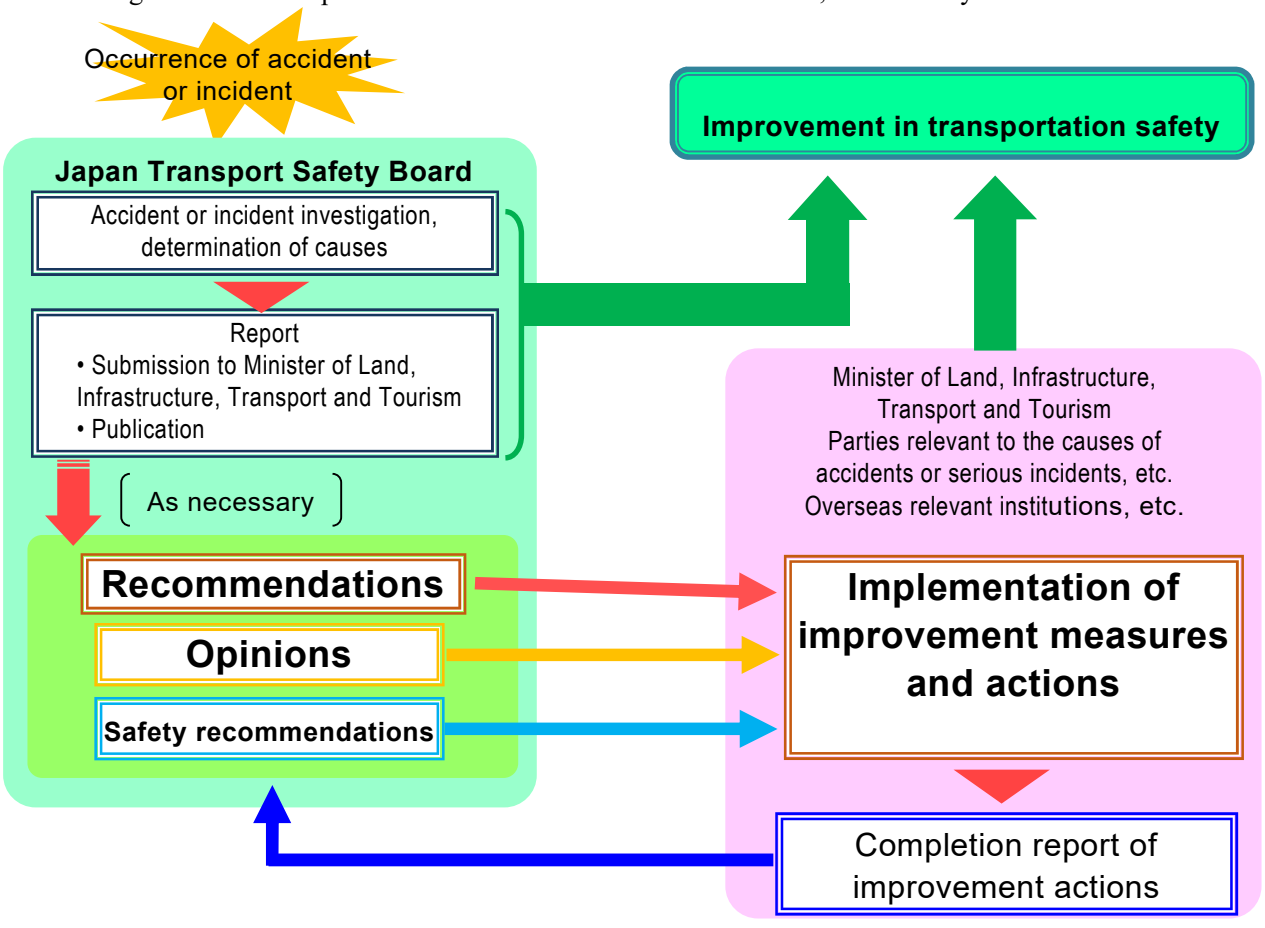
Chapter 2 Summary of recommendations and opinions

The Japan Transport Safety Board (hereinafter referred to as “the JTSB”) is an organization established as an external organ of the Ministry of Land, Infrastructure, Transport and Tourism in order to achieve the purposes stipulated in Article 1 of the Act for Establishment of the Japan Transport Safety Board (hereinafter referred to as the "Act for Establishment") (Article 3 of the Act for Establishment), and it is stipulated that its mission is not only to appropriately conduct investigations to determine the causes of accidents and incidents involving aircraft, railway, and marine and the causes of damage caused by the accidents, but also to demand the Minister of Land, Infrastructure, Transport and Tourism or parties relevant with the cause to implement necessary policies or measures based on the results of these investigations. (Article 4 of the Act for Establishment)

In order to fulfill its mission of improving transportation safety, the JTSB has a system of "recommendation" and "opinion" as an important system along with accurate accident investigation. Based on the results of investigations into accidents, the JTSB can make recommendations to the Minister of Land, Infrastructure, Transport and Tourism and other parties concerned about measures that should be taken to prevent accidents and reduce damage. It is stipulated in the act that the Minister of Land, Infrastructure, Transport and Tourism must notify the JTSB of the measures taken based on the recommendations, and if the parties concerned with the cause do not take measures related to the recommendations, the JTSB is entitled to make a public announcement to that effect. (Articles 26 and 27 of the Act for Establishment)

On the other hand, when it is determined not only based on the results of investigations into individual accidents, but also on the interim results of investigations or results of investigations of past accidents. The JTSB is entitled to state its opinion to the Minister of Land, Infrastructure, Transport and Tourism about policies and measures to be taken to prevent accidents and reduce damage, if necessary. (Article 28 of the Act for Establishment)

Incidentally, in the case of aircraft and marine accidents, the JTSB may recommend measures to be taken swiftly to enhance safety (recommendations on safety) in the course of accident investigations to relevant overseas organizations and parties based on international conventions, if necessary.



1 Recommendations

The recommendations issued by the JTSB in 2022 are as follows. The status of measures taken in response to the recommendations reported during the same year is posted including its summary.

(1) Recommendations related to the grounding of the passenger ship No. 12 An-ei and the status of measures taken in response to the recommendations

(Recommendations on June 30, 2022)

○Summary

On August 29, 2021, the passenger ship No. 12 An-ei grounded on a shallow reef while proceeding southeast.

The ship suffered bending damage in her both rudder shafts.

○Probable Causes

It is Probable that in this accident, while the ship was sailing southeast off the northwestern coast of Taketomi Island, since the master thought that time could be saved by sailing in the waters south of the normal standard route deviated from the normal standard route and sailed in an area close to shallow reefs only visually, the ship entered the waters with rocks located north of Hidehama called Hamashima off the northwest coast of Taketomi Island and grounded on a shallow reef.

○Details of recommendations to An-ei Kanko Company

It is probable that in this accident, while No. 12 An-ei was sailing southeast off the northwestern coast of Taketomi Island, Taketomi Town, Okinawa Prefecture since the master thouoght that time could be saved by sailing in the waters south of the normal standard route deviated from the normal standard route and sailed in an area close to shallow reefs only visually, the ship entered the waters with rocks located north of Hidehama called Hamashima off the northwest coast of Taketomi Island and grounded on a shallow reef.

An-ei Kanko Company is a general passenger liner operator that connects Ishigaki Island and remote islands by standard routes and transports a large number of passengers daily on these standard routes considered as the life routes. On the other hand, around these standard routes, there is a wide sea area with shallow reefs made of coral reefs unique to the Nansei Islands. It is needless to say that it is necessary to sufficiently recognize that there is a risk of grounding and a serious accident may be caused in which not only the ship but also passengers suffer damage when sailing only visually close to the wide sea area with shallow reefs, and to take care of safe navigation, accordingly.

However, since October 2008, there have been 11 incidents in which passenger ships operated by An-ei Kanko Company grounded on shallow reefs during navigation. Although measures such as safety education for crew members have been taken by the company, recurrences of grounding accidents show that the crew members are not sufficiently aware of the importance of safe navigation. Therefore, it is considered necessary in the future that not only the crew members are enforced to sail the standard routes stipulated in the safety management manual, but also An-ei Kanko Company as a whole engage in ensuring the passengers to be safety transported by continuously providing guidance on the need to check the heading properly.

Therefore, in order to prevent the recurrence of similar accidents, based on the results of this accident investigation, the JTSB recommends the following to An-ei Kanko Company based on Paragraph 1, Article 27 of the Act for Establishment.

In addition, based on the provisions of paragraph 2 of the same article, the JTSB will request a report on the measures taken based on this recommendation.

Recommendations

(1) Continuous guidance on the compliance with the sailing of the standard routes stipulated in the safety management manuals and the checking of the accurate heading should be provided to all crew members of all ships operated based on the understanding of their navigation records.
(2) The standard routes stipulated in the safety management manuals should be checked and second standard routes in which safety is ensured should be established and made known to the whole company.
(3) Guidance should be provided to all crew members of all ships operated so that information regarding safety during navigation can be shared among persons on watch duty regardless of their ranks.
(4) For crew manning, consideration should be given so that specific crew members are not burdened in an unbalanced way, such that late hour work is continuously assigned to them.

○**Measures taken by An-ei Kanko Company based on the recommendations**

In response to the "Recommendations related to the grounding accident of the passenger ship No. 12 An-ei" sent through the notification UN-I-SOU No. 102 dated June 30, 2022, we inform you of the measures taken based on the recommendations as follows:

Recommendations

1. Continuous guidance on the compliance with the sailing of the standard routes stipulated in the safety management manuals and the checking of the accurate heading should be provided to the crew members of all ships operated based on the understanding of their navigation records.

[Improvement measures]

*We are not only providing guidance on the compliance with the sailing of the standard routes stipulated in the safety management manuals, but also are providing guidance continually on the checking of the accurate heading using the GPS plotters and the like to crew members of our company at our monthly seminars on safety. (See Attachment 1)

* We have posted the notice in the steering house of each ship to ensure strict adherence to the standard navigation routes, the use of GPS plotters, and the matters to be strictly complied with when the target object is lost. (See Attached Photo 1) In addition, on July 7, 2020, we decided to post the “Observance of the standard routes stipulated in the safety management manuals” as a priority safety measure. (See attached photo 2)

* We are checking the operational status and navigation records of each ship using IP radios, etc. install on each ship, (See attached photo 3)

2. The standard routes stipulated in the safety management manuals should be checked and second standard routes in which safety is ensured should be established and made known to the whole company.

[Improvement measures]

* Regarding the standard route on the Ishigaki-Uehara, since the navigation on the standard route is susceptible to the effects of waves when the south wind is strong, we have established the second

standard route by sufficiently considering the safety of the route. (See Attachment 2)

* The second standard route is made known to each crew member through monthly seminar on safety, in-office meetings, and bulletin boards in the office. (See attached photo 4)

3. Guidance should be provided to all crew members of all ships operated so that information regarding safety during navigation can be shared among persons on watch duty regardless of their ranks.

[Improvement measures]

* We are providing guidance to the crew members of our company at our monthly seminar on safety, so that information regarding safety during navigation can be shared among persons on watch duty, regardless of their ranks.
* We have posted a notice in the steering house of each ship to remind the crew members to share what they noticed during navigation with each other and keep safe navigation in mind. (See attached photo 5)

4. For crew manning, consideration should be given so that specific crew members are not burdened in an unbalanced way, such that late hour work is continuously assigned to them.

[Improvement measures]

* We are making the manning plan by exercising utmost care so that late hour work is not assigned in an unbalanced manner to specific crew members.

*The details of the completion report of improvement actions is posted on the website of the JTSB.
https://www.mlit.go.jp/jtsb/shiphoukoku/ship-kankoku24re_20221118.pdf

2 Opinions

The opinions issued by the JTSB in 2022 are as follows. The status of measures taken in response to the opinions reported during the same year is posted including its summary.

(1) Opinions related to the grounding of the cargo ship WAKASHIO and the status of measures taken in response to the opinions

(Opinion on June 30, 2022)

○Summary

The cargo ship WAKASHIO (hereinafter referred to as "the Ship"), with the master and 19 crew members on board, was navigating to Tubaran Port in the Federative Republic of Brazil at around 19:25 on July 25, 2020 (Mauritius time) and grounded on shallows off the southeastern of the island of the republic of Mauritius.

No crew member was neither died nor injured, but the Ship sustained buckling damage on the hull and fuel oil spilled later.

○Details of the opinion to the Minister of Land, Infrastructure, Transport and Tourism

The JTSB is currently conducting an intensive investigation into this accident. However, since it is necessary to conduct further detailed investigation and analysis about the oil spills caused by the accident, it is expected that more time will be required before the JTSB can wrap up a final report.

It is considered probable according to the investigation and analysis to date so far that while the Ship was proceeding west-southwest off the east-northeast coast of Mauritius without a nautical chart with the detailed coastlines of the Mauritius Island, she continued her navigation on a course approaching the island for the purposes of receiving signal for the smartphone of the crew member and grounded on shallow off the southeastern of the island.

It is considered necessary at this time, not only to obtain a nautical chart with the detailed coastlines of the sea area in advance, but also not to take unsafe actions such as approaching the coasts for private reasons, in order to prevent the recurrence of this accident, when navigating in coastal waters.

On the other hand, it has become clear through this investigation that the crew members of the Ship did not comply with the matters stipulated in the safety management manual, and that the ship management company did not have a system in place to immediately recognize the unsafe actions of the ships and call attention to them. The JTSB believes that these may jeopardize the safety of operating ships.

In addition, such a situation of operation as that of the Ship in which multiple companies are involved may also apply to other Japanese merchant fleets.

In order to deal with these problems, it is necessary for companies involved in the operation of ships, not only to ensure thorough guidance on safe operation through education and training for crew members of similar ships, but also to build a system for close coordination and cooperation between companies regarding safety measures and develop a system to timely share the positional information of ships.

Furthermore, it is considered important to consider the working environment of seafarers, such as ensuring the convenience of life on board, in order to ensure safe navigation.

Based on the above, the JTSB states the following opinion in order to enhance the safety of the Japanese merchant fleets in which multiple companies are involved in the operation of ships and prevent the occurrence of similar accidents based on the investigation and analysis to date so far and based on the provisions of Article 28 of the Act for Establishment.

Opinions

(1) Ship management companies should be given guidance to implement the following matters.

① Thorough guidance should be provided to crew members not to try risk-taking and prevent them from taking unsafe actions such as changing course for personal reasons by repeatedly providing education and training.

② Thorough guidance should be provided to the master and officers to obtain appropriate nautical charts and others for the planned navigation area in order to develop a voyage plan that fully ensures the safety of the ship, and to ensure her safe operation by keeping a proper lookout and checking her position at all times.

③ Thorough guidance should be provided to crew members to ensure that the watch duty at the bridge to be carried out by the appropriate number of personnel specified in the company's safety management manual.

④ Crew members who will newly board the ship under management should be allowed to board the ship with accurate understanding of the contents of the company's safety management manual, and training on the manual should be continuously provided even after boarding.

In addition, it is desirable that guidance be provided to develop a system to timely share the position information of the ship between the master and the ship management company until a system to grasp and monitor the movements of the vessel is built ashore.

(2) Charters should be given guidance to implement the following matters.

In order to ensure the safe navigation of chartered vessels, they should be actively involved in the safety measures implemented by the ship management companies ((1) above).

In addition, in view of the special nature of life on board unlike on land, it is desirable that guidance be given to operators of ships making long international voyages to improve the working environment for seafarers by ensuring the convenience of life on board, such as introducing devices that enable data communication with a flat-rate billing system.

Incidentally, regarding this matter, as shown in the attachment, the Maritime Bureau of the Ministry of Land, Infrastructure, Transport and Tourism issued an administrative notice to the Japanese Ship owners' Association for the prevention of recurrence and safety improvement based on this accident in March, 2021. However, the JTSB would request them to renew their efforts on the basis of the analysis of the factual information and accident occurrence situation described in the interim report.

*The full text of the opinion, including attachments, is available on the website of the JTSB.
https://www.mlit.go.jp/jtsb/shiphoukoku/ship-iken16_20220630.pdf

○Policies and measures taken by the Minister of Land, Infrastructure, Transport and Tourism based on the opinions

Regarding the above subject matter referred to the opinion UN-I-SOU No. 101 dated June 30, 2022, the Maritime Bureau Bulletin No. 30 was issued to the Japanese Shipowners' Association dated June 30, 2022 to request persons concerned of the ship management companies and charterers to actively work toward improving the safety of the ocean shipping business and fostering a safety culture.

*The details of the completion report of improvement actions is available on the website of the JTSB.

https://www.mlit.go.jp/jtsb/shiphoukoku/ship-iken16re_20220630.pdf

(2) Opinions on the collision between the cargo ship OCEAN ARTEMIS and the submarine SORYU

(Opinion on August 25, 2022)

○Summary

See Chapter 5, page 125.

○Details of opinions to the Minister of Defense

It is probable that in this accident, while the submarine SORYU was navigating fully submerged off the south-southeast coast of Cape Ashizuri-misaki without noticing the azimuth line (line which is drawn when the heading of the radiation sound from the sound source is continuously displayed over time on the sonar screen) as a ship with a passive sonar (sonar), she determined that there was no ship that would interfere with the navigation at the periscope depth (to navigate underwater with a part of the periscope over the sea surface) and started to work to navigate at the periscope depth towards the sea surface on the course of the cargo ship OCEAN ARTEMIS which continued navigate without noticing SORYU underwater, and collided with OCEAN ARTEMIS.

On the other hand, it is probable that in the collision accident occurred off the coast of Miyazaki Prefecture between the submarine ASASHIO and the chemical tanker SPRING AUSTER, although ASASHIO detected SPRING AUSTER with the sonar and made necessary reports to the master, the submarine continued the work to navigate at the periscope depth while no sufficient communication within the command post was established and the monitoring of her movements was insufficient, resulting in the collision despite recognizing the approaching SPRING AUSTER.

In response to the opinions on the assumption that the other ship is recognized from the former Japan Marine Accident Inquiry Agency in the aforementioned accident of the submarine ASASHIO, Japan Maritime Self-Defense Force has taken measures including lessons learned from the accident and provided education and training following them since then.

It is probable, however, that it is impossible to prevent the occurrence of the same type of accidents with the aforementioned measures so far implemented alone because potential risks in sonar monitoring have become apparent in this accident, which was caused by the combined occurrence of various factors, including the fact that the navigating sound of the approaching ship could not be perceived with sonar when preparing work for the navigation at the periscope depth, that it was difficult to recognize the azimuth line of the ship as that of the ship because the detection range ability was high in the vicinity, that such an event as that the azimuth line of the ship was in the same heading of the azimuth line of another ship thereby overlapping with each other occurred, and further that since such an event as that the hearing sound near the heading changed from the radiation sound of another ship to the radiation sound of the approaching ship occurred when the submarine changed the course, the submarine understood that the hearing sound of another ship changed due to the change of the position of the submarine's course to and determined that the situation did neither call for emergency nor seriousness, accordingly.

Therefore, in consideration of the importance of grasping the presence of surrounding ships with sonar and of securely transmitting changes in the situation by the submarine to ensure further the safety of the transportation of ships navigating on the surface of the sea, it is considered necessary that the Japan Maritime Self-Defense Force take measures in this regard.

Consequentry, based on the results of this accident investigation, the JTSB states the following opinion in order to contribute to the prevention of recurrence of similar submarine accidents and the reducing of damage based on the provisions of Article 28 of the Act for Establishment.

Opinions

(1) Ensuring safety during work to navigate at the periscope depth

On the basis of the lessons learned, such a system should be built onboard the submarine, where not only the search and movement monitoring of ships by sonar are carried out reliably and appropriately, but also all the collected information for determining the risk of collision with other ships is gathered into the hands of the ship operator, etc., to allow the him/her to recognize the presence of surrounding ships and determine the risk of collision in a timely and appropriate manner.

(2) Revision of the reporting guidelines

In order to realize the above (1), the revision of the contents of the guidelines should be considered, including specifying their description so that the operating procedure for detecting the azimuth line with sonar and the reporting procedure when a change in the sound of the detected ship is recognized may function more safely.

(3) Enhanced monitoring with sonar

In consideration of the events of this accident, the monitoring system with sonar should be enhanced, including building a system onboard the submarine in which all information collected by sonar is put together to be rechecked by a plurality of people.

(4) Prompt reporting at the occurrence of an accident

From the perspective of protecting human lives and preventing damage to the ship, a system should be built which will allow the practice of prompt reporting on the assumption of the occurrence of such a situation as this accident by installing satellite mobile phones.

(5) Continuing education and training

The lessons learned from this accident should be thoroughly disseminated to all crew members, etc., and more effective education and training incorporating the lessons should be continuously implemented.

○Policies and measures taken by the Minister of Defense based on the opinions

Regarding the aforementioned matter, We will reply to your opinions (1) to (5) as follows.

1 Ensuring safety during work to navigate at the periscope depth

In order to build such a system onboard the submarine, where not only the search and movement monitoring of vessels by sonar are carried out reliably and appropriately, but also all the collected information for determining the risk of collision with other ships is gathered into the hands of the ship operator, etc., to allow the him/her to recognize the presence of surrounding ships and determine the risk of collision in a timely and appropriate manner, we implemented the improvement measures as described in "2. Revision of the reporting guidelines" and "3. Enhanced monitoring with sonar" below.

In addition, in order to clarify the responsibilities of the executive officer as a safety officer for ensuring safety during work to navigate at the periscope depth, we revised the related regulations.

2 Revision of the reporting guidelines

In order to ensure safety during work to navigate at the periscope depth, the following has been adopted as matters to be complied with by submarine crew that when only an image is detected on the sonar system screen, it should be managed as a detection target unless it is clearly determined as fish sound or other noise, and that when a change in hearing sound is recognized, not only the fact is reported to the master, but also it should be managed as a new detection target unless it is determined to be the same target.

3 Enhanced monitoring with sonar

In order to enhance the monitoring system with sonar, including building a system onboard the submarine in which all information collected by sonar is put together to be rechecked by a plurality of people, we established a system in which information collected by each sonar technician is checked and put together by the chief sonar technician and rechecked by a plurality of people through the verification of the situation by the executive officer.

4 Prompt reporting at the occurrence of an accident

In order to build a system which will allow the practice of prompt reporting on the assumption of the occurrence of a contingency situation from the perspective of protecting human lives and preventing damage to the ship, we enforced all submarines in operation to carry satellite mobile phones onboard immediately after the accident.

In addition, based on the lessons learned from this accident, we have been conducting regular training on reporting on the assumption of the occurrence of a contingency situation including senior commanders Head-Quarters (roughly once every six months).

5 Continuing education and training

In order to thoroughly disseminate the lessons learned from this accident to all crew members, we have been providing education and training for all crew members during our regular safety education (once in a quarter).

In addition, the master provides safety education and training on the navigation at the periscope depth when the patrol officer is changed as a result of staff reshuffle.

* For details on the activities of the JTSB, see page 11 of “Major activities in past year 7.”

(3) Opinions related to the flooding of the passenger ship KAZU I

(Opinion on December 15, 2022)

○Summary

When the passenger ship KAZU I (hereinafter referred to as "the Ship") with master (hereinafter referred to as "the Master"), one ordinary seaman (hereinafter referred to as "the Ordinary seaman") and 24 passengers on board was proceeding southwest off the Kashuni-no-taki waterfall, on the west side of the Shiretoko Peninsula, the ship was flooded and sank off this fall in a short time after 13:26 on April 23, 2022.

In this accident, 18 passengers, the master and the ordinary seaman died and 6 passengers went missing.

○Details of opinions to the Minister of Land, Infrastructure, Transport and Tourism

The JTSB is currently conducting an intensive investigation into the flooding of the passenger ship KAZU I occurred off the Kashuni-no-taki waterfall, on the west side of the Shiretoko Peninsula on April 23, 2020, since it is necessary to conduct further detailed investigation and analysis, it is expected that more time will be required before the JTSB can wrap up a final report.

The JTSB will further analyze the factors leading to the occurrence of this accident in the future. However, the recurrence prevention measures have become clear from the navigation route of the ship, the estimated weather and hydrographic conditions, and the mechanism from flooding to foundering described

in a focused manner in the interim report of the accident investigation.

It is most likely that the direct cause of the Ship's foundering was the fact that the waves hitting the bow deck entered the ship through the hatch on the bow deck, allowing the flooding to spread into each section below the upper deck through the opening of the bulkhead from the bow section. Therefore, the water-tightness of the bulkhead is possible to contribute to the improvement of safety of small vessels.

Furthermore, it became clear that despite the fact that the Ship encountered weather and hydrographic conditions that met the criteria for requiring it to take measures, such as canceling navigation, returning to the port, evacuating or temporarily calling at a port on the return trip, the Ship did not take measures, such as evacuating into the Utoro fishing port (Shiretoko-misaki Cape area) to wait for rescue.

Based on these facts, and in consideration of the current situation that many small passenger ships are operated nationwide, in order to prevent accidents of operators that operate small passenger ships like that of the Shiretoko Sightseeing Ship Company.,Ltd. based on the results of this accident investigation, the JTSB states the following opinion on the basis of the provisions of Article 28 of the Act for Establishment.

Opinions

The Minister of Land, Infrastructure, Transport and Tourism should make the following matters known to operators operating small passenger ships and provide guidance.

(1) Inspection of the opening on the bow deck of small passenger ships whose navigation area were changed from the smooth water area to the limited coasting area.

The presence or absence of the risk of flooding of the ship should be checked in an emergency manner by ensuring that the opening on the bow deck is securely closed and not easily opened when hit by the waves.

(2) Use of evacuation ports, etc.

The existence and use of evacuation ports in the sea area to be navigated should be rechecked.

In addition, in order to further enhance safety in the future, the Minister of Land, Infrastructure, Transport and Tourism should consider on the enhancement of water-tightness of the bulkhead of small passenger ships which navigate the limited coasting area.

*For details on the activities of the JTSB, see page 8-9 of “Major activities in past year 5.”

3 Safety recommendations

In 2022, the JTSB did not issue any safety recommendations.

4 Implementation status of measures taken in response to the recommendations, opinions, etc. issued in the past

The following is summaries of the implementation status of measures taken in response to the recommendations and opinions reported in 2022. See 1 to 3 of this chapter for the implementation status of measures taken in response to the recommendations and opinions issued in 2022.

(1) Measures taken based on the recommendations related to the railway accident with injuries occurred at the Shin-Sugita Station of Yokohama Seaside Line Company

(Recommendation issued on February 18, 2021)

The JTSB did not only publish an accident investigation report on February 18, 2021 on the railway accident with injuries occurred at the Shin-Sugita Station on June 1, 2019, but also made a recommendation to the Minister of Land, Infrastructure, Transport and Tourism. The JTSB received the following report on the measures taken in response to the recommendations on March 7, 2022.

*For a summary of the accident and probable causes, see the website of the JTSB.
https://jtsb.mlit.go.jp/jtsb/railway/detail.php?id=1952

○Details of recommendations to the Minister of Land, Infrastructure, Transport and Tourism

The direct cause of the accident was probable that the forward and reverse circuit of the train was disconnected, causing the train to start traveling with the motor driving direction facing the upward direction at the end of the track. It is probable that the reason why such a dangerous event could not be avoided at the occurrence of the failure lies in the lack of sufficient "checking and adjustment of design systems," "extraction of safety requirements," and "verification of safety" in the vehicle design and manufacturing process.

In the design of trains which are becoming increasingly complicated in recent years, it is important to build a design system for performing a system integration in order to thoroughly extract and assess all conditions that may lead to dangerous events before designing and reflect the countermeasures as the safety requirements for designing, manufacturing and modifying the automated operating system of the train in which a driver on the railroad track or a staff member to operate an emergency stop at the front of the train is absent. In addition, the safety management for the lifecycle as a whole including the manufacturing and operation is necessary. In these circumstances, it is probable that railway operators and train manufacturers establish a stage in which the design system, etc., is carefully checked and adjusted and the safety requirements are extracted and the verification of the safety after the completion of the designing is fully performed.

For this reason, based on the results of this accident investigation, in order to prevent railway accidents and reduce damage in the event of a railway accident, the JTSB recommends the Minister of Land, Infrastructure, Transport and Tourism to take the following measures on the basis of the provisions of Paragraph 1, Article 26 of the Act for Establishment.

Recommendations

The Railway Bureau of the Ministry of Land, Infrastructure, Transport and Tourism should thoroughly instruct railway operators nationwide and manufacturers involved in the design and manufacture of railway vehicles on the following matters.

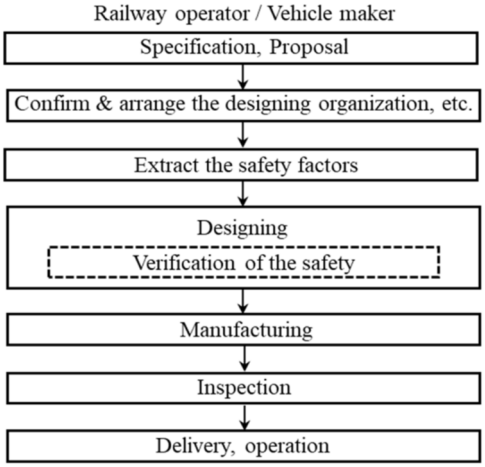
(1) Each stage in which “the design system, etc., is checked and adjusted,” “the safety requirements are extracted” and “the safety is verified” respectively should be established for designing, manufacturing and modifying the automated operating system of the train on which no driver is present in refer to the design and manufacturing process shown in the attachment.

(2) In the phase in which “the design system, etc., is checked and adjusted,” a design system for performing a system integration should be built, in which the roles and responsibilities of each company, the standard specification of each company or the specification generally recognized as the global standard for each device shall be checked and adjusted.

(3) In the phase in which “the safety requirements are extracted,” systematic safety analysis, etc., should be implemented according to the system characteristics so that comprehensive verification of safety is performed against an expected occurrence of abnormal state, and the necessary requirements for ensuring safety shall be established.

(4) In the phase in which “the safety is verified,” the design results should be verified with respect the safety requirements extracted in the phase (3) to check whether or not the system as a whole ensures safety.

（Attachment）



Design and manufacturing process

○Measures taken by the Ministry of Land, Infrastructure, Transport and Tourism based on the recommendations

In response to the aforementioned recommendation by the UN-I-SAN No. 99 dated February 18, 2021 (hereinafter referred to as the "recommendation"), the Railway Bureau of the Ministry of Land, Infrastructure, Transport and Tourism has taken the following measures. Therefore, we notify to the effect on the basis of the provisions of Paragraph 2, Article 26 of the Act for Establishment.

(1) We held the “Review meeting on the prevention of accidents on the railway tracks on which the train operation is unmanned and automated” established in June of 2018 after the accident in October last year (fifth meeting) and confirmed that the measures described in the recommendation were being implemented by the 6 operators that are conducting unmanned and automated operation except for the Yokohama Seaside Line company. Therefore, we summarized the efforts as “the efforts for the designing of manufacturing and modifying unmanned and automated railway system (hereinafter referred to as the "Efforts").

(2) We did not only issue Attachment 1 to the Regional Transport Bureaux and the Okinawa General Bureau, Cabinet Office, and Attachment 2 to related organizations, respectively. In addition, we provided the “Efforts” to railway operators and manufacturers involved in the design and manufacture of railway vehicles and provided guidance so that the evaluation on safety and reliability may be performed appropriately for designing, manufacturing and modifying railway tracks in future, on which the train operation is unmanned and automated.

In addition, we notified the “Efforts” to the Japan Railway Rollingstock&Machinery Association, the Japan Railway Electrical Engineering Association, and the Japan Assosiation of Signal Industries.

* The details of the completion report of improvement actions is available on the website of the JTSB.
https://www.mlit.go.jp/jtsb/railkankoku/railway-kankoku6re_20220309.pdf

(2) Report based on the recommendations on the passenger injury accident involving pleasure boat GURILAND 900

(Recommended on August 26, 2021)

Regarding the investigation of the accident with passenger injuries of the pleasure boat GURILAND 900 occurred off the northern coast of Ogura Peninsula, Towada City, Aomori Prefecture (east of Lake Towada) on September 19, 2019, the JTSB did not only publish the accident investigation report on August 26, 2021, but also made recommendations to the non-regular route business operator, general safety manager and operation manager. The JTSB received the following report on the measures taken in response to the recommendations on January 14, 2022.

*For an overview of the accident and its cause, please refer to the website of JTSB.
https://jtsb.mlit.go.jp/jtsb/ship/detail.php?id=13266

○Contents of recommendations to the non-regular route business operator, general safety manager and operation manager

The west-northwest wind gradually getting stronger with a strong wind warning announced, the master of the pleasure boat GURILAND 900 continued to navigate at the speed unchanged while proceeding east at approximately 18 knots in the vicinity of the north side of the Ogura Peninsula in the east area of the Towada Lake with a wave height of approximately 50 cm. For this reason, the boat rode on the first wave with a wave height of approximately 50 cm and then hit the surface of the water, repeating the same situation on the second and subsequent waves. Therefore, the injury of a passenger who sat on the front seat of the starboard side was probable that the passenger received the impact to the buttocks caused by falling onto the seating surface time and again.

On boat operated by the non-regular route business operator, general safety manager and operation manager (hereinafter referred to as "the Operator"), a similar case of accident occurred in the past. The Operator has been providing safety education and training and so on to crew members, etc. after the similar case of accident.

However, although the master of the pleasure boat GURILAND 900 had to stop the standard navigation pursuant to the safety management manual and the navigation standard, the master continued to navigate the boat keeping the speed of approximately 18 knots at the time when the standard for decelerating, etc. was reached, consequently the accident occurred.

On the basis of the investigation results, in order to prevent the recurrence of similar cases of accident, the JTSB recommends the Operator to take the following measures on the basis of the provision of Article 27, paragraph (1) of the Act for Establishment:

In addition, it is required to submit a report on measures taken in response to these recommendations pursuant to the same Article, paragraph (2).

Recommendations

The Operator must take the following measures to prevent the recurrence of similar cases of accident.

(1) The Operator should ensure its masters and crew members to stop the standard navigation pursuant to the safety management manual and the navigation standard when high waves are recognized, decelerate sufficiently to a speed that is appropriate for the wave height when the standard for decelerating, etc. is reached, and take other measures to reduce the vessel oscillation.

(2) The Operator should instruct its master to convey instructions using a loudspeaker, etc., and also to confirm that the instructions have been certainly transported to passengers by carefully monitoring the movements of passengers because oral instructions provided by the master may not be heard to passengers due to the influences of winds and/or engine noise while the boat is sailing.

(3) The Operator should not allow elderly passengers, etc. to sit on front seats as much as possible. If it is impossible to securely provide rear seats for elderly passengers, etc., allocate those passengers to another ship for safety reason.

○**Measures taken by the Operators based on the recommendations**

In response to the “recommendations related to the accident with personal injuries of the pleasure boat GURILAND 900" sent by the UN-I-SAN No. 37 dated August 26, 2021, we are pleased to report on the measures taken based on the recommendations as follows.

Recommendations

Details of the recommendation (1)

The Operator should ensure its masters and crew members to stop the standard navigation pursuant to the safety management manual and the navigation standard when high waves are recognized, decelerate sufficiently to a speed that is appropriate for the wave height when the standard for decelerating, etc. is reached, and take other measures to reduce the vessel oscillation.

Measures taken based on the recommendations

We instructed each master involved in the operation of owned ships to take measures on recognizing high wind and waves by sufficiently reducing the speed in line with the wave height when the criteria to reduce the speed, etc., is met.

Incidentally, we also instructed them to consider the latest weather information, the wind direction and wave direction on the navigation course and changes in wind and waves due to topography when making a decision to stop the voyage, even if it is possible to continue sailing under the operating standards.

Implementation date: August 26, 2021

Implementation method: Training for each master and oral guidance at the meeting before voyage

Recommendation (2)

The Operator should instruct its master to convey instructions using a loudspeaker, etc., and also to confirm that the instructions have been certainly transported conveyed to passengers by carefully monitoring the movements of passengers because oral instructions provided by the master may not be heard conveyed to passengers due to the influences of winds and/or engine noise while the boat is sailing.

Measures taken based on the recommendations

We placed a megaphone on the owned ships and instructed each master involved in the operation of owned ships to use the megaphone for verbally giving instructions to passengers.

In addition, we instructed them not only to reduce the speed or stop the ship with a view to reducing the effects of the wind, engine noise, etc., much as possible when giving instructions to passengers, but also pay attention to the movements and reactions of the passengers to check that the instructions have been securely conveyed.

Incidentally, we have confirmed that instructions given by the megaphone could be clearly heard at all seats on the owned ships.

Implementation date: August 26, 2021

Implementation method: Training for each master and oral guidance at the meeting before voyage

Recommendation (3)

The Operator should not allow elderly passengers, etc. to sit on front seats as much as possible. If it is impossible to securely provide rear seats for elderly passengers, etc., allocate those passengers to another ship for safety reason.

Measures taken based on the recommendations

Elder Passengers are guided to sit in the rear seats including those who wish to sit in the front seats. In addition, we make it a rule to take safety measures such as assigning them to another ship when rear seats are not secured for elderly passengers.

Implementation date: August 26, 2021

*The details of the completion report of improvement actions is available on the website of the JTSB.
https://www.mlit.go.jp/jtsb/shiphoukoku/ship-kankoku22re_20220218.pdf

(3) Report based on the recommendations related to the collision between the cargo ship SENSHO MARU and the cargo ship SUMIHOU MARU

(Recommended on August 26, 2021)

Regarding the investigation of the collision between the cargo ship SENSHO MARU and the cargo ship SUMIHOU MARU occurred off the southern coast of Inubozaki, Choshi City, Chiba Prefecture on May 26, 2019, the JTSB did not only publish the accident investigation report on December 16, 2021, but also made recommendations to the NS United Kaiun Kaisha, Ltd. and the Otokura Domestic Shipping Cooperative Association. The JTSB received the following reports on the measures taken in response to the recommendations from the NS United Kaiun Kaisha, Ltd. on February 14, 2022 and from the Otokura Domestic Shipping Cooperative Association on March 1, 2022.

*For an overview of the accident and its cause, see website of the JTSB.
https://jtsb.mlit.go.jp/jtsb/ship/detail.php?id=11445

○Details of the recommendations to the NS United Kaiun Kaisha, Ltd. and the Otokura Domestic shipping Cooperative Association

It is probable that this accident was happened during the night, off the southern coast of the Inubozaki under limited visibility caused by a thick fog, while SENSHO MARU was navigating southwest and SUMIHO MARU was navigating northeast, both ships were approaching dead ahead.

In that situation, while SENSHO MARU was approaching up to about 1,600 meters to SUMIHO MARU, SENSHO MARU turned right keeping the speed to pass by port side to port side, and while SUMIHO MARU was approaching up to about two nautical miles to SENSHO MARU, SUMIHO MARU changed its course slightly to the left to pass by starboard side to starboard side and navigated visually keeping the course and the speed. Therefore, it was too late to notice they are approaching each other, resulting in collision.

In this accident, if the watch officer on both of the ships confirmed the movement of each other on the radar screen and also used acoustic signals or communicated each other through VHF earlier, it is probable that they could have been taken measures to avoid the collision by decelerating, etc. while confirming mutual movements and operational intentions.

And, if each master was notified by their watch officer on duty the situation under the condition of the limited visibility, and reinforced the watch system pursuant to the safety management manual and the navigation standard, it is probable that they could have been able to confirm mutual movements and operational intentions, leading to the avoidance of the occurrence of this accident.

Therefore, on the basis of the investigation results, in order to prevent the recurrence of similar cases of accident, the JTSB recommends the NS United Kaiun Kaisha, Ltd. and Otokura Domestic Shipping Cooperative Association to take the following measures on the basis of to the provision of Article 27, paragraph (1) of the Act for Establishment.

In addition, it is required to submit a report on measures taken in response to these recommendations pursuant to paragraph (2) of the same Article.

Recommendations

(1) NS United Kaiun Kaisha, Ltd. and Otokura Domestic Shipping Cooperative Association should continuously instruct crew members of their operating ships to communicate with other ships using VHF and acoustic signals where approaching other ships under the condition of limited visibility.

(2) NS United Kaiun Kaisha, Ltd. and Otokura Domestic Shipping Cooperative Association should continuously instruct crew members of their operating ships to know the importance of instructions given by their master on the bridge and strengthening the watch standingunder the condition of limited visibility.

○Measures taken by NS United Kaiun Kaisha, Ltd. based on the recommendation

We are pleased to report on the measures taken based on the recommendations as follows.

Recommendations

1. Recommendations

(1) Instruction should be provided to the crew members of the operating ships continuously so that communication is conducted using VHF and acoustic signals if they are close to other ships under conditions of restricted visibility.

(2) Not only the importance of the master going up to the bridge and giving instructions under conditions

of restricted visibility should be made known to the crew members of the operating ships, but also instruction should be provided on the strengthening of the watch standing continuously.

2. Completion report for the recommendations

We are continuously implementing the following measures in response to the recommendations (1) and (2).

(1) Heads up document

We provided instructions to the operating vessels using the heads up document on the accident.

① May 26, 2019 "Regarding the collision accident in the fog" (Document 1-1)

We provided instruction on the occurrence of accidents in the fog and strengthening of the watch standing.

② August 20, 2019 "Ensuring the prevention of marine accidents in the fog" in order not to forget the serious marine accident (Document1-2)

We provided written guidance on the dissemination of the presumed cause of the accident and on measures to prevent recurrence of the collision accident in the fog (including the master going up to the bridge).

③ March 26, 2020 "Importance of safe operation" (Document 1-3)

We made known the details of the written guidance issued by the Kanto Regional Transport Bureau and made known again the measures to prevent the recurrence including the master going up to the bridge to the operating ships.

④ May 26, 2020 "Ensuring the prevention of marine accidents in the fog" in order not to forget the serious marine accident (Document1-4)

On the day of the accident, we provided written guidance again on the measures to prevent the recurrence (including the master going up to the bridge).

⑤ May 26, 2021 "Ensuring the prevention of marine accidents in the fog" in order not to forget the serious marine accident (Document1-5)

On the day of the accident, we provided written guidance again on the measures to prevent the recurrence (including the master going up to the bridge).

⑥ February 3, 2022 "Marine accident inquiry and accident investigation report related to SENSHO MARU accident" (Document 1-6)

We provided instruction on the secure handover of the master as an additional measure to prevent accident recurrence.

(2) Provision of information on maritime warnings and advisories related to the weather and hydrographic conditions nationwide (Document 2)

From December 2019, we provide information on the nationwide maritime warnings and advisories (stormy weather, heavy fog, etc.) issued by the Japan Meteorological Agency twice a week (Tuesdays and Fridays) to the operating ships to share the information with ships navigating in rough sea areas and heavy fog sea area in order to strive for safe operation. We provide instruction on the importance of the master going up to the bridge under restricted visibility conditions, strengthening of the watch standing, engine S/B, use of VHF radio telephone, blowing of the whistle and others along with the provision of the information.

(3) Distribution of a leaflet (Document 3) <Addition of the response to the visibility of 3 miles or less to the Safety Management Manuals >

We revised partly the leaflet about the obligation to be performed by the ship according to the article

related to “Navigation of ships under restricted visibility conditions (in heavy fog)” of the Act on Preventing Collisions at Sea (excerpt) on September 20, 2019 and distributed it to the operating ships. (4) Holding of the safety promotion meetings

We dealt with the SENSHO MARU accident in the safety promotion meeting held for ship owners as a key safety measure to be implemented and gave instruction on the importance of the master going up to the bridge under restricted visibility conditions, importance of the strengthening of the watch standing and recurrence prevention measures.

① Held on July 22, 2019 with an attendance of 32 ship owners (40 people) and 20 staffs of our company including the president (Document 4-2)

We provided an explanation of the outline of the SENSHO MARU accident and we requested the placement of lifejackets at the bridge.

② Held on January 30, 2020 with an attendance of 13 ship owners (18 people) and 13 staffs of our company including the president

As a summary of the safety promotion campaign, we the importance of the master going up to the bridge under restricted visibility conditions, significant course change and use of the engine.

② Held on February 4, 2020 with an attendance of 32 ship owners (37 people) and 19 staffs of our company including the president

As a summary of the safety promotion campaign, we the importance of the master going up to the bridge under restricted visibility conditions, significant course change and use of the engine.

⑤ Since the holding the safety promotion meeting was cancelled due to the spread of COVID-19, we sent only the meeting materials dated July 27 and August 6, 2020 to ship owners. (Document4-3)

⑥ Held online on January 28, 2022 due to the spread of COVID-19 with an attendance of 38 ship owners (63 people) and 25 staffs of our company including the president. (Document 4-4)

We explained about the marine accident inquiry and the accident investigation report.

(5) Holding of the safety promotion campaign

We dealt with the SENSHO MARU accident in the safety promotion campaign implemented by visiting all operating ships and gave instruction on the importance of the master going up to the bridge under restricted visibility conditions, importance of the strengthening of the watch standing and recurrence prevention measures.

① Holding of the 1st Safety Promotion Campaign in 2019: May 7 to July 8, 2019

After the accident, we explained about the early detection, early avoidance, and continuous monitoring as a heads up when the visibility is limited.

② Holding of the 2nd Safety Promotion Campaign in 2019: October 21 to December 20, 2019 (Document-5-1)

We explained about the “prevention of accidents under restricted visibility conditions” as a “matter to be implemented for accident prevention”.

③ 2020 Safety Promotion Campaign

As the activity to visit ships was suspended voluntarily due to the spread of COVID-19, we sent only the materials to the operating ships. (Document 5-2)

We explained the “accident cases in dense fog and measures.”

④ 2021 Safety Promotion Campaign

We sent a similar document of the Safety Promotion Campaign of 2020 to the operating ships.

(6) Implementation of safety training at the time of the docking and implementation of internal audit (Document 6)

When an operating ship entered the dock, safety training to the ship owner and crew members was provided by our company staff and the guidance on the prevention of accident recurrence including the explanation of accident cases including the SENSHO MARU accident and heads up, as well as hearing of the operating status of each ship and request for improvements was also provided.

In addition, at that time, we checked directly with the master and crew members about the importance of the master going up to the bridge under restricted visibility conditions, importance of the strengthening of the watch standing and recurrence prevention measures on the basis of the internal audit checklist.

We have been unable to conduct dock safety training and internal audit in 2020 and 2021 due to the cancellation of ship visiting activities.

(7) Implementation of the annual safety action plans (2019, 2020, and 2021) (Document 7)

We distribute the monthly targets and actions to be taken of the following month as the safety action plan of each operating ship at the end of each month.

(8) Confirmation of the transfer details, including the presence or absence of matters to be reported to the master (Document 8)

In order to ensure the system where when the ship is likely to face a danger, the master issues a clear instruction to the watch officer to provide a report to the effect, the watch officer reports to the master following the instruction and the master him/herself takes command, we decided to keep and store the transfer checking record. Currently, the record is entitled as "Alcohol check and confirmation of the transfer details," which will be eventually changed to "Confirmation of the transfer details, including the presence or absence of matters to be reported to the master."

Since the matters to be implemented in response to the recommendation of the item 2 above are implemented since the occurrence of the accident, we will continue to implement them in the future following the recommendation.

○Measures taken by the Otokura Domestic Shipping Cooperative Association based on the recommendation

We have prepared and submitted the completion report in response to the recommendation of the "UN-I-SAN No. 83 dated December 16, 2021."

1. Purpose

(1) Instruction should be provided to the crew members of the operating ships continuously so that communication is established conducted using VHF and acoustic signals if they are close to other ships under conditions of restricted visibility.

(2) Not only the importance of the master going up to the bridge and giving instructions under conditions of restricted visibility should be made known to the crew members of the operating ships, but also instruction should be provided on the strengthening of the watch standing continuously.

2. Implemented matters

(1) Measures of each person concerned

(Measures taken for the operator)

① The operator should make every effort to ensure smooth communication between the crew members and ground personnel.

② The operator should install and operate communication equipment and other necessary equipment to ensure the communication described in the preceding paragraph.

(Measures taken for the master)

The master should always notify the ship operator in the following cases:

① The master should make every effort to ensure smooth communication between the crew members and ground personnel.

② The master should obtain information on the weather and hydrographic conditions using observation equipment and observed information, and share this information with all of the crew members of the ship.

③ The master should obtain weather information from any information source before departure, and should discuss the navigation system in advance with the crew members if visibility restricted conditions are expected.

④ When the point stipulated in the operating standards (visibility of 500m or less) is reached.

(On the operator side)

① We will request the master to provide a written report at least once in a quarter on whether the safety operation system of the ship (safety management manuals and operation standards, in particular, strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing) has been established and complied with thoroughly by crew members, and we will visit the ship at least once in a quarter to check the understanding of the master and the crew members about the establishment of the safety operation system of the ship and provide the corrective instruction if it is insufficient.

② We will implement the following in order to strengthen the communication using VHF and acoustic signals, and the measure of the master going up the bridge under restricted visibility conditions and the watch standing when we visit the ship.

A: We will provide a workshop based on the hearing of the actual situation of the ship to allow the crew VHF and acoustic signals without hesitation.

B: We will provide a workshop based on the hearing of the actual situation of the ship to enforce the master to go up to the bridge and stay there in the fog, etc., without hesitation.

③ We will install AIS and electronic nautical charts on our operating ships not equipped with them for the purpose of improving the operational safety.

(On the ship side)

① In order to ensure thorough response when visibility becomes restricted, excerpts of the safety management manuals and operational standards will be posted in easily visible locations on the bridge.

② When visibility restricted conditions are expected from the weather information obtained before departure, the navigation system will be discussed in advance and shared among the crew members.

③ Meeting on the safety operation system of the ship (safety management manuals and operation standards, in particular, strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing) will be held on board the ship at least once a month in order to thoroughly build a safe operation system including response to restricted visibility conditions in a continuous manner.

The details of the measures for safety operation implemented after the accident are as follows.

① SUMIHO MARU

[Emergency safety meeting after the accident]

Date: July 2, 2019
Venue: Conference room at the Mukaishima Dock Co., Ltd. (864-1 Mukaishima-cho, Onomichi City, Hiroshima Prefecture)
Participants: SUMIHO MARU crew members
Operator: Otokura Domestic Shipping Cooperative Association
Nippon Steel Nisshin Shipping Co., Ltd.
Contents of the meeting: Education using marine accident cases in the fog, strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing, use of navigation equipment and looking back of the accident

[Special safety training]
Date: July 31, 2019
Venue: Conference room at the Ship Safety Service Co., Ltd. (4th floor, at Hiroshima Marine Building, 2-33-36, Ujina Kaigan, Minami-ku, Hiroshima City, Hiroshima Prefecture)
Participants: SUMIHO MARU crew members
Operator: Otokura Domestic Shipping Cooperative Association
Ship Safety Service Co., Ltd.
Contents of the meeting: Crew training, boarding diagnosis, in particular, the key points of lookout, matters that require attention in restricted visibility conditions (strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing), and a workshop including the display of the radar screen and azimuth method

[Boarding diagnosis]
Date and time: 11:00 on August 1, 2019 to 12:00 hrs on August 2, 12:00 (1st time)
Venue: SUMIHO MARU
Participants: SUMIHO MARU crew members
Assessor: Ship Safety Service Company
Assessment contents: We installed a ship track recording device on board the ship and diagnosed the ship maneuvering status and navigational watch standing of the master and other crew members during the voyage from the Takaramachi Wharf, Kure Port to the Hanshin office of the Nippon Steel Nisshin Shipping Co., Ltd. at the Hanshin Port via the Nippon Steel Nisshin Wharf.
Date and time: 15:20 to 21:30 on February 3, 2022 (2nd time)
Venue: SUMIHO MARU
Participants: SUMIHO MARU crew members
Assessor: Ship Safety Service Co., Ltd.
Assessment contents: We diagnosed the use status of AIS, checking of watch-keeping support and the ship maneuvering status and navigational watch standing of the master and other crew members during the voyage from the pier of Etajima Shipyard to the Utenberth of Shunan Works of Nippon Steel Stainless Steel Corporation.

[Safety meeting at the time of docking]
Date: February 22, 2021

Venue: Conference room at the Etajima Shipyard Co., Ltd. (3-17-15 Etajima-cho, Etajima City, Hiroshima Prefecture)
Lecturer: Ship Safety Service Co., Ltd.
Participants: SUMIHO MARU crew members
Operator: Otokura Domestic Shipping Cooperative Association
Contents of the lecture: Communication of the efforts in the Maritime Safety Plan and various matters that require attention, and sharing of information on accident cases and heads-up (including strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing)

② Other operating ships
[Safety meeting at the time of docking and workshop on the use of radar]
October 13, 2020 No. 7 SANNO Okajima Shipyard
October 19, 2020 DAIKOKU MARU Etajima Shipyard
November 16, 2020 SHINSEI MARU Kanda Shipyard
January 13, 2021 TAIYO Nakata Shipyard
January 14, 2021 SHINTATSU MARU Etajima Shipyard
February 26, 2021 HAKUSHIN MARU Etajima Shipyard
May 11, 2021 URUME Kanda Shipyard
June 3, 2021 DAIICHI OKURA MARU Etajima Shipyard
June 29, 2021 KAN-EI MARU Asakawa Shipyard
October 13, 2021 Daiichi KEISHO MARU Etajima Shipyard
November 18, 2021 DAIKOKU MARU Etajima Shipyard
November 19, 2021 SHINSEI MARU Kanda Shipyard
December 22, 2021 No. 7 SANNO Kanda Shipyard
January 19, 2022 TETSURYU MARU Etajima Shipyard
Contents of the meeting: Communication of the efforts in the Maritime Safety Plan and various matters that require attention, and sharing of information on accident cases and heads-up (including strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing)
[Information sharing and heads-up by visiting ships and using phone and FAX]
2019 (after the accident): A total of 28 ships were visited.
Main contents of communication: Sharing of the information of the accident, request to strengthen look-out under restricted visibility conditions, early give-way to avoid danger (including strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the duty system) and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing)

2020: A total of 25 ships were visited.
Main contents of communication: Sharing of the information of the recent accidents, heads-up (including strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing) and of the measure of the master going up the bridge under restricted visibility conditions and of

the watch standing), prohibition of Prohibition of bringing smartphones to the bridge during watch duty, and prohibition of creating documents unrelated to the voyage during watch standing

2021: A total of 44 ships were visited.

Main contents of communication: Sharing of the information of the recent accidents, heads-up (including strengthening of communication using VHF and acoustic signals, and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing) and of the measure of the master going up the bridge under restricted visibility conditions and of the watch standing), matters to be compulsorily complied with for the appointment of the master, measures to avoid contact with fixed fishing gear, etc., and the proper speed when docking

[Equipment installation status]

AIS SUMIHO MARU July 25-26, 2019 (installation work)

Installation completed Installed on all 12 other operating ships

Electronic chart SUMIHO MARU June 21 and 29, 2020 (installation work)

Installation completed Installed on all 12 other operating ships

Lifejackets Completion of deployment of lifejackets on the bridge of all ships

*The details of the completion reportof improvement actions is available on the website of the JTSB.
https://www.mlit.go.jp/jtsb/shiphoukoku/ship-kankoku23re_20220322.pdf

(7) Report based on the opinions related to the accident with a crew member injuries of the fishing vessel NO. 3 SEIRYO MARU

(Opinion on August 29, 2019)

Regarding the investigation of the accident with a crew member injuries of the fishing vessel NO. 3 SEIRYO MARU occurred on September 14, 2018, off the west of Oshima, Amatsu-City, Kumamoto Prefecture, the JTSB did not only publish the accident investigation report on August 29, 2018, but also expressed its opinions to the Director-General of the Fisheries Agency. The JTSB received the following reports on the measures taken in response to the opinions on October 6, 2022.

*For summary and probable causes, see the website of the JTSB.
https://jtsb.mlit.go.jp/jtsb/ship/detail.php?id=11617

○Details of the opinions to the Director-General of the Fisheries Agency

Based on the occurrence of similar accidents, the JTSB provides the following opinion based on the provisions of Article 28 of the Act for Establishment.

Opinions

The Director-General of the Fisheries Agency with the duty to formulate the Basic Plan for Fisheries based on the Fisheries Basic Act and strengthen safety measures for fishing vessels and fisheries, in light

of the repeated occurrence of similar accidents involving purse seine fishing vessels and stick-net fishing vessels which use side rollers during, in order to draw the attention of fisheries to similar accidents, the JTSB will not only disseminate information on the following forms of similar accidents clarified by accident investigations as well as the recurrence prevention measures, but also strongly recommends the implementation of recurrence prevention measures, including the introduction of an emergency stop device for the side rollers with a view to further improving safety.

1 Forms of similar accidents

(1) During the preparation work to bring fishes in the nets into the fish hold, one worker alone tried to fix the nets to the side rollers by manually passing a part of the nets lifted by the side rollers through a gap between the side rollers and the bulwark outboard and sandwiching it between the net being lifted and the side rollers in a state in which the side rollers were rotating.

(2) During the work to lift the net onto the ship using the side rollers, a part of the nets lifted onto the ship went outboard through between the side rollers and the bulwark and got caught to be wound up by being sandwiched between the net and the rotating side rollers (hereinafter referred to as "reverse winding").

2 Measures to prevent recurrence of similar accidents

(1) The hem and cuffs of the crew's jacket should be tightened so as not to get caught and wound up by the side rollers.

(2) An operator to operate the operation lever of the side rollers should be placed to cause him to monitor the situation of the work performed by the side rollers at all times so that they may be stopped immediately in the event of an abnormality.

(3) When fixing the net, the side rollers should be temporarily stopped, and the worker to fix the net and the operator to operate the operation lever should work together by communicating with each other.

(4) Since the worker who fixes the net performs the work wearing gloves, the fingertips of the gloves may get caught between the net being lifted and the rotating side rollers, he/she should remove the gloves when fixing the net.

(5) The following measures to prevent reverse winding should be taken in order to prevent it from occurring beforehand.

① The situation of the net should be carefully observed, and when a part of the net susceptible to reverse winding is recognized, the side rollers should be stopped immediately to eliminate such a situation.

② Scratches on the rubber part on the surface of the side rollers should be repaired appropriately.

③ In a situation in which reverse winding is likely to occur when a part of the net lifted onto the ship is blown by the wind, air screens should be spread out on the deck.

④ A part of the net lifted onto the ship should not be on top of the bulwarks.

⑤ When nets in bundle are lifted by the side rollers, since a part of the nets lifted onto the ship may be twisted to thereby cause reverse winding, the nets should be lifted onto the ship by evening them out on the side rollers.

(6) Even if an operator to operate the operating lever of the side rollers is placed, since there is a possibility that the operating lever may not be operated properly or the side rollers may not be stopped immediately as below, it is desirable to introduce an emergency stop device for the side rollers with a view to further improving safety.

①There are cases in which when the nets are being lifted onto the ship using the side rollers, if a worker's hand, etc. is caught between the nets being lifted and the rotating side rollers, the operation lever may not be operated properly.

②Since reverse winding can occur in various situations, it is difficult to predict or prevent all such situations, and in the case where reverse winding occurs all of a sudden and a worker's hand, etc. is caught between the nets being lifted and the rotating side rollers, it is not easy to immediately stop the side rollers with the operation lever.

(7) It is desirable to introduce equipment for fixing nets as an alternative measure to fixing the nets to the side rollers in purse seine fishing vessels in which the side rollers are used for lifting the nets.

(8) The side rollers, emergency stop devices for the side rollers, or special equipment for fixing the nets should be used in accordance with the handling specified by the manufacturer of each equipment.

○**Measures taken by the Director-General of the Fisheries Agency based on the opinions**

In response to the aforementioned opinions by the JTSB through the UN-I-SAN No. 37 dated August 29, 2019, we are pleased to inform that the directors of prefectural fisheries affairs, representatives of related organizations, and directors of fisheries coordination offices were notified as attached on September 9, 2018 for ensuring the operational safety of purse seine and stick seine fishing vessels.

In addition, the Fisheries Agency has not only designated October as a month to promote the safety operations of fishing vessels, but also developed a norm to raise awareness of operational safety to be address by onsite operators as "new measures for work safety for agriculture, forestry, fisheries and food industries" in order to promote the efforts for work safety.

*The details of the completion report of improvement actions is available on the website of the JTSB.
https://www.mlit.go.jp/jtsb/shiphoukoku/ship-iken15re_20221020.pdf

Column

Cutting Edge Investigation Techniques
(Use of a 3D Scanner and Introduction of a CT Scanner)
"In Search of the World between 1s and 0s"

JTSB Lab

The accident investigation work of the JTSB begins with steadily accumulating factual information as the "first step," and there is a strong demand for scientific and objective analysis based on the state of accident sites and conditions of accident articles obtained in the course of the investigation. For this reason, the JTSB Lab engages itself in steady work to find out the information that is the key to the causes of an accident by converting so-called "digital data consisting of 1s and 0s" into visual numerical values, graphs, images, or videos. In such circumstances, there are some devices which are playing a very active role for the elucidation of the causes of accidents in accident investigations and which are used for more sophisticated analysis in recent years.

< 3D Scanner >

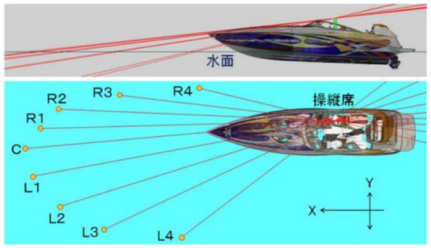
In principle, a 3D scanner applies a laser beam to a target and the coordinates of each point obtained by reflection are acquired as data. The data consisting of the collection of these points is commonly called "point cloud data." When the point cloud data is processed with specialized software, it is possible to create a cubic"3D model" of the surrounding conditions of the accident site and the state of the aircraft or the ship to be investigated. This 3D model allows a precise measurement and drawing creation and a 3D model of an aircraft or a ship obtained by precisely reproducing the real ones may be used for various simulations. Achievements in recent years include a three-dimensional measurement of the part of an aircraft with which a bird collided and the prediction of the blind spot range according to the speed of a small boat. Thus, the device is capable of calculating numerical values with high accuracy. In addition, it is under consideration to use the device for the investigation of railway accidents.

Currently, it has become possible to faithfully reproduce not only the terrain around the accident site, but also the interior of the accident object with a 3D scanner, by synthesizing data obtained by a 3D scanner from the ground and aerial photography obtained by a drone for investigation purposes. We are confident that the devices are useful for verifying objective facts more than ever.

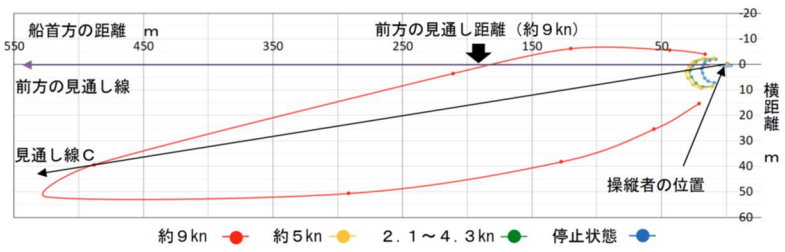
Fixed type

Handy type

Drone for investigation purposes



A船の速力	船体縦傾斜角	操縦者からC点までの距離
停止状態0kn	1．8°	約19m
2．1～4．3kn	3．8°	約28m
約5kn	4．8°	約31m
約9kn	7．6°	約480m



Relationship among the speed, ship inclination angle and visibility in the bow direction

<CT Scanner >

A CT scanner is generally used for “non-destructive inspection”, etc. It is a device that can see through the inside of an object in a three-dimensional manner without disassembling it and was introduced for the first time in January 2023 by the JTSB. Investigative agencies in other countries that already have CT scanners use them to check the inside of the flight recorder of the accident aircraft and check the cracks of the damaged parts of the accident as well as to check the structure of the memory chip in which “digital data consisting of 1s and 0s” is recorded. It is necessary in these days to “retrieve, restore and analyze” the data composed of “1s and 0s” recorded in all sorts of electronic devices. With the progress of digitalization in aircraft, train and ship, the JTSB Lab is also actively incorporating the device into investigations as a very useful means for elucidating the causes and preventing recurrences.

The CT scanner is a very effective device for the JTSB to obtain information from data recorded in electronic devices. For example, when extracting data from electronic devices such as the GPS receiver used in the aircraft related accident, mobile phones and cameras carried by passengers in order to reproduce the estimated route of this aircraft and images taken at the time of the accident, there is likelihood that the data is lost or the data cannot be extracted upon connecting to the power source carelessly in cases in which these electronic devices are wet with water or the internal electronic boards are severely damaged. In these cases, it is necessary to carefully proceed with work such as disassembling, restoring, connecting, etc., for extracting the data. The CT scanner allows the work to be performed speedily and securely. The example below shows a flow to check the damage on the memory chip and perform repair work thereof using a CT scanner in which extremely thin wires are connected to the damage memory chip to supply power and to finally extract the recorded data.

We have just introduced CT scanner which will be used extensively for accident investigations of aircraft, railway and marine in the future.