeared, and no other vessels were seen outside the blind spot, leading the deckhand to believe no vessels obstructed their course and to continue using the radar to supplement the lookout for the blind spot ahead.</p> <p>It is probable that the deckhand on Vessel A could not detect Vessel B on the radar because the left radar, set to a short pulse width, was not adjusted for sensitivity, and the right radar was set to a long pulse width. This configuration made both radars unable to detect Vessel B as the distance decreased to approximately 1.2 miles.</p> <p>It is probable that the master of Vessel B believed no vessels were approaching because, after helping to retrieve fish on the portside midsection of the upper deck, he looked around the starboard side while returning to the wheelhouse and did not notice any approaching vessels.</p> <p>*1. The "GPS plotter" is a device that displays the ship's position on a map on the screen using information obtained from satellites via the Global Positioning System (GPS) and can plot the ship's track.</p>	
Safety actions		<p>The following measures should be taken to prevent the recurrence of similar accidents and mitigate damage:</p> <ol style="list-style-type: none"> <li>(1) Navigators should correctly understand their radar's performance, functions, and operation methods and adjust the range, pulse width, sensitivity, rain/snow clutter suppression, and sea clutter suppression levels according to the distance, terrain, weather, and sea conditions.</li> <li>(2) Navigators of vessels with blind spots due to the ship's structure should not rely solely on radar for lookout. They should use visual methods such as swaying the bow left and right to supplement the radar and maintain a proper lookout using all available means, including radar.</li> <li>(3) Shipowners should ensure that the visibility from the bow is maximized as much as possible when designing and constructing new vessels or modifying existing ones.</li> <li>(4) Navigators of drifting vessels should maintain a proper lookout in all directions to detect approaching vessels early. Upon recognizing an approaching vessel, they should issue a warning early and take measures to avoid a collision, such as starting the engine and moving the vessel.</li> <li>(5) Crew members of recreational fishing vessels should, even when they notice that their</li> </ol>	


		<p>vessel is approaching another vessel and cannot avoid a collision, alert anglers as early as possible using the onboard microphone or other means to ensure they take actions to minimize damage, such as bracing for impact, avoiding injury, or jumping into the water to avoid being trapped inside the vessel in the event of a collision.</p> <p>(6) High-sided vessels with a small crew should equip ladders or other means to rescue anyone who falls overboard effectively.</p>	
	Report	<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-4-2_2020tk0002.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-4-2_2020tk0002.pdf</a> (Japanese)	
6	Date of publication	Date and location	Vessel type and name, accident type
	April 27, 2023	April 27, 2021 Motobu Port (Toguchi District), Motobu Town, Okinawa Prefecture	Pleasure boat KUMASAN 007 Explosion
	Summary	<p>An explosion occurred lower part of the upper deck while the vessel prepared to depart for a sightseeing trip.</p> <p>As a result of the explosion, the master and four passengers were seriously injured, and the steering stand, outboard motor, and upper deck sustained fire damage.</p>	
	Probable causes	<p>It is probable that this accident occurred while the vessel was preparing to depart from the port. During the pre-departure inspection, the master decided not to open the front inspection hatch, thinking it was unnecessary, and only checked the bow storage and aft bilge compartment. This led to the failure to notice the fuel oil and combustible gas leak in the front bilge compartment. It is thought that the leaked combustible gas reached the explosive range*<sup>1</sup> and was ignited by an electric spark, causing the explosion.</p> <p>The master likely only checked the bow storage and aft bilge compartment because he believed there was no need to open the front inspection hatch unless there was a failure in components like the fuel gauge sensor.</p> <p>It is probable that the fuel oil and combustible gas leak in the front bilge compartment was due to a loosened hose clamp at the connection between the oil-resistant hose and the fuel oil tank. However, severe fire damage to the connection and fuel supply system prevented a detailed investigation.</p> <p>*1. "Explosive range" refers to the concentration range of combustible vapor and air that can support combustion.</p>	
	Safety actions	<p>The following measures should be considered to prevent the recurrence of similar accidents and mitigate damage:</p> <ul style="list-style-type: none"> <li>• Masters should open inspection hatches and use their senses (sight, smell, etc.) to check for fuel leaks or combustible gases in adjacent compartments near the fuel oil tank during refueling and pre-departure inspections.</li> <li>• Masters should regularly inspect for looseness in the oil-resistant hoses connected to the fuel oil tank and tighten the hose clamps, as necessary.</li> <li>• Masters should consider attaching supports to the oil-resistant hoses to prevent excessive load on the connections.</li> <li>• Masters should equip portable fire extinguishers on board.</li> </ul>	
	Report	<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-4-1_2021tk0004.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-4-1_2021tk0004.pdf</a> (Japanese)	
7	Date of publication	Date and location	Vessel type and name, accident type
	June 29, 2023	May 20, 2021 Off the southeast of Ohara Fishing Port, Isumi City, Chiba Prefecture	Recreational fishing vessel AMAMASAMARU (Vessel A) Recreational fishing vessel


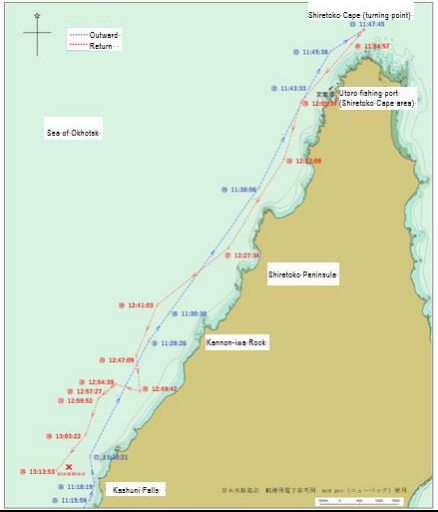


			HANABUSAMARU (Vessel B) Collision
	Summary	<p>Vessel A was heading south towards the fishing grounds, and Vessel B was drifting for recreational fishing when the two vessels collided.</p> <p>As a result, one angler on Vessel B died, and the aft deck extension sustained damage, while Vessel A sustained scrapes on the bow's outer plate.</p>	
	Probable causes	<p>It is probable that this accident occurred southeast of Ohara Fishing Port when Vessel A was heading south at approximately 13 knots under autopilot, moving to a different fishing spot. Meanwhile, Vessel B was drifting for recreational fishing. The master of Vessel A, believing no vessels were obstructing his course, continued navigating while organizing fishing gear in the wheelhouse's aft area, failing to notice Vessel B drifting ahead. Meanwhile, the master of Vessel B was focused on the anglers on the starboard deck, the GPS plotter, and the fish finder for vessel position adjustments, delaying his recognition of Vessel A's approach and leading to the collision.</p> <p>The master of Vessel A more likely thought no vessels were obstructing his course and continued navigating while organizing fishing gear in the wheelhouse's aft area because he was more concerned with the positions of four other recreational fishing vessels drifting and fishing from the port beam to the port bow rather than the bow itself, only glancing at the bow momentarily.</p> <p>The master of Vessel B continued drifting without noticing Vessel A's approach. It is probable that he was accustomed to other vessels avoiding his drifting vessel and believed they would do the same during this incident, leading to a decreased awareness of his surroundings.</p>	
	Safety actions	<p>The following measures should be considered to prevent the recurrence of similar accidents:</p> <ul style="list-style-type: none"> <li>• Masters or other watchkeepers should constantly watch out while navigating and avoid being distracted by specific tasks, focusing on steering.</li> <li>• Masters or other watchkeepers should maintain a constant lookout while drifting and, upon recognizing approaching vessels, should not assume that the navigating vessels will avoid them, taking necessary measures to avoid collisions.</li> <li>• Masters or other watchkeepers should confirm the approach of other vessels by switching radar ranges appropriately in addition to visual observation.</li> </ul>	
	Report	<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-6-1_2021tk0005.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-6-1_2021tk0005.pdf</a> (Japanese)	
8	Date of publication	Date and location	Vessel type and name, accident type
	June 29, 2023	June 5, 2022 Off the northern coast of Jino Island, Wakayama City, Wakayama Prefecture	Recreational fishing vessel No.2 EBISUMARU Fatality
	Summary	<p>The vessel, operated by the master alone, was navigating off the northern coast of Jino Island with two anglers on board when one angler fell overboard and died.</p>	
	Probable causes	<p>It is probable that this accident occurred when the vessel navigated off the northern coast of Jino Island. The angler, who was intoxicated, fell overboard, and drowned while moving around the vessel.</p>	



	Safety actions	<p>The following measures should be considered to prevent the recurrence of similar accidents and mitigate damage:</p> <ul style="list-style-type: none"> <li>• Masters should pay attention to the behavior of the anglers and alert them to avoid excessive drinking and to watch the step when moving around the vessel.</li> <li>• Anglers should be aware that adult inflatable life jackets are designed for individuals who can maintain their posture independently. Falling overboard while intoxicated can lead to death, so they should avoid excessive drinking.</li> <li>• Recreational fishing vessel operators should ensure the safety of the anglers by warning them against excessive drinking.</li> </ul>	
	Report	<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-6-2_2022tk0004.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-6-2_2022tk0004.pdf</a> (Japanese)	
9	Date of publication	Date and location	Vessel type and name, accident type
	July 27, 2023	February 23, 2021 Off the southeast of Katakai Fishing Port, Kujukuri Town, Chiba Prefecture	Cargo ship ASAHIMARU (Vessel A) Recreational fishing vessel No.3 SHOICHIMARU (Vessel B) Collision
	Summary	<p>With a master and four crew members on board, Vessel A was heading northeast towards Kushiro Port, Hokkaido. Meanwhile, with a master and one crew member on board, Vessel B was heading west-northwest towards Katagai Fishing Port with 12 anglers. The two vessels collided.</p> <p>As a result, the master, crew member, and eight anglers on Vessel B were injured, and the bow was crushed. Vessel A sustained dents and scrapes on the starboard side.</p>	
	Probable causes	<p>It is probable that this accident occurred southeast of Katagai Fishing Port. Vessel A was heading northeast towards Kushiro Port, and Vessel B was heading west-northwest towards Katagai Fishing Port after fishing at the Katagai Trough. Both vessels continued on the same course and speed as their paths intersected almost simultaneously, leading to the collision.</p>  <p>It is probable that Vessel A continued on the same course and speed because the boatswain of Vessel A saw Vessel B on the starboard bow and assumed that fishing vessels and recreational fishing vessels usually avoided Vessel A, believing Vessel B would do the same. Additionally, the presence of an approximately 70-meter-long coastal oil tanker (hereinafter referred to as “Vessel C”) on the starboard-to-starboard meeting situation led him to consider it dangerous to turn starboard to avoid Vessel B.</p> <p>Vessel B continued on the same course and speed because Master B had limited visibility due to spray hitting the front windows of the wheelhouse. When he spotted Vessel A and Vessel C on radar and visually, it is probable that he judged he could safely pass ahead of both vessels. Later, when sea clutter obscured both vessels on the radar screen, he still believed he could safely pass ahead.</p>	
	Safety actions	<p>The following measures should be considered to prevent the recurrence of similar accidents and mitigate damage:</p> <ul style="list-style-type: none"> <li>• Masters and watchkeepers should continuously monitor the movements of approaching vessels using visual and radar observations without relying solely on their experience. They should also use the radar’s ARPA<sup>*1</sup> functions to maintain a proper lookout.</li> <li>• Masters and watchkeepers should avoid collisions well in advance by changing their course and speed early enough to ensure sufficient time to avoid a collision if there is no</li> </ul>	


		<p>change in the course and speed of approaching vessels.</p> <ul style="list-style-type: none"> <li>• Masters of small vessels should open the side windows of the wheelhouse to maintain a visual lookout when visibility is reduced due to waves hitting the wheelhouse windows. If equipped with radar, they should use it appropriately after proper adjustments.</li> </ul> <p>*1. The “Automatic Radar Plotting Aids (ARPA)” is a device that processes information received from radar to detect, track, and predict the movements of targets such as other vessels, providing collision warnings.</p>	
	Report	<p><a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-7-1_2021tk0002.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-7-1_2021tk0002.pdf</a> (Japanese)</p> 	
10	Date of publication	Date and location	Vessel type and name, accident type
	August 31, 2023	<p>March 21, 2022</p> <p>Location unknown (The vessel was found on fire at approximately 145° true bearing, 106 nautical miles from Tanegashima Lighthouse)</p>	<p>Fishing vessel No.5 JUICHIYUJIN MARU</p> <p>Fire</p>
	Summary	<p>With a master, chief engineer, and six other crew members, the vessel was engaged in tuna longline fishing southeast of Tanegashima, Kagoshima Prefecture, when a fire broke out near the engine room.</p> <p>The vessel later sank, resulting in the deaths of four crew members, one missing person, and one injured person out of the eight crew members.</p>	
	Probable causes	<p>It is possible that this accident occurred at night while many crew members were resting, possibly due to a fire that broke out near the port side of the engine room in waters southeast of Tanegashima.</p> <p>It is probable that the fire spread to the vessel because the smoke detector alarm did not sound, delaying the crew’s awareness of the smoke and fire and preventing initial firefighting efforts.</p> <p>Furthermore, it is possible that the lack of adequate fire drills and training before this accident contributed to the severity of the damage.</p>	
	Safety actions	<p>The following measures should be considered to mitigate the damage from similar accidents involving small fishing vessels:</p> <p>(1) Fire drills and training</p> <ol style="list-style-type: none"> <li>① In the event of a fire in the engine room, crew members should close the engine room and shut off ventilation to stop the air supply (oxygen).</li> <li>② If a fire occurs, crew members should engage in firefighting activities to prevent or delay the spread of the fire to the vessel.</li> <li>③ Shipowners should instruct crew members to wear life jackets when evacuating the vessel and carry radar transponders*1 and Emergency Position Indicating Radio Beacons (EPIRBs)*2 to facilitate early rescue operations.</li> <li>④ In addition to the measures described in ①, ②, and ③, masters should conduct drills according to the Seafarers Act Enforcement Regulations, and shipowners should regularly provide safety and health education and training following the Seafarers Safety and Health Regulations.</li> </ol> <p>The crew must work together in a fire for firefighting and lifesaving activities. By conducting regular training, the crew can become aware of the actions they need to take, identify areas for improvement, internalize appropriate actions, and enhance safety levels through repetition.</p> <ol style="list-style-type: none"> <li>⑤ Shipowners should monitor the implementation of drills as stipulated by the Seafarers Act Enforcement Regulations and ensure they are carried out appropriately.</li> </ol> <p>(2) Installation of smoke detectors and emergency bells:</p> <ol style="list-style-type: none"> <li>① Shipowners should install smoke detectors inside the vessel to detect smoke or flames early in the event of a fire, regularly update the devices according to their lifespan, and check the alarm sound to ensure they function correctly.</li> <li>② Even if smoke detectors do not activate due to the smoke conditions, shipowners should consider installing manual emergency bells to alert the crew to the presence of smoke so they can recognize and respond to the emergency</li> </ol>	

		<p>early.</p> <p>*1. The “radar transponder” is a device that automatically responds to radar signals transmitted by patrol boats or aircraft during a search, indicating the distress position.</p> <p>*2. The “Emergency Position Indicating Radio Beacon (EPIRB)” is a satellite-based radio buoy system that transmits distress signals when activated. It automatically floats and activates when the vessel sinks due to a water pressure sensor.</p>	
	Report	<p><a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-8-1_2022tk0002.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-8-1_2022tk0002.pdf</a> (Japanese)</p> 	
11	Date of publication	Date and location	Vessel type and name, accident type
	September 7, 2023	<p>April 23, 2022</p> <p>Off the western coast of the Shiretoko Peninsula near Kashuni Falls, Hokkaido</p>	<p>Passenger ship KAZU I</p> <p>Foundering</p>
	Summary	<p>With a master and one deckhand, the vessel was navigating the waters off the western coast of the Shiretoko Peninsula with 24 passengers when it began to take on water and sank near Kashuni Falls.</p> <p>As a result of this accident, 18 passengers, the master, and the deckhand died, and six passengers were missing.</p> 	
Probable causes	<p>(1) Probable causes of the accident</p> <p>① It is probable that the accident occurred because the vessel encountered waves over 1.0 m high while navigating back from Cape Shiretoko under conditions where waves were increasing due to worsening weather with northwesterly winds brought by a cold front passing over the Sea of Okhotsk. These waves hit the bow deck, and the resulting vessel motion caused the bow hatch cover to open, allowing seawater to enter the storage compartment below the upper deck. The water then spread to the storage compartment, engine room, and steering gear room, causing a loss of buoyancy*1 and resulting in the vessel sinking near Kashuni Falls.</p> <p>The bow hatch cover opened under the impact of the waves on the bow deck. The vessel left Utoro Fishing Port*2 despite the expected worsening of sea conditions without ensuring the hatch was securely closed and continued navigation without stopping operations, returning early, or taking refuge in a sheltered port.</p> <p>② It is probable that the bow hatch cover was not securely closed due to inadequate inspection and maintenance of the hatch components, which had deteriorated and loosened over time. The failure of the Japan Craft Inspection Organization (JCI) to conduct an opening and closing test during the inspection just before the accident, relying only on visual checks to judge it in good condition, also contributed to the vessel departing with a faulty hatch.</p> <p>The spread of flooding from the forward compartment to the storage compartment, engine room, and steering gear room was due to the lack of watertight integrity below the upper deck, with bulkhead openings.</p> <p>③ It is probable that the vessel departed contrary to the established operating standards, following the previous method of departing, assuming they would return if weather and sea conditions deteriorated.</p> <p>Moreover, the vessel continued operating without stopping after departure because the master lacked the necessary knowledge and experience regarding the weather and sea</p>		

		<p>characteristics on the western side of the Shiretoko Peninsula and their impact on the vessel’s handling. Additionally, there was no person in the office of Shiretoko Yuran Co., Ltd. to manage operations and support the master’s decisions. There were no effective means of communication between the vessel and the office. Consequently, the master could not receive information or advice from the office personnel during navigation.</p> <p>The vessel’s lack of effective communication was partly due to the JCI’s<sup>*3</sup> approval of a KDDI Corporation mobile phone with limited coverage on the western side of the Shiretoko Peninsula as the vessel’s communication equipment.</p> <p>④ The significant lack of personnel with the necessary knowledge and experience for safe operation, non-compliance with operating standards, insufficient actual operation management, and inadequate maintenance of physical facilities, such as the hull and communication equipment, at Shiretoko Yuran Co., Ltd. were attributed to the absence of a knowledgeable safety manager. The safety management system was not adequately established, resulting in serious consequences. Furthermore, the Hokkaido District Transport Bureau of the Ministry of Land, Infrastructure, Transport and Tourism failed to identify and address the deficiencies in Shiretoko Yuran Co., Ltd.’s safety management system during the examination of the notification in 2021 when the company’s president was appointed as the safety manager and operations manager, and during the audit of the company. This oversight contributed to the continued operation of the vessel under a weak safety management system.</p> <p>(2) Probable causes of human casualties</p> <p>The vessel’s flooding and sinking resulted in the deaths of 18 passengers, the master, and the deckhand, and six passengers remain missing. The vessel’s lifesaving equipment provided an extremely low chance of rescuing people while they were still alive unless they were rescued immediately after being submerged in seawater with a surface temperature of approximately 4°C. In this accident, the passengers, master, and deckhand were submerged, leading to accidental hypothermia<sup>*4</sup> and the inability to hold their breath, causing them to ingest seawater and die from seawater drowning<sup>*5</sup>. The six missing passengers have not been found, likely due to being swept away in rough sea conditions.</p> <p>*1. “Buoyancy” refers to the force that lifts the vessel upwards when submerged to the upper deck.</p> <p>*2. Utoro Fishing Port is a fishing port located in Shari Town, Shari District, Hokkaido, divided into two districts: the main port in the Utoro area and the branch port in the Shiretoko Cape area. In this report, the main port is referred to as “Utoro Fishing Port,” and the branch port is referred to as “Utoro Fishing Port (Shiretoko Cape Area).”</p> <p>*3. The Japan Craft Inspection Organization (JCI) is a special private corporation established under Chapter 2 of the Ship Safety Act (Act No. 11 of 1933) to ensure the seaworthiness and safety of human life on small vessels. It acts as an agency of the government, handling inspection duties for small vessels.</p> <p>*4. “Accidental hypothermia” refers to a life-threatening condition where the body’s core temperature drops significantly due to exposure to cold.</p> <p>*5. “Seawater drowning” refers to drowning caused by seawater entering the airways.</p>
	<p>Safety actions</p>	<p>Based on the causes of this accident, it is necessary to take preventive measures from the perspective of the vessel’s structure and equipment (hatches, bulkheads, communication equipment), the master’s compliance obligations, establishing an operation management system, and the safety management system.</p> <p>(1) Vessel’s structure and equipment</p> <p>① Hatches</p> <p>Shipowners must conduct maintenance to ensure that the hatch closure devices meet the safety standards (weathertight) mandated by the Ship Safety Act and the Small Vessel Safety Regulations. The master must confirm that the hatches are securely closed during pre-departure inspections. The JCI needs to enhance the effectiveness of inspections by regularly checking that hatch clips are functioning correctly and ensuring they meet safety standards.</p> <p>② Bulkheads</p> <p>The Maritime Bureau of the Ministry of Land, Infrastructure, Transport, and Tourism should consider safety standards requiring watertight bulkheads to prevent the spread of</p>

		<p>flooding and the vessel’s foundering.</p> <p>③ Communications equipment The JCI must ensure that small passenger vessels have communication devices that allow constant communication on their routes. The inspection methods for radio equipment need to be made effective.</p> <p>(2) Master’s obligations Masters of small passenger vessels must accurately understand and adhere to the operating standards, ensuring they do not depart with the assumption of deciding to return midway if weather and sea conditions deteriorate.</p> <p>(3) Establishment of operation management and safety management systems Operators of small passenger vessels must appoint safety managers, operation managers, and masters with high safety awareness, knowledge of the characteristics of the navigation area, and the ability to make appropriate decisions on whether to depart or continue navigation. They must establish a safety management system that ensures accurate understanding and adherence to safety management regulations and operating standards, enhancing safety awareness, improving the capabilities of all personnel involved in safety, and continuously conducting education, training, and maintenance of the vessel and equipment to maintain and strengthen the safety management system. Collaboration among local operators for mutual safety support is also considered effective.</p> <p>Moreover, the operation management system must function effectively to ensure appropriate operational decisions and land-based support, such as canceling departures, suspending operations, or using refuge ports based on changes in weather and sea conditions. Particularly, operators of small passenger vessels in the Utoro area must accurately understand and comply with the operating standards, ensuring they do not depart with the assumption of deciding to return midway if weather and sea conditions deteriorate.</p> <p>The Maritime Bureau of the Ministry of Land, Infrastructure, Transport, and Tourism needs to enhance the effectiveness of audits conducted by the transport bureau to understand the actual conditions of safety management and operation management by small passenger vessel operators and to take appropriate corrective actions, as necessary. Additionally, it should ensure that small passenger vessel operators accurately understand and comply with operating standards and promote awareness of the importance of identifying and utilizing refuge ports in the navigable areas by including this information in the operating standards.</p> <p>(4) Stricter examination of safety managers and operation managers The Maritime Bureau of the Ministry of Land, Infrastructure, Transport and Tourism will tighten the examination of practical experience, etc., which is a requirement*<sup>6</sup> for Chief Safety Management Officers and Flight Operations Managers. It is also desirable to consider a new system where individuals with experience and knowledge in operation management and safety management, along with high safety awareness, are appointed as safety and operation managers.</p> <p>(5) Lifesaving equipment The Maritime Bureau of the Ministry of Land, Infrastructure, Transport, and Tourism needs to develop lifesaving equipment for small passenger vessels that prevents passengers from coming into direct contact with seawater in case of a foundering. It should also encourage the introduction of such equipment for small passenger vessels operating in areas with low sea surface temperatures.</p> <p>*6. The Enforcement Regulations of the Maritime Transportation Act specify the requirements for safety managers in regular passenger vessel route operations in Article 7-2-2 and for operation managers in Article 7-2-3, and these requirements are applied to irregular passenger route operations as per Article 23-4.</p>	
12	Date of publication	Date and location	Vessel type and name, accident type
Report		<a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-9-1_2022tk0003.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-9-1_2022tk0003.pdf</a> (Japanese)	

September 28, 2023	July 25, 2020 Shallows off the southeast coast of the island of Mauritius, Republic of Mauritius	Cargo Ship WAKASHIO Grounding
Summary	<p>The Vessel, with a master and 19 other crew members aboard, was sailing to the Port of Tubarão in the Federative Republic of Brazil when she ran aground on shallows off the southeast coast of the island of Mauritius, Republic of Mauritius.</p> <p>Although there were no fatalities or injuries to the crew, the Vessel's hull buckled*<sup>1</sup> and sustained other damage and, subsequently, fuel oil spilled from a rupture caused by the</p> <div data-bbox="483 443 1377 857" style="text-align: center;"> <p>*Photo taken on August 15, 2020</p>  </div> <p>occurrence and spreading of cracks that resulted from the buckling, contaminating the southeastern coast of the island.</p> <p>*1 "Buckling" refers to a phenomenon that occurs when a load (mainly compression) on a structure is gradually increased, equilibrium becomes unstable at a certain load, and major deflection occurs rapidly, resulting in a sudden loss of bearing force.</p>	
Probable causes	<p>(1) Probable causes of the accident</p> <p>It is probable that the cause of the Accident was that, as the Vessel was proceeding west-southwest off to the east-northeast of Mauritius without obtaining Charts, etc., showing detailed representations of the coastline and other features of Mauritius, the Master changed the passage plan and the Master and Chief Officer continued navigating on a course approaching shallows in the island's southeast region with their attention drawn to smartphone transmission, and consequently the Vessel grounded on the shallows.</p> <p>It is probable that the Master changed the passage plan in order to take a course approaching Mauritius for the purpose of receiving a smartphone signal.</p> <p>It is probable that the Vessel did not obtain detailed Charts, etc., for the area around Mauritius because the Master thought they were unnecessary, as the Vessel was not scheduled to enter port at Mauritius.</p> <p>It is probable that the Vessel had repeatedly approached land, etc., in the past to receive a smartphone signal, and that low awareness with respect to safe navigation and a higher risk acceptability among the crew as a whole were involved in the occurrence of the Accident.</p> <p>(2) Probable Cause of the Damage (Release of Fuel Oil)</p> <p>It is probable that the cause of the damage was that, under conditions in which it took at least five days for tugboats to arrive after the grounding, and which even after their arrival, the tugboats were unable come alongside the hull and join a tug line due to worsening sea conditions, the Vessel's hull buckled after striking against the seafloor, causing a rupture in the plating shell near a fuel oil tank, and consequently approximately 1,000 tons of fuel aboard remaining in the tank spilled onto the sea surface and polluted the coasts of southeastern Mauritius.</p> <p>It is probable that Mauritius's regional circumstances, worsening sea conditions, and the effects of COVID-19-related isolation measures were involved in the release of fuel oil from the rupture caused by the hull's buckling and the spread of damage caused by the oil spill.</p>	
Safety actions	<p>Crew members must implement the following measures to prevent the occurrence of a similar accident.</p> <p>(1) Crew members must not engage in any unsafe behaviors, such as approaching the shore,</p>	

		<p>etc., for personal reasons.</p> <p>(2) Sailing in coastal waters, masters and navigation officers must obtain appropriate charts and other nautical publications for planned areas of navigation and prepare passage plans with careful thought to ensure their vessels' safety, and must endeavor to operate their vessels safely by conducting appropriate watchkeeping (lookout) and checking ship's position at all times.</p> <p>(3) Masters must station bridge watchkeepers with the proper personnel.</p>	
	Report	<p><a href="https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-10-1_2020tk0010.pdf">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-10-1_2020tk0010.pdf</a> (Japanese)</p> <p><a href="https://www.mlit.go.jp/jtsb/eng-mar_report/2023/2020tk0010e.pdf">https://www.mlit.go.jp/jtsb/eng-mar_report/2023/2020tk0010e.pdf</a> (English)</p>	

**9 Provision of factual information in 2023 (marine accidents and incidents)**

The JTSB provided no factual information in 2023.

## Column

## Utilization of 3D Models in Accident Investigation Marine Accident Investigators JTSB Lab

Have you ever heard of the term LiDAR or LiDAR scanner? LiDAR stands for Light Detection and Ranging. It is a technology that acquires spatial position information (three-dimensional coordinates) of objects by reflecting laser beams emitted from a scanner. Recently, this technology has been utilized in driver assistance and autonomous driving technologies for automobiles. Today, high-performance smartphones are also equipped with LiDAR scanners, making creating and utilizing 3D models more accessible.

In the accident investigations conducted by the JTSB, there is a strong demand to determine the causes scientifically and objectively. In the investigation of the foundering of the passenger ship “KAZU I,” which occurred on April 23, 2022, we implemented an analysis using 3D models.



\*Simple model

Creating a 3D model of the entire “KAZU I” — To investigate the KAZU I’s hull, a team of Marine Accident Investigators and JTSB Lab personnel was formed and worked on this task.

During the hull investigation phase, it was unclear what analyses would be necessary to determine the cause of the accident. Therefore, to withstand subsequent detailed analyses, the goal was to scan and three-dimensionally reproduce not only the exterior of the hull but also the interior, including the cabins and engine room, in as much detail as possible.

The JTSB owns two types of 3D scanners: stationary and handheld. The stationary type can stably scan objects up to approximately 130 meters in all directions from the scanner. The handheld type can scan up to four meters but can be moved to measure areas the stationary type cannot capture, such as the backside of objects.



Stationary 3D scanner



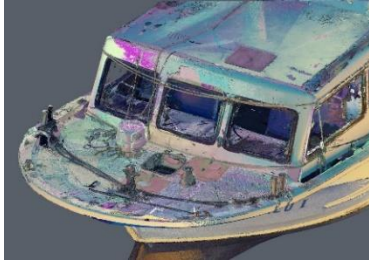
Handheld 3D scanner

To accurately recreate the shape, it was necessary to obtain as many coordinate points as possible without blind spots (areas not hit by the laser). During the hull investigation of the “KAZU I,” the two types of equipment were used according to the target objects, such as the narrow interior and engine room. Scanning was conducted from over 200 locations inside and outside the hull, acquiring approximately two billion three-dimensional coordinates (point cloud data).

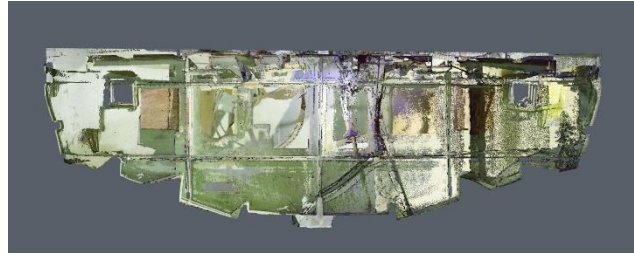
However, the point cloud data consisting of approximately two billion points could not be used for analysis as it was. Tasks such as aligning data obtained from different equipment and locations, removing noise from non-hull and non-structural objects, and correcting missing parts due to laser shadowing were necessary. The 3D team worked on these tasks with full effort, creating the 3D models over approximately three months. This allowed for detailed reproduction on the desk, measurement, and analysis using a more precise actual measurement model than various drawings, unaffected by any state changes after the scanning.

The investigation report on the foundering of the “KAZU I” includes several images of this 3D models. Here is one example.

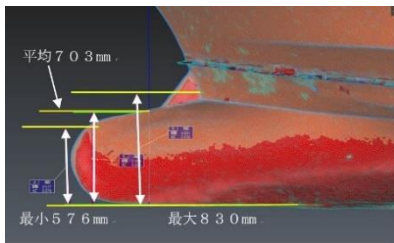




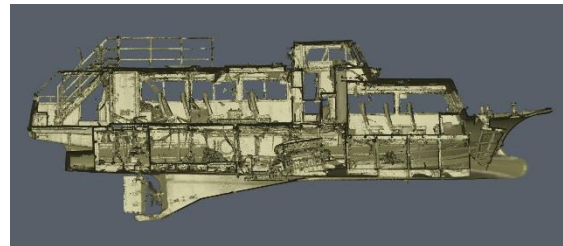
Confirming the shape of the curved deck and the height relationship between the bow hatch and the gunwale



Reproducing interior bulkheads that cannot be photographed entirely due to structures



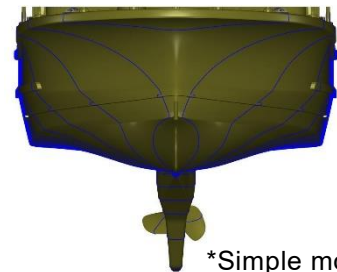
Estimating the draft at the time of the accident



Visualizing the arrangement of each room and structure inside the ship using cross-sectional diagrams

Additionally, to elucidate the mechanism that led to the foundering of the “KAZU I,” the JTSB has commissioned the National Maritime Research Institute, National Institute of Maritime, Port and Aviation Technology to analyze the vessel’s draft and hull inclination, the impact of waves, and the vertical acceleration at the hatch area. This analysis is also based on data obtained from the 3D models.

In order to analyze the conditions such as hull movement, wave impact, water ingress, and hull inclination, it was necessary to have coordinate values not only for the hull’s exterior shape but also for the positions and sizes of openings like the bow hatch, the locations of bulkheads within compartments, and the heights and sizes of bulkhead openings. Additionally, data on the volumes of each compartment and the positions of heavy objects like the main engine were required. These data were also calculated through the analysis of the 3D models.



\*Simple model  
Determining the shape using multiple cross-sectional coordinate values

By utilizing the actual 3D models of the hull, it is possible to perform a more precise quantitative evaluation of the mechanism leading to the accident compared to drawings. Visualizing the analysis results can also aid in understanding the report.

The JTSB aims to propose effective accident prevention measures through more scientific and objective cause investigations. Therefore, it will extensively use 3D models in accident investigations of aviation, railways, and ships.

\*Note: The images labeled as “simple model” in this column are reproduced from photographs and differ from those used in the analysis.