JTSB Japan Transport Safety Board

ANNUAL REPORT 2024

JAPAN TRANSPORT SAFETY BOARD

March, 2024

Aiming for the further development of the Japan Transport Safety Board

The Japan Transport Safety Board (JTSB) celebrated its 15th anniversary on October 1, 2023. Investigating the causes of accidents and incidents across three modes of transport (aircraft, railway, and marine), and recommending measures and actions to prevent recurrence and to mitigate damage have made us appreciate our important role in preserving transportation safety from a fair and neutral standpoint, and we will continue our efforts for further development.

While facing the Covid-19 pandemic, the JTSB has been building a system based on the recognition that it is necessary to prepare for major accidents that have not occurred in recent years, and we were able to apply this system to the investigation of the sinking of the passenger ship KAZU I, which occurred on April 23, 2022, and to the final investigation report, which was issued on September 7, 2023. Although the Marine Committee was the main authority of the investigation, all members of the Aircraft Committee and the Railway Committee participated in the investigation, conducted multiple analyses, and exercised scrutiny while utilizing their varied experience.

At first, the investigation of this accident was extremely difficult, since the JTSB could not investigate the hull. However, the JTSB worked hard to conduct as thorough a preliminary investigation as possible, and we were able to obtain information on the location of the passenger ship in operation by obtaining data from the families of the passengers, including the ship's location information (GPS) on the day of the accident and photos that were supposedly taken by the passengers on board. This information, together with the results of marine and meteorological simulations, made it possible to estimate the condition of the passenger ship scientifically and quantitatively.

The Committee members and investigators were able to share a common understanding that there was no damage to the outer hull that might be a flooding route, that the situation of the destroyed hatches was known, that there was an opening in the bulkhead dividing the compartment below the upper deck, and that the cause of the engine stoppage could be estimated. This was a major factor in the efficient investigation of the passenger ship. Another significant achievement was the quantification of hull dimensions and shape through the full utilization of recently introduced 3-D laser scanners (fixed and handheld types). This data led to subsequent scientific and quantitative analyses of the hatch opening and closing, seawater inflow through the hatches, and a simulation of the passenger ship's hull tilt.

The above investigation and analysis of the tangible elements, such as equipment, that were involved in the accident were subsequently corroborated by statements with many parties involved, and a progress report (issued on December 15, 2022) described mainly the tangible elements of the accident. Based on the investigation and quantitative analysis of these tangible elements, we can now adequately examine the intangible elements, such as human factors, of

the accident.

The intangible elements of the investigation required considered descriptions because of the many aspects related to people and organizations, but we were able to issue the final investigation report after discussion and deliberation. We went one step further than previous reports and included a section at the end entitled “Safety Actions Expected in the Future,” which gives recommendations for immediate action, and a section entitled “Toward Fostering Safety Awareness in Local Communities,” which points out the need to ensure safety in the community and in tourism on a continuous basis.

Although there is room for debate as to how far the JTSB should go in making recommendations, we believe that it will continue to be necessary to make recommendations that only us, with our guaranteed independence, can make.

Now, the entire JTSB, which celebrated its 10th anniversary in October 2018, has been working on the “Duty improvement Action Plan” from the viewpoint of sincerely accepting and responding to your expectations and requests and from the viewpoint of further promoting the assurance of traffic and transportation safety. We have set three targets: “Strengthening analytical ability,” “Strengthening information provision,” and “Strengthening global competitive ability.” To achieve these, we have added the perspective of “Strengthening organizational and individual abilities,” set higher quality targets than ever, and promoted new operational improvement initiatives. These four initiatives were utilized in the investigation of the foundering of the passenger ship KAZU I, but we also felt the need to continue promoting them.

In the past few years, we have continuously recruited highly motivated new administrative and technical officials, and we will continue to develop the human resources of these new officials as well as provide domestic and international training for investigators and administrative officials to continuously improve their skills. In addition, we will also focus on the publication of the “JTSB Digest,” which summarizes trends and common factors of accidents based on statistics and data analyses of valuable survey results unique to the JTSB, as well as on awareness-raising activities on our website. In addition, we will promote the strengthening of our international capabilities to contribute to the investigation of accidents and incidents in global cooperation.

We appreciate your understanding and cooperation.

March 2024

TAKEDA Nobuo
Chairperson
Japan Transport Safety Board

Japan Transport Safety Board

Annual Report 2024

Contents

○ On the usage of terms

In the text of this annual report, aircraft accidents and the signs of aircraft accidents are described as "aircraft accidents and serious incidents," railway accidents and the signs of railway accidents as "railway accidents and serious incidents," and marine accidents and the signs of marine accidents as "marine accidents and serious incidents."

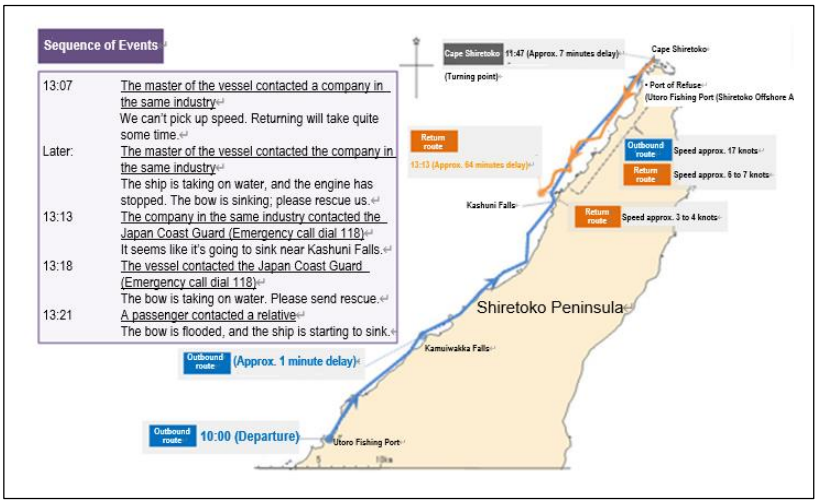
Major activities in the past year

1. Publication of the investigation report on the foundering of the passenger ship *KAZU I*

On April 23, 2022, the passenger ship *KAZU I*, a sightseeing vessel observing the scenic spots and wildlife along the western coast of the Shiretoko Peninsula from the sea, was navigating the waters off the western side of the Shiretoko Peninsula with 24 passengers onboard, along with the master and one deckhand. The vessel took on water and sank off the coast of the Kashuni Falls on the western side of the same peninsula.

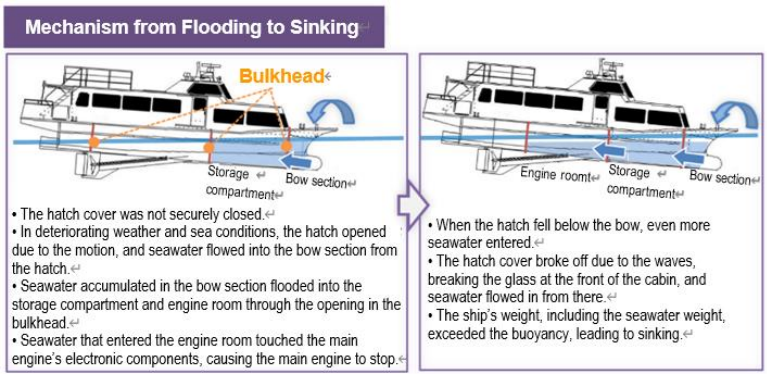
As a result of this accident, 18 passengers, the master, and the deckhand lost their lives, and six passengers remain missing (as of the publication of the report).

On the day of the accident, the vessel departed from Utoro Fishing Port at around 10 AM for a Shiretoko Cape course, a three-hour round trip to and from Shiretoko Cape. The vessel turned around at the cape at around 11:47 AM. However, due to the passage of a cold front, which caused high waves to spread, the vessel could not make speed on the return trip. Subsequently, the main engine stopped due to flooding, and the vessel began to list. Although a distress call was made, the vessel sank shortly after 1:26 PM on the same day.



The JTSB dispatched marine accident investigators to the site the day after the accident to begin the investigation. In July 2022, when the vessel was salvaged and a hull inspection became possible, marine accident investigators and committee members with specialized knowledge boarded the vessel and conducted the investigation.

Although it was difficult to obtain direct information on the circumstances leading to the vessel's flooding and foundering in this accident, data from the location information service of a passenger's mobile phone revealed that the vessel turned around at the tip of Shiretoko Cape and did not use the sheltering ports on that day. Furthermore, the hull inspection results indicated that seawater entered through the hatch on the bow deck and spread to various compartments below the upper deck through bulkhead openings.



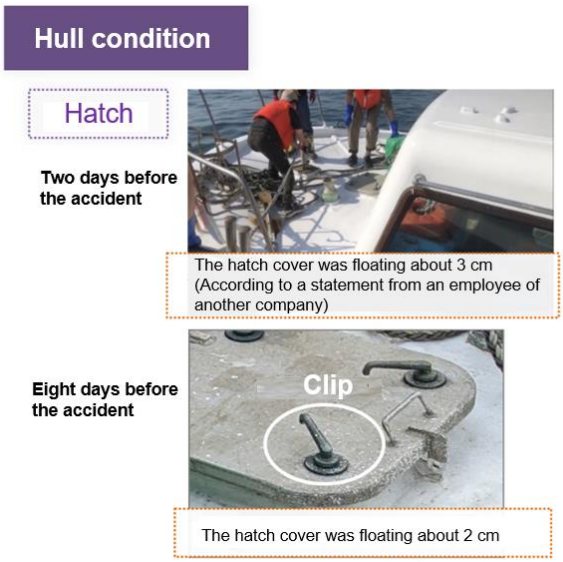
As a result, by commissioning the Japan Weather Association and the National Maritime Research Institute (NMRI) of the National Institute of Maritime, Port and Aviation Technology, the JTSB clarified the mechanism of the vessel's flooding and foundering through weather analysis and calculation of hull inclination due to flooding.

Based on these findings, on December 15, 2022, the JTSB reported to the Minister of Land, Infrastructure, Transport and Tourism on the progress of the accident investigation up to that point, including the mechanism leading to the foundering of the vessel. Additionally, as urgent measures, the JTSB offered "opinions" on inspecting the bow openings of small passenger ships, utilizing sheltering ports, and considering the watertightness of bulkheads on small passenger ships.

Meanwhile, detailed investigations and further analysis were conducted on the cause of the accident and damage mitigation, such as issues with the decision to depart and continue navigation, compliance with safety management regulations, and the effectiveness of audits of the operating company and inspections of the vessel.

Regarding the hatch on the bow deck, identified in the progress report as the starting point of the flooding route into the vessel, investigations, and analyses were conducted on the possibility of the hatch opening and allowing water ingress.

It was found that the hatch cover had defects that prevented it from being securely fixed, based on the condition of the clips and the floating state of the cover before the accident.



According to the numerical analysis results from NMRI, under the wave conditions on the day of the accident, the hatch cover, which was not secured by clips, could open due to the vessel's motion, and waves could break over the bow deck.

From these findings, it was analyzed that on the day of the accident, the hatch cover opened early on the return trip from Shiretoko Cape due to the vessel's motion, and frequent waves broke over the deck under high wave conditions. This led to the progressive loss of buoyancy due to the expanding ingress of water, the main engine's stoppage, and the vessel's eventual foundering as the hatch cover, struck by waves, broke the windows of the passenger cabin.

Regarding the navigation decisions made by the vessel's master, it was revealed that while a former master of the vessel indicated that three years of deckhand experience was necessary to understand the characteristics and regional features of navigating the waters off the western side of the Shiretoko Peninsula, the master of the vessel had become the master after only a few months of deckhand experience following his employment. It was also revealed that among small sightseeing vessel operators in the Utoro area, there were cases where departures were made based on a practice different from the established operational standards, departing with the assumption of assessing weather and sea conditions after departure and deciding to turn back if conditions were expected to worsen.

Based on these findings, it was analyzed that on the day of the accident, the master decided to depart with the awareness that strong wind and wave warnings had been issued, which would normally preclude departure according to operational standards. He planned to return if weather and sea conditions worsened en route. However, he continued navigating without accurately judging the timing to turn back, despite being aware of the presence of sheltering ports.

Regarding the company's operation management system, it was found that the president, who also served as the safety general manager and operation manager, lacked knowledge about ships and rarely worked in the office of the operation company. Additionally, there was no assistant to act on his behalf. Furthermore, in terms of safety management, since the fiscal year 2020, experienced masetrs have been laid off, resulting in the absence of personnel who had practically performed the duties of the safety general manager and operation manager and those who could educate successor masters. Additionally, issues with the hatch and communication equipment were identified.

Based on these findings, it was analyzed that the company lacked a substantial operation management system. On the day of the accident, the inexperienced master was forced to make operation decisions alone, leading to the accident. Furthermore, it was analyzed that the company did not have a safety management system, which significantly impacted the background of the accident.

Regarding the Hokkaido Transport Bureau, it was found that they had not verified the qualification requirements when receiving notifications of changes to the safety general manager and others and that their checks during special audits were insufficient. As a result, the company was operating without a substantial safety management system. Additionally, regarding the Japan Craft Inspection Organization (JCI), it was found that during the inspection shortly before the accident, they judged the hatch cover to be in good condition based on a visual inspection only and omitted the opening and closing test, which failed to identify and rectify the hatch's defects.

Due to the significant loss of life in this accident and high public interest, the JTSB held its first public hearing since its inception, and the final report was compiled based on the opinions received from experts.

Based on these investigation and analysis results, the probable causes of the accident were identified as a combination of factors.

The direct cause was that the vessel departed with the bow deck hatch cover not securely closed despite expected worsening sea conditions and continued navigating without evacuating to a sheltering port. This led to the hatch cover opening due to the vessel's motion, allowing seawater to flow in, expand to compartments below the upper deck, and eventually sink the vessel.

Hardware issues included inadequate maintenance of deteriorating and loose hatch components, JCI's visual-only inspection of the hatch shortly before the accident, and the vessel's structure lacking watertight integrity due to bulkhead openings.

Software issues included the company's deviation from operational standards by departing with the assumption of assessing conditions after departure and deciding to turn back if they worsened, the captain's lack of necessary knowledge and experience, the absence of a substantial operation management system, and inadequate communication means preventing the captain from receiving advice, the appointment of an unqualified safety general manager, inadequate safety management, JCI's acceptance of mobile phones with limited coverage, and the Hokkaido Transport Bureau's failure to improve the safety management system through inspections and audits.

Regarding the factors contributing to the loss of life, the seawater temperature at the time of the accident was about 4°C, making it extremely unlikely for passengers to be rescued alive unless they were rescued immediately after immersion. It was estimated that the Japan Coast Guard would have difficulty arriving near the accident site quickly. However, it was pointed out that strengthening the search and rescue system with optimal personnel and equipment and reviewing and enhancing coordination among rescue agencies was necessary.

Following the accident, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) decided to implement 66 measures, including amendments to the Maritime Transportation Act, based on the findings of the Review Committee on Countermeasures for the Shiretoko Sightseeing Boat Accident. These measures include the accident's identified causes and derived recurrence prevention measures.

The process leading to the accident revealed that safety nets, including the effectiveness of inspections and audits, were not functioning adequately.

Therefore, the report emphasizes the need for the thorough implementation of and adherence to the 66 measures by the MLIT, ensuring measures are rigorously implemented at the field level and striving for personnel training and understanding of on-site conditions.

Additionally, the report touches on the operators' need to foster a safety culture and the effectiveness of safety management activities through regional cooperation, including other operators and administrative and rescue agencies.

For a summary of the accident investigation report, please refer to Chapter 5 (page 104).

2. Investigation of accidents involving pilotless aircraft and unmanned aircraft begins

In June 2023, the JTSB dispatched aircraft accident investigators to investigate an accident of a pilotless aircraft[*1], and in July 2023, to investigate an accident of an unmanned aircraft[*2].

Until now, the JTSB has not investigated pilotless aircraft or unmanned aircrafts. Therefore, the above accidents mark the first time the JTSB has investigated these types of aircraft.

This section provides an overview of the current investigations into these accidents.

(1) Accident of a pilotless aircraft shortly after takeoff from Shimojishima Airport

[Summary]

On June 28, 2023, a pilotless aircraft on a flight test experienced a malfunction in the radio communication between the ground control station and the aircraft shortly after takeoff from Shimojishima Airport in Okinawa Prefecture. The aircraft switched to autopilot and continued flying. However, as the likelihood of deviating from the designated flight test area increased, the flight termination system automatically activated, causing the aircraft to land on the sea surface and to have been destroyed.

[Investigation implementation status]

The JTSB is conducting interviews with the operator and manufacturer, verifying the aircraft's system and flight modes, and analyzing the factors that triggered the activation of the autopilot mode's termination function.

(2) Accident of an unmanned aircraft in Kusu District, Oita Prefecture

[Summary]

On July 14, 2023, during a training session for pesticide spraying, an unmanned aircraft collided with a utility pole and then struck the operator, resulting in serious injuries.

[Investigation implementation status]

The JTSB is conducting interviews with the operator and manufacturer, verifying the aircraft's system and flight modes, and analyzing the flight records.

*1. Pilotless Aircraft: An aircraft which can be used for air navigation with a person on board, equipped with apparatus which enables it to fly without being boarded by a pilot and fly without being boarded by a pilot.

*2. Unmanned Aircraft: An aircraft can be used for air navigation without a person on board and, and capable of being flown by remote control or autopilot. Drones fall under this category.

3. Investigation of large aeroplane turbulence accidents

Between 2022 and early 2023, seven accidents involved passengers or cabin crews injured by the turbulence of a large aeroplane, significantly higher than the usual number of such accidents. Over the past ten years, turbulence accidents have accounted for approximately 60% of accidents involving large aeroplane. Most accidents with serious injuries involving large aeroplane were due to turbulence.

This section introduces two accidents from the six turbulence accident investigation reports published in 2023.

(1) An accident where a passenger was injured over Kurashiki City, Okayama Prefecture

[Summary]

On January 16, 2022, an aircraft took off from Tokyo International Airport. While flying for Kitakyushu Airport, the aircraft was shaken, and a passenger was seriously injured.

[Probable causes]

It is probable that in this accident, when encountering clear air turbulence created due to the jet stream, the Aircraft was shaken to the left, therefore, the passenger hit their right side against the armrest on the right side of the seat, resulting in a serious injury.

(2) An accident where a cabin crew member was injured over Nakatsugawa City, Gifu Prefecture

[Summary]

On March 26, 2022, an aircraft took off from Tokyo International Airport and flew to Oita Airport, where the aircraft encountered turbulence and a flight attendant was injured by falling down.

[Probable causes]

It is probable that the aircraft was shaken as it encountered turbulence that was difficult to predict, therefore the flight attendant working in the aft galley probably lifted into the air, lost her balance, and fell, resulting in injuries.

Turbulence accidents occur due to turbulence in cloudless areas or air disturbances caused by convective clouds such as cumulonimbus clouds. To prevent such accidents, it is necessary to obtain and analyze weather information before the flight to select appropriate flight routes and to monitor changes in weather conditions during the flight, ensuring early use of seat belts and safely avoiding air disturbances.

To prevent injuries of passengers, cabin crew should advise that passengers always wear their seat belts low and tight while seated. Cabin crew should also ensure that passengers are using their seat belts properly, taking into account their body shapes and other factors.

To prevent injuries of cabin crews, it is important to share information about turbulence between flight crew and cabin crew and train cabin crew to secure themselves when turbulence occurs.

Each airline has implemented measures in response to past accidents. However, given the continued occurrence of turbulence accidents, airlines, aviation authorities, and the JTSB need to cooperate in continuing efforts to prevent recurrence by re-communicating the lessons learned from these accidents to all relevant parties.

4. Publication of accident investigation report: The helicopter crashed while flying in a mountain region under strong wind conditions

[Summary]
On December 30, 2020, a helicopter encountered turbulence while flying over a mountain region under strong wind conditions, became uncontrollable and crashed. Only a captain was on board the helicopter, and fatally injured in the crash. The helicopter was destroyed, but there was no outbreak of fire.

[Probable causes]
It is probable that during flight in a mountain region under strong winds, when the helicopter encountered a downdraft caused by a roll-shaped thermal convection and fell into a low-G condition, it is highly probable that the helicopter was resulted in the mast bumping[*1] and the loss of flight control failure when the aircraft's attitude was not properly controlled, it crashed. The mast bumping occurred leading to the loss of flight control failure was probably because the helicopter continued flying due to encountering turbulence while maintaining airspeed.

In the investigation of this aircraft accident, it was considered that the helicopter experienced sudden attitude changes over the mountainous region, possibly influenced by mountain waves. The Atmosphere and Ocean Research Institute, the University of Tokyo conducted detailed weather simulations to investigate the impact of mountain waves at the time of the accident. The results were compared with information from witnesses and GPS devices to analyze the events leading to the accident.

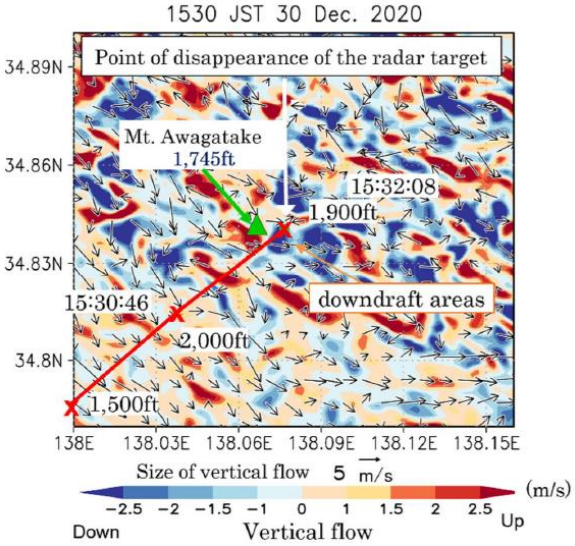


Fig. 1: Vertical flow at 600 m altitude (color) and horizontal wind deviation from the

As a result, the JTSB concluded that while flying at an altitude of approximately 2,000 ft at maximum cruising speed, the aircraft encountered a localized downdraft near the point where the radar target disappeared (Fig. 1). During the low-G flight condition (a state of reduced gravitational forces), the aircraft's attitude was not properly controlled, resulting in mast bumping, where the main rotor blade attachment contacted part of the main rotor drive shaft. This most likely led to a loss of control and a subsequent crash.

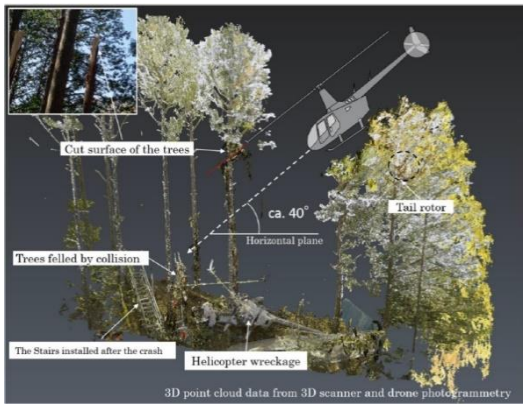


Fig. 2: Estimated approach angle at the time of the crash

In this investigation, to accurately measure the contact position with trees and the wreckage location at the time of the crash, 3D images were taken from above using a drone, and further measurements were made around the wreckage using a 3D laser scanner. By combining these data, the situation near the accident site was

represented as a 3D image (Fig. 2). This investigative method will be used for accident analysis as needed in the future.

Based on the results of this investigation, one measure considered necessary to prevent recurrence is to inform pilots of semi-rigid rotor helicopters*2 about precautions to prevent mast bumping, which can lead to loss of control, and to ensure that they obtain necessary weather information before departure. If adverse weather conditions are expected, pilots should either cancel or conduct the flight with a safe flight plan (see Chapter 3, page 44).

*1 “Mast bumping” is a phenomenon where the main rotor blade spindle (or main rotor hub for Bell Helicopter type) strongly contacts or bumps the main rotor drive shaft when a helicopter (usually often for two-bladed helicopter) having semi-rigid rotor systems enters a low-G condition out of the normal condition of 1G and the attitude is not properly controlled.

*2 “Semi-rigid rotor type” refers to a rotor system in which the blades are fixed to the hub, but flapping and feathering are flexible, such as teeter ring type and under sling (seesaw) type.

5. Publication of the derailment accident investigation report of a new transit system due to an earthquake

[Summary]

On October 7, 2021, a train leaving from Nippori Station bound for Minumadai Shinsui Koen Station derailed at a junction within the premises of Toneri Koen Station. An earthquake with a maximum seismic intensity of upper 5 had occurred with an epicenter in the northwestern part of Chiba Prefecture immediately before the accident. Incidentally, eight of 29 passengers were injured in this accident.

[Probable causes]

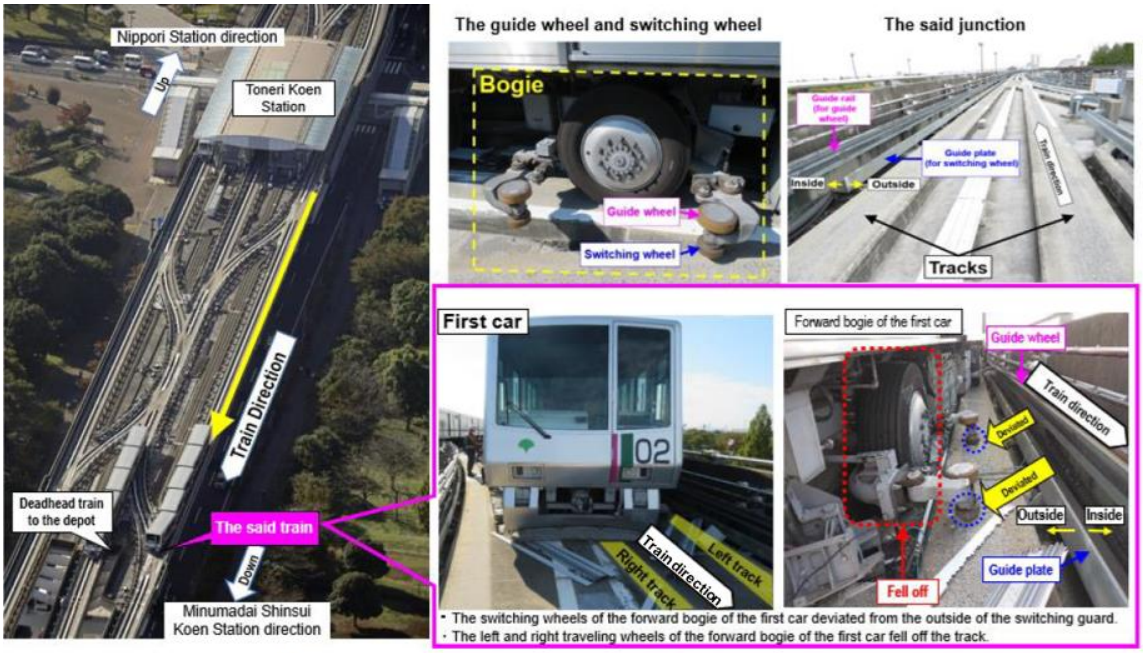
It is probable that the train was significantly shaken in the roll direction due to seismic motion, causing the right-side switching wheel of the bogie to ride up onto the guide rail. As a result, the guide rail detached, and the bogie ran towards the right side of the track. Subsequently, the left-side switching wheel of the bogie deviated outside the fixed guide board installed on the left side of the track ahead, resulting in derailment.

The investigation analyzed the relationship with the earthquake just before the accident. The main findings were:

- The seismic amplification characteristics of the ground near the accident site may have influenced the occurrence of this accident.
- The natural frequencies of the structures near the accident site in the direction perpendicular to the track and the vehicle's roll direction were around 1.0 Hz, which likely amplified the vehicle's rolling during the earthquake.
- The structures near the accident site exhibited rotational behavior during the earthquake, likely contributing to the vehicle's rolling.

Additionally, during the evacuation of passengers after the accident, re-electrification was conducted without confirming the train's derailment status, resulting in sparks from the overhead wire.

Based on the investigation results, the Tokyo Metropolitan Bureau of Transportation was recommended to take measures to prevent recurrence, such as preventing the guide wheels and switching wheels from riding up onto the guide rail during earthquakes and organizing evacuation guidance methods and procedures that prioritize passenger safety.



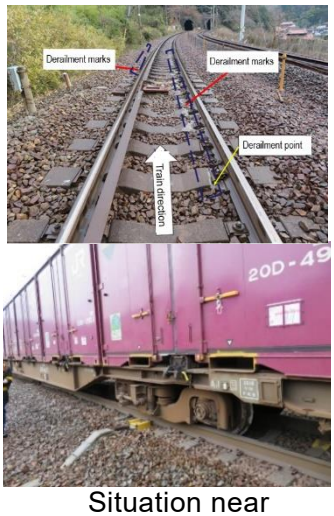
*The leftmost figure was created using a photo provided by Kyodo News.

Situation of the accident site

6. Publication of the derailment investigation report due to uneven loading of cargo

[Summary]

On December 28, 2021, a 25-car freight train traveling from Hiroshima Freight Terminal to Tokyo Freight Terminal, with an additional locomotive connected to the rear due to steep gradients, was traveling at approximately 52 km/h after passing Seno Station when the brakes were applied, and the train came to a stop. When the driver of the front locomotive got off to inspect the train, it was found that all two axles of the front bogie of the 12th car had derailed to the left. There was one driver on the front locomotive and one on the rear auxiliary locomotive, but no injuries occurred.



Situation near the accident site

[Probable causes]

It is probable that the derailment occurred when the first axle of the front bogie of the freight car experienced a reduction in the wheel load on the outer rail while passing through a right curve with a radius of 300 meters.

The reduction in the wheel load on the outer rail is thought to be due to the imbalance of the wheel load being exacerbated by the cargo in the container being unevenly loaded towards the inner rail side*.

The uneven loading of the cargo in the container was due to:

(1) Lack of information sharing regarding uneven loading among related companies such as the transport service provider, the shipper, and the loading company.

(2) Inadequate verification system for checking the uneven loading of cargo.

(3) Lack of a mechanism to investigate the cause and take recurrence prevention measures when uneven loading was identified. These factors collectively contributed to the accident.

*Several containers loaded on the train exceeded the management target guideline of a 10% lateral load imbalance for a single container.

The investigation into this accident thoroughly analyzed factors related to operational handling, vehicles, tracks, and loading. The results revealed that the primary cause was uneven loading of the cargo. Further analysis was conducted on the factors leading to the uneven loading.

Condition of the cargo in the 12th freight car

The published accident investigation report includes recommendations for recurrence prevention, such as (1) Ensuring that important information, such as the container loading guidelines, is fully shared and disseminated among companies involved in cargo transportation, (2) Establishing a system to thoroughly understand and address the actual loading practices and prevent uneven loading in advance, (3) Developing a mechanism for investigating the cause and taking recurrence prevention measures in cooperation with related companies, such as transport service providers and loading companies, when uneven loading is identified, and (4) Early enhancement of hardware measures to detect uneven loading effectively.

7. Publication of the “JTSB Digests” for the prevention of accidents of small aircraft


運輸安全委員会ダイジェスト
JTSB Japan Transport Safety Board
航空事故分析編
小型飛行機等の事故防止に向けて
～簡易型飛行記録装置（FDM）をご存じですか～
第1章 はじめに
第2章 最近の航空事故の発生状況
第3章 簡易型飛行記録装置（FDM）とは
第4章 運航者における FDM 情報の安全運航への活用
第5章 事故調査から見る客観的情報の重要性
第6章 事故分析に向けた客観的情報の有用性
第7章 海外調査機関の動向
第8章 まとめ
第1章 はじめに
図1 FDM

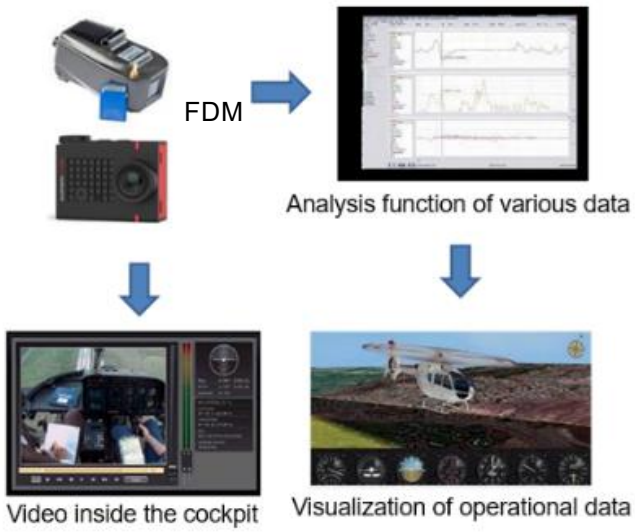
The JTSB publishes the JTSB Digests, which analyzes the contents of similar accidents and incidents, and includes preventive measures. In August 2023, the JTSB Digests titled “For Prevention of Accidents of Small Aircraft: Do You Know flight data monitoring device (FDM)?” was published, emphasizing the necessity of equipping small aircraft with flight data monitoring devices to prevent accidents.

FDM refers to a simple device capable of recording information such as the position, altitude, and other data of an aircraft, as well as audio and video inside the cockpit, primarily targeting small aircraft that do not have flight data recorders (FDR) or cockpit voice recorders (CVR). It is expected to be utilized to reduce the safety risks associated with the operation of small aircraft.

Looking at aircraft accidents over the past ten years, about 60% involved small aircraft. Additionally, over 80% of these accidents were related to human factors, many of which could have been prevented with proper risk management. If FDM devices were equipped, it would allow for regular analysis of data obtained from the FDM device, improving pilot skills and enabling effective risk management. Furthermore, the data would be crucial for the investigations conducted by the JTSB.

The usefulness of FDM devices have been highlighted in several JTSB investigation reports, and overseas accident investigation agencies have also emphasized its necessity. The Ministry of Land, Infrastructure, Transport and Tourism’s Civil Aviation Bureau has also recognized FDM as a safety measure in the Small Aircraft Safety Promotion Committee. After several years of verification surveys, the “Guidelines for Introduction of FDM for Small Aircraft,” including points to consider when installing FDM devices, were formulated in August 2023 to promote the introduction of FDM in small aircraft. Given the shared recognition of FDM’s usefulness between the JTSB and the Civil Aviation Bureau, the JTSB have decided to collaborate for its promotion, issuing this Digest in alignment with the Bureau’s guideline formulation (for details, see Chapter 6, page 111).

By referring to this Digest, the JTSB hopes to increase understanding of the effectiveness of FDM devices, leading to more aircraft being equipped with FDM devices and enhancing aviation safety.



Overview of FDM functions

8. Training for railway accident investigators in Singapore

The JTSB conducts training and other human resource development programs in various countries to enhance global railway accident investigation capabilities and support overseas infrastructure development through soft infrastructure cooperation.

In response to the request from the Transport Safety Investigation Bureau (TSIB) of Singapore, which included railway accidents as a subject of investigation from April 2020, the JTSB conducted a five-day training program for railway accident investigators on-site in Singapore from Monday, July 31, to Friday, August 4, 2023.

The training was conducted using the following program. The program was created based on requests from the TSIB collected from 2022 until the training was conducted, ensuring it aligned with their needs as much as possible.

[1] Overview of Japan's railway transportation
[2] Overview of JTSB activities and key points of accident investigations
[3] Case studies of accident investigations (signal, track, vehicle, and human factors)
[4] Special expert lectures (signal, track, vehicle, and human factors)
[5] Group work (case studies of past accident investigations)

The training participants included TSIB railway accident investigators, other TSIB staff led by the director, and representatives from government agencies, public transportation operators, and accident investigation organizations within Singapore and internationally, representing various countries and perspectives.

The training covered a wide range of topics, from an overview of Japanese railways and railway accident investigations to detailed case studies and academic content in each specialized field. Following the lectures, there were active question-and-answer sessions with the participants.

After the training, the TSIB expressed deep gratitude for the profound understanding and insights that the participants gained regarding railway accident investigations. The TSIB also appreciated the efforts of the JTSB in designing and preparing the training program to suit the local context of Singapore based on on-site surveys.

The JTSB intends to continue sharing knowledge, experience, and technology related to railway accident investigations with the TSIB, based on the revised Statement of Intent (SOI) signed in March 2023, to enhance these capabilities mutually.

Training session (Q&A)

Presentation of a commemorative plaque from TSIB's Director Chong (right) to JTSB's Director of Railway Committee Okumura (left)

Chapter 1 Summary of major investigation activities in 2023

In the case of occurrence of aircraft, railway, or marine accidents, the JTSB designates an investigator-in-charge and accident investigators who begin investigations to determine their causes. Since we can never know when or where accidents may occur, the personnel of the Board, including accident investigators, are making continuous efforts to be able to conduct investigation activities immediately when accidents should occur.

Accident investigators conduct investigations and invite comments from parties relevant to the cause of the accident; accordingly, they make draft recommendations or opinions regarding the measures to be taken to prevent the recurrence of accidents and to mitigate damage caused by accidents. Therefore, they shall endeavor to improve their level of skill and knowledge by participating in national and international training; moreover, they share accident information among international society by attending international conferences.

In the future, we will continue to carry out thorough investigations into the causes of aircraft, railway, and marine accidents, and will publish our investigation reports as soon as possible. Based on the results of our investigations, who will also make recommendations and state our opinions as necessary to related government institutions and parties relevant to the causes of accidents to prevent the recurrence of accidents.

[Regarding recommendations and opinions, see “Chapter 2. Summary of recommendations and opinions issued in 2023” (page 18).]

1 Major accidents and serious incidents occurred in 2023, for which investigations commenced

The accidents and serious incidents also occurred in 2023. The primary investigations which the JTSB commenced are listed below:

(1) Aviation mode

- **Accident involving damage to a Boeing 767-300 (large aeroplane) of All Nippon Airways Co., Ltd. due to a collision with a vehicle on the apron at Narita International Airport (Occurred on January 25)**
- **Accident involving damage to a Boeing 747-400F (large aeroplane) of United Parcel Service, Inc. during landing on Runway B at Narita International Airport (Occurred on May 6)**
- **Accident involving damage to a PDAS-X06 (small aeroplane, pilotless aircraft) of PD AeroSpace (PDAS) shortly after takeoff from Shimojishima Airport, resulting in a water landing (Occurred on June 28)**
- **Accident involving serious injury caused by a privately owned Sami Sami Lab’s SAMI SAMI AGV2 (unmanned aircraft) in Kusu District, Oita Prefecture (Occurred on July 14)**
- **Accident involving damage to a Cirrus SR22 (small aeroplane) of the Civil Aviation College on a taxiway at Kushiro Airport during the landing (Occurred on September 7)**

In 2023, 17 aircraft accidents were subject to investigation, with investigations into the causes of 50 accidents conducted, including 33 ongoing accident investigations from the previous year. Further, 14 serious aircraft incidents were subject to investigation, with investigations into the causes of 35 serious incidents conducted, including 21 ongoing serious incident investigations from the previous year.

(2) Railway mode

- **Other accidents with casualties on the Toyama Chiho Railway Main Line between Echu-Ebara Station and Echu-Sango Station (Toyama City, Toyama Prefecture) (Occurred on April 11)**
- **Train derailment between Tosa-Shirahama Station and Ariigawa Station on the Nakamura Line of the Tosa Kuroshio Railway (Hata District, Kochi Prefecture) (Occurred on June 2)**
- **Other accidents with casualties at Ofuna Station on the Tokaido Line of East Japan Railway Company**

(Kamakura City, Kanagawa Prefecture) (Occurred on August 5)

- **Train derailment between Owani Station and Shukugawara Station on the Owani Line of Konan Railway Company (Minamitsugaru District, Aomori Prefecture) (Occurred on August 6)**

In 2023, 11 railway accidents were subject to investigation, with investigations into the causes of 27 accidents conducted, including 16 ongoing accident investigations from the previous year. Further, two serious railway incidents were subject to investigation, with investigations into the causes of four serious incidents conducted, including two ongoing serious incident investigations from the previous year.

(3) Marine mode

- **Grounding of the cargo ship XIN HAI ZHOU 2 northwest of Taketomi Island, Okinawa Prefecture (Occurred on January 24)**
- **Collision between the recreational fishing vessel SHINGYOMARU and the recreational fishing vessel SEA BRAVO off the coast of Hayase Fishing Port, Mihama Town, Fukui Prefecture (Occurred on March 15)**
- **Capsizing of PASSENGER SHIP NO. 9 on the Katsura River in Kameoka City, Kyoto Prefecture (Occurred on March 28)**
- **Collision between the container ship CONTSHIP UNO and the cargo ship IZUMIMARU in the Kii Channel (Occurred on August 24)**
- **Fatality of a crew member on the coal carrier ENERGIA CENTAURUS at Tokuyama-Kudamatsu Port in Kudamatsu City, Yamaguchi Prefecture (Occurred on September 21)**

In 2023, 658 marine accidents were subject to investigation, with investigations into the causes of 1,287 accidents conducted, including 636 ongoing accident investigations from the previous year (excluding seven incidents deemed to not be accidents as a result of investigations). Further, 158 marine incidents were subject to investigation, with investigations into the causes of 334 (excluding five incidents deemed to not be an incident as a result of investigations) incidents conducted, including 181 ongoing incident investigations from the previous year.

2 Major accidents and serious incidents for which investigation reports were published in 2023

Completed investigations into the causes of accidents and incidents undergo committee (subcommittee) review/resolution. Investigation reports were submitted to the Minister of Land, Infrastructure, Transport, and Tourism and published on the JTSB website. Major accidents and incidents, for which the investigation reports published on the website, are as follows.

(1) Aviation mode

- **Serious incident of an Airbus A320-214 (large aircraft) of Peach Aviation Limited that attempted to land on Runway 34L (Runway A) at Tokyo International Airport while another aircraft was using the runway (Occurred on November 30, 2019)**
- **Crash of a privately owned Robinson R66 (rotorcraft) in Oshiro, Shimada City, Shizuoka Prefecture (Occurred on December 30, 2020)**
- **Accident involving passenger injury due to shaking of an Airbus A320-214 (large aircraft) of Star Flyer Inc. at FL280 over Kurashiki City, Okayama Prefecture (Occurred on January 16, 2022)**
- **Fatal water landing accident of a privately owned Fuji Heavy**

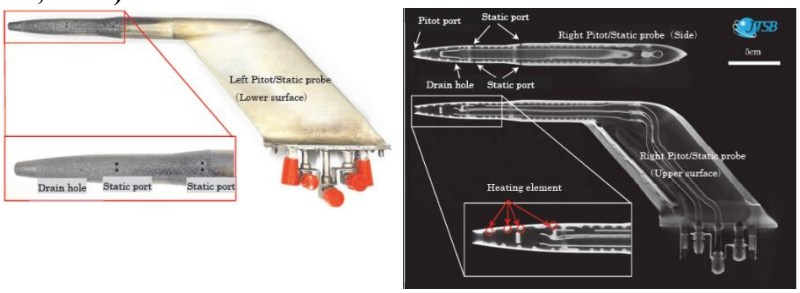


Photo of the pitot-static tube of the Ibex Airlines aircraft (left) and an X-ray CT scanner image taken by the JTSB (right)

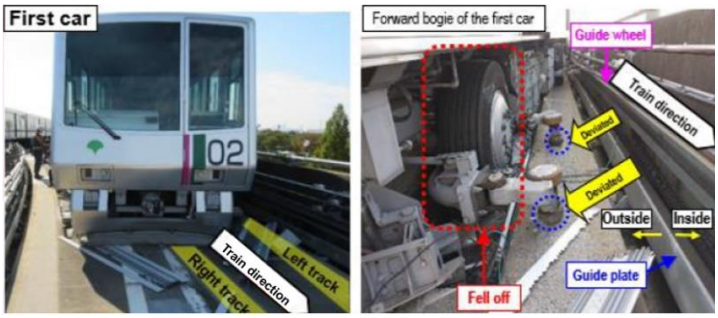
Industries' FA-200-160 (small aeroplane) approximately 10 km west of Miike Port in Omuta City, Fukuoka Prefecture (Occurred on April 18, 2022)

- **Serious incident involving multiple malfunctions that threatened the safety of an aircraft in flight, involving a Bombardier CL-600-2C10 (large aircraft) of Ibex Airlines Co., Ltd. at FL360 over Oda City, Shimane Prefecture (Occurred on April 18, 2022)**

Completed investigation reports into 21 aircraft accidents and 17 serious aircraft incidents have been published.

(2) Railway mode

- **Train derailment in the premises of Toneri-Koen Station on the Nippori-Toneri Liner, Tokyo Metropolitan Bureau of Transportation (Adachi-ku, Tokyo) (Occurred on October 7, 2021)**
- **Train derailment in the premises of Hikoneguchi Station (Hikone City, Shiga Prefecture) of the main line, OHMI Railway Co., Ltd. (Occurred on December 27, 2021)**



Nippori-Toneri Liner train derailment

- **Train derailment between Seno Station and Hachihommatsu Station on the Sanyo Line, Japan Freight Railway Company (Hiroshima City, Hiroshima Prefecture) (Occurred on December 28, 2021)**
- **Train derailment in the premises of Takamiya Station (Hikone City, Shiga Prefecture) of the Taga Line, OHMI Railway Co., Ltd. (Occurred on February 7, 2022)**
- **Serious incident (dangerous trouble in vehicle) in the premises of Shonan Kaigan Park Station on the Enoshima Electric Railway Line, Enoshima Electric Railway Co., Ltd. (Fujisawa City, Kanagawa Prefecture) (Occurred on July 24, 2022)**
- **Train derailment between Hage Station and Ekawasaki Station on the Yodo Line, Shikoku Railway Company (Shimanto City, Kochi Prefecture) (Occurred on August 25, 2022)**
- **Train derailment within the premises of Mukomachi Station on the Tokaido Line, West Japan Railway Company (Mukomachi City, Kyoto Prefecture) (Occurred on September 6, 2022)**

Completed investigation reports into 17 railway accidents and one serious railway incident have been published.

Regarding the train derailment in the premises of Toneri Koen Station (Adachi-ku, Tokyo) on the Nippori-Toneri Liner of the Tokyo Metropolitan Bureau of Transportation published in the investigation report, a recommendation was made to the Tokyo Metropolitan Bureau of Transportation on February 16.

(Please refer to Chapter 2, "Summary of recommendations and opinions" on page 19.)

(3) Marine mode

- **Collision between the fishing vessel TAKAHISAMARU and the recrational fishing vessel SHINEIMARU off the northern coast of Katsumoto Port, Iki City, Nagasaki Prefecture (Occurred on February 29, 2020)**
- **Grounding of the cargo ship WAKASHIO on the shallow reef in the southeastern part of Mauritius Island, Republic of Mauritius (Occurred on July 25, 2020)**
- **Grounding of the passenger ship SHRIMP OF ART northwest of Hasajima, Sakaide City, Kagawa Prefecture (Occurred on November 19, 2020)**
- **Explosion of the pleasure boat KUMASAN 007 at Motobu Port (Tokuchi District), Motobu Town, Okinawa Prefecture (Occurred on April 27, 2021)**

- **Foundering of the passenger ship KAZU I off the western coast of the Shiretoko Peninsula, near Kashuni Falls, Hokkaido Prefecture (Occurred on April 23, 2022)**

Completed investigation reports into 678 marine accidents and 182 marine incidents have been published.

Regarding the injury accident involving a passenger on the recreational fishing vessel SUHARAMARU NO. 15 published in the investigation report, an opinion was expressed to the Director-General of the Fisheries Agency on February 16.

(Please refer to Chapter 2, “Summary of recommendations and opinions” on pages 20-21.)

Foundering of the passenger ship KAZU I

3 Major accidents and serious incidents for which progress reports were published in 2023

Regarding the injury accident involving a passenger on the recreational fishing vessel SUHARAMARU NO. 15 published in the investigation report, an opinion was expressed to the Director-General of the Fisheries Agency on February 16.

(1) Railway mode

- **Train derailment between the Tohoku Shinkansen Fukushima Station - Shiroishi Zao Station (Shiroishi City, Miyagi Prefecture) of East Japan Railway Company (Occurred on March 16, 2022)**

The JTSB has been conducting investigations to determine the cause of this accident; however, obtaining factual information will still take time, as will analyzing the cause and considering measures to prevent a recurrence. For this reason, as it is expected to be difficult to complete the investigation within one year from the date ofthe accident, we will publish an interim report after its submission to the Minister of Land, Infrastructure, Transport and tourism on February 16.

This progress report has been published on the JTSB website.

https://www.mlit.go.jp/jtsb/railway/rep-acci/keika20230216-1.pdf **(Japanese)**

(2) Marine mode

- **Grounding of the cargo ship XIN HAI ZHOU 2 northwest of Taketomi Island, Okinawa Prefecture (Occurred on January 24, 2023)**

The JTSB has been conducting investigations to determine the cause of this accident; however, obtaining factual information will still take time, as will analyzing the cause and considering measures to prevent a recurrence. For this reason, as it is expected to be difficult to complete the investigation within one year from the date of the accident, we will publish an interim report after its submission to the Minister of Land, Infrastructure, Transport and Tourism on December 21.

This progress report has been published on the JTSB website.

https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/keika20231221-0_2023tk0001.pdf **(Japanese)**

Column

JTSB Launches Its First Official Social Media

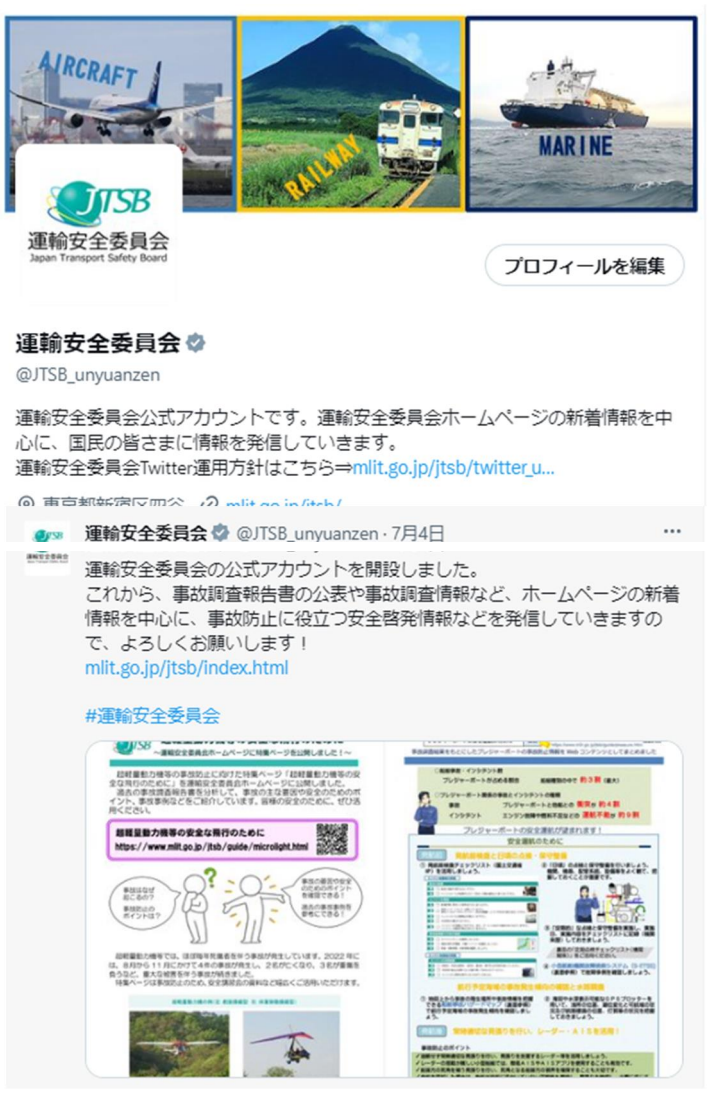
Public Relations Office

We started using Twitter!

On July 4, 2023, just before Twitter rebranded as X and changed its blue bird logo to the X mark, the JTSB launched its first official social media account.

Previously, our website and a monthly email newsletter were the main channels for our information dissemination.

To enhance our communication capabilities, we established an official social media account to provide faster and more timely information to a broader audience, different from our website visitors and email newsletter subscribers.



In preparation for the launch, we developed operational guidelines and a user manual following the Ministry of Land, Infrastructure, Transport and Tourism's information security policy. We also created an icon for the profile and selected a top image, taking into account the opinions of our younger staff members seemed to be familiar with social media.

We deliberated on the appropriate content for our first post within the Public Relations Office.

On the day of our first post, we received a considerable number of views, and it felt rewarding after all the hard work leading up to the launch.

On social media, we mainly share updates from our website. However, depending on the season, we also introduce useful content such as past "JTSB Digest" issues and post-accident investigation information before it is available on our website. Some content has garnered surprising views in number, even catching our team off guard.

Moving forward, our staff will continue to work together to share information that helps prevent accident recurrence, aiming to increase awareness of the JTSB's activities. We appreciate your follow!

Official Account: @JTSB_unyuanzen

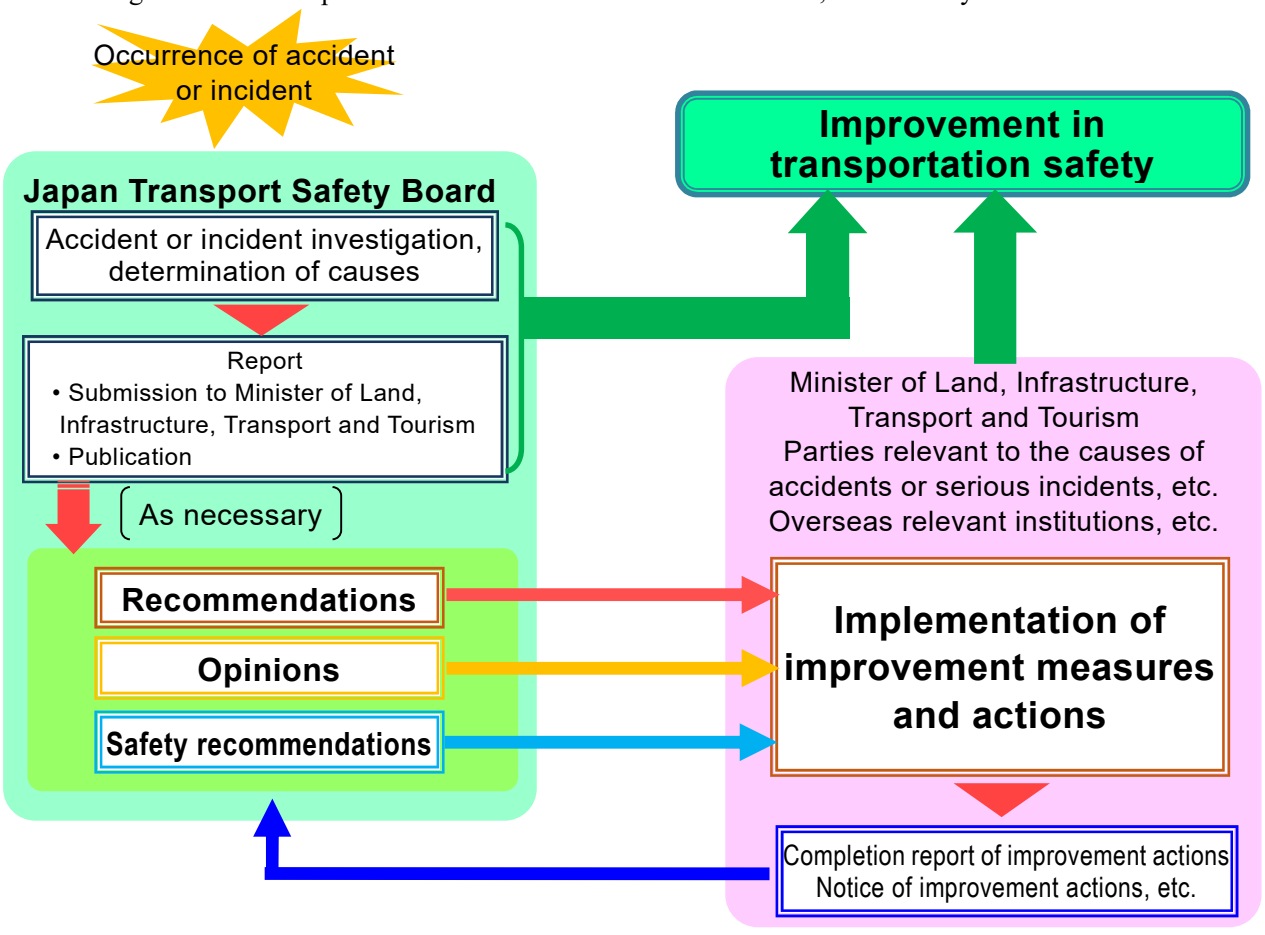
Chapter 2 Summary of recommendations and opinions

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 an important system of "recommendations" and "opinions" 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. If the parties concerned with the cause do not take measures related to the recommendations, the JTSB is entitled to announce that effect publicly. (Articles 26 and 27 of the Act for Establishment)

On the other hand, it is determined not only based on the results of investigations into individual accidents but also on the interim results of investigations or 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 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 (safety recommendations) 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 2023 are as follows.

(1) Recommendations concerning the railway accident that occurred in the premises of Toneri Koen Station on the Nippori-Toneri Liner operated by the Tokyo Metropolitan Bureau of Transportation

(Recommendations on February 16, 2023)

○Summary and probable causes

See Chapter 4, page 70.

○Details of the recommendation to the Tokyo Metropolitan Bureau of Transportation

This accident is believed to have occurred because the right-side guide wheel of the front bogie of the first car rode up onto the guide rail due to seismic motion from an earthquake with an epicenter in the northwestern part of Chiba Prefecture. This accident was exacerbated by the natural frequencies of the structures near the accident site and the vehicle itself being around 1.0 Hz, combined with the rotational behavior of the structures near the accident site, which amplified the rolling motion of the vehicle, causing the bogie's left and right wheels to lift alternately.

After the accident, the dispatcher instructed the power supply controller to re-electrify the section near the accident site to move train No. 2265A and evacuate passengers. However, this was done without confirming that the train had derailed, resulting in sparks from the overhead wire, which caused smoke to enter the train.

Based on the investigation results, the JTSB recommends that the Tokyo Metropolitan Bureau of Transportation implement the following measures to ensure transportation safety per Article 27, Paragraph 1 of the Act for Establishment of the Japan Transport Safety Board.

In addition, under Article 27, Paragraph 2, the JTSB requests a report on the measures taken.

Recommendations

(1) The Tokyo Metropolitan Bureau of Transportation should implement measures at facilities near the accident site to prevent the guide wheels and guide rails from riding up onto the guide rail due to seismic motion.

(2) The Tokyo Metropolitan Bureau of Transportation should establish procedures and methods for evacuation guidance, prioritizing passenger safety. It should ensure that re-electrification is not conducted until vehicle and facility conditions are confirmed after an earthquake with a seismic intensity of 5 lower or higher on the Japanese seismic intensity scale. These procedures should be included in the abnormal situation response manual and thoroughly communicated to relevant personnel.

The accident investigation report can be viewed on the JTSB website.
https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-2-1.pdf (Japanese)

2 Opinions

The opinions issued by the JTSB in 2023 are as follows.

(1) Opinions concerning the accident of the recreational fishing vessel SUHARAMARU NO. 15 injuring anglers and the measures taken in response to the opinions

(Opinions on February 16, 2023)

○Summary

On January 4, 2022, while heading south-southeast, two passengers on the starboard bow of the recreational fishing vessel SUHARAMARU NO. 15 were injured when the bow moved up and down.

○Probable Causes

This accident is believed to have occurred when the vessel, moving south-southeast at approximately 15 knots in swells of about 0.5 to 1.0 meters from the southwest off the east-southeast of Kannonzaki, experienced significant vertical movement of the starboard bow due to the swells. As a result, two passengers, A and B, seated on the starboard bow fishing seats, were lifted upward and then fell, striking their buttocks on the seats.

After the swells appeared, the master reduced the cruising speed of about 20 knots to about 15 knots and did not feel significant rolling. Therefore, the master continued navigating at the same speed and made the usual pre-arrival announcement, leading passengers A and B to move to the starboard bow fishing seats.

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

This accident is believed to have occurred when the vessel, moving south-southeast at approximately 15 knots in swells of about 0.5 to 1.0 meters from the southwest off the east-southeast of Kannonzaki, Yokosuka City, Kanagawa Prefecture, experienced significant vertical movement of the starboard bow due to the swells. As a result, two passengers, A and B, seated on the starboard bow fishing seats, were lifted upward and then fell, striking their buttocks on the seats.

After the swells appeared, the master reduced the cruising speed of about 20 knots to about 15 knots and did not feel the vessel rolling significantly. Therefore, the master continued navigating at the same speed and made the usual pre-arrival announcement, leading passengers A and B to move to the fishing seats at the starboard bow.

In September 2011, the JTSB expressed opinions to the Director-General of the Fisheries Agency to prevent the recurrence of similar accidents involving recreational fishing vessels. In response, the Fisheries Agency revised the operational guidelines in October of the same year, advising that “masters of recreational fishing vessels should instruct passengers to move to the middle or rear parts of the vessel where the rolling is relatively mild when significant rolling is expected due to waves” and provided this advice to prefectural governors to guide recreational fishing vessel operators to revise their operational guidelines.

However, 14 similar accidents involving recreational fishing vessels (only those with published reports by the JTSB) have occurred since then, resulting in 21 passengers suffering injuries such as lumbar fractures, with accidents occurring every year since 2016.

These accidents have occurred because the guidance to seat passengers in the vessel’s rear and adequate speed reduction, as specified in the operational guidelines, were not properly followed. Therefore, it is necessary to ensure strict compliance with the operational guidelines for masters of recreational fishing vessels.

Based on the results of this accident investigation, the JTSB expresses the following opinions to ensure the safety of passengers using recreational fishing vessels in accordance with Article 28 of the Act for Establishment of the Japan Transport Safety Board.

If any measures are taken in response to this opinion, please provide us with the details.

Opinions

The Director-General of the Fisheries Agency should advise prefectural governors to inform recreational fishing vessel operators about the injuries caused to passengers by this accident and ensure the following measures are implemented to ensure the safety of passengers.

(1) Masters and other responsible parties of recreational fishing vessels should reduce rolling by changing course and sufficiently reducing speed when the vessels are affected by waves. They should also instruct passengers to move to the middle or rear of the boats when significant rolling is expected due to waves, following the operational guidelines for preventing passenger injuries due to rolling.

(2) Masters and recreational fishing vessel operators should review and implement the following measures to ensure compliance with the operational guidelines for preventing passenger injuries due to rolling.

1) Establish guidelines for wind direction, wind speed, wave direction, wave height, etc., with consideration of the wave characteristics of the navigated area, past similar accidents, and the rolling characteristics during navigation, to instruct passengers to move to the middle or rear of the boats.

2) If the established guidelines are exceeded during navigation, stop or sufficiently reduce speed to ensure safety before moving passengers to the middle or rear of the boats.

3) Obtain information on wind and waves in the planned navigation area, and if the established guidelines are exceeded, confirm that passengers have moved to the middle or rear of the boats before departure. If the area exceeding the guidelines is far away, move the passengers to the middle or rear well before entering the area.

(3) Recreational fishing vessel operators should educate and instruct masters and other responsible parties to comply with the above (1) and (2) measures.

A report on the measures taken by the Director-General of the Fisheries Agency based on the opinions issued on March 13, 2023, has been received. For details, please refer to the JTSB website.
https://www.mlit.go.jp/jtsb/shiphoukoku/ship-iken19re_20230328.pdf (Japanese)

The accident investigation report can be viewed on the JTSB website.
https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-2-8_2022yh0025.pdf
(Japanese)

3 Safety recommendations

In 2023, 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

There were no reports in 2023 on the measures taken in response to recommendations and opinions issued by the JTSB up to 2022. For the status of measures taken in response to recommendations and opinions issued in 2023, refer to 1-3 of this chapter.

Column

Holding of Opinion Hearing

Director for Management

On September 7, 2023, the Japan Transport Safety Board published the Marine Accident Investigation Report on the foundering of the passenger ship “KAZU I.”

This accident falls under the provisions of Article 24, Paragraphs 2 and 3 of the Act for Establishment of the Japan Transport Safety Board (a marine accident, etc., occurring to a ship used for marine transportation services that transport passengers and draws public attention). Therefore, the Japan Transport Safety Board held an opinion hearing on July 26.

The Japan Transport Safety Board held the opinion hearing to listen to the opinions of those involved in the accident or those with academic experience to aid in determining the cause of the accident.

Although the predecessor organizations of the Japan Transport Safety Board, the Japan Aircraft Accident Investigation Commission and the Aircraft and Railway Accidents Investigation Commission, held eight opinion and hearing sessions in the past, this was the first time since the establishment of the Japan Transport Safety Board in 2008 that such a hearing was held.

Prior to the hearing, we posted a draft report on the factual investigation on the Japan Transport Safety Board’s website. We solicited public speakers from among those involved in the accident or those with academic experience to provide their opinions. Three individuals applied, and we added two members appointed by the Japan Transport Safety Board, making a total of five public speakers who attended and provided their opinions at the venue on the day of the hearing.

The proceedings of the opinion hearing were streamed live over the internet, except for the opinions of two individuals who requested confidentiality, allowing many people to watch.

In the past, general audience members attended the venue for such hearings. However, for this opinion hearing, we adopted online live streaming for the first time to make it easier for those who could not attend in person to listen, taking advantage of advancements in communication technology. The hearing was successfully held without any communication disruptions.

The opinions received from the public speakers were used as references in the Japan Transport Safety Board’s deliberations. We hope that such accidents will never be repeated.

The venue

During the event

Chapter 3 Aircraft accident and serious incident investigations

1 Aircraft accidents and serious incidents to be investigated

<Aircraft accidents to be investigated>

◎Article 2, paragraph (1) of the Act for Establishment of the Japan Transport Safety Board

The term "aircraft accident" as used in this Act means the accident prescribed as follows:
(i) the accident prescribed in each of the items of Article 76, paragraph (1) of the Civil Aeronautics Act (Act No.231 of 1952), regarding aircraft.
(ii) the accident prescribed in each of the items of Article 132-90, paragraph (1) of the Civil Aeronautics Act, which are serious ones as may be specified in the Order of the Ministry of Land, Infrastructure, Transport and Tourism (Article 1 of Regulation for Enforcement of the Act for Establishment of the Japan Transport Safety Board), regarding unmanned aircraft.

1. **Accidents related to aircraft**

○Article 76, paragraph (1) of the Civil Aeronautics Act

(i) crash, collision, or fire of aircraft
(ii) injury or death of any person, or damage of any object caused by aircraft
(iii) death (except those specified in Order of the Ministry of Land, Infrastructure, Transport and Tourism) or disappearance of any person on board the aircraft
(iv) contact with other aircraft
(v) other accidents relating to aircraft specified in the Order of the Ministry of Land, Infrastructure, Transport and Tourism

▪Article 165-3 of the Regulation for Enforcement of the Civil Aeronautics Act

Case where aircraft in flight is damaged*1*2

*1 excluding the sole damage of engine, cowling, propeller, wing tip, antenna, tire, brake or fairing
*2 case which refers to the case corresponding to "major repair." "Major repair" means a repair that has a significant effect on airworthiness.

2. Accidents related to unmanned aircraft

○Article 132-90, paragraph (1) of the Civil Aeronautics Act

(i) injury or death of any person, or damage of any object caused by unmanned aircraft
(ii) collision or contact with an aircraft
(iii) other accidents relating to unmanned aircraft which are serious ones as may be specified in Order of the Ministry of Land, Infrastructure, Transport and Tourism (*Currently, there is no order)
↓which are
serious ones as may be specified in Order of the Ministry of Land, Infrastructure, Transport and Tourism (Article 1 of Regulation for Enforcement of the Act for Establishment of the Japan Transport Safety Board)

▪Article 1 of the Regulation for Enforcement of the Act for Establishment of the Japan Transport Safety Board

(i) injury or death of any person caused by unmanned aircraft
(ii) damage of any object caused by an unmanned aircraft prescribed below.
(a) damage of buildings for which a person is actually present or movable facilities such as vehicles, ships, etc.
(b) case where electricity supply facilities, telecommunications facilities, transportation facilities, educational facilities, medical facilities, government facilities, or other public facilities operations are disrupted.
(c) other cases which are recognized as particularly exceptional in addition to those listed in (a) and (b)
(iii) collision or contact with an aircraft

<Aircraft serious incidents to be investigated>

◎Article 2, paragraph (2), item (ii) of the Act for Establishment of the Japan Transport Safety Board (serious incidents involving aircraft and unmanned aircraft)

Aircraft serious incident is a case recognized a risk of aircraft accident as may be specified in the Order of the Ministry of Land, Infrastructure, Transport and Tourism (Article 2 of the Regulation for Enforcement of the Act for Establishment of the Japan Transport Safety Board).

○Article 2 of the Regulation for Enforcement of the Act for Establishment of the Japan Transport Safety Board

3. Serious incidents related to aircraft

(1) The following cases*. However, item (viii), (xi) and (xii) are limited to the cases occurred to an aircraft during flight.

(i) case where a pilot in command of an aircraft, during a flight, recognized a risk of collision or contact with any other aircraft

(ii) takeoff from a closed runway, a runway being used by other aircraft, a runway which is different from the instructed one or a taxiway, or aborted takeoff

(iii) landing on a closed runway, a runway being used by other aircraft, a runway which is different from the instructed one or a location where an aircraft is not normally supposed to land such as a taxiway or a road

(iv) case where engine cowling, wingtip or component other than landing gear is contact with ground surface during landing

(v) overrun, undershoot and deviation from a runway (limited to when an aircraft is unable to perform taxiing)

(vi) case where emergency evacuation was conducted by using the emergency evacuation slide

(vii) case where aircraft crew executed an emergency operation during flight in order to avoid crash into water or contact with the ground

(viii) damage to the engine (limited to a case where fragments penetrated the casing of the engine or a major damage occurred inside the engine)

(ix) the engine is stopped continuously or loss of power or thrust thereof (except when the engine(s) are stopped with an attempt of assuming the engine(s) of a motor glider) of engines (in the case of multiple engines, two or more engines) in flight

(x) case where any of aircraft propeller, rotary wing, landing gear, rudder, elevator, aileron or flap is damaged and thus flight of the aircraft may not be continued

(xi) multiple malfunctions in one or more systems installed on aircraft impeding the safe flight of aircraft

(xii) occurrence of fire or smoke inside an aircraft and occurrence of fire within an engine fire-prevention area

(xiii) abnormal decompression inside an aircraft

(xiv) shortage of fuel requiring urgent measures

(xv) case where aircraft operation is impeded by an encounter with air disturbance or other abnormal weather conditions, failure in aircraft equipment, or a flight at a speed exceeding the airspeed limit, limited payload factor limit operating altitude limit

(xvi) case where aircraft crew was unable to perform normal duties due to injury or disease

(xvii) case where an object which attached to the exterior of the aircraft, suspended, or towed dropped unintentionally or it dropped as an emergency operation from the aircraft.

(xviii) case where parts fell from aircraft collided with persons

(xix) case equivalent to those listed in the preceding items

*Item (ii) through (xix) are the cases listed in Article 166-4 of the Regulation for Enforcement of the Civil Aeronautics Act, which are cited in Article 2 of the Regulation for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

(2) The following cases, and an unusual case in particular:

(i) case listed in item (viii), (xi), and (xii) of 1 above occurring with an aircraft other than during flight

(ii) case where an aircraft other than during flight is damaged[*1*2]

*1 except the sole damage of engine, cowling, engine accessories, propeller, wing tip, antenna, tire, brake or fairing

*2 case which refers to the case corresponding to “major repair.” “Major repair” means a repair that has a significant effect on airworthiness.

(iii) case where any of aircraft propeller, rotary wing, landing gear, rudder, elevator, aileron or flap is damaged and thus flight of the aircraft may not be started

(iv) case equivalent to those listed in the preceding items

4. Serious incidents related to unmanned aircraft

(1) case where a pilot in command of an unmanned aircraft, during a flight, recognized a risk of collision or contact with any other aircraft

(2) The following cases, and an unusual case in particular:

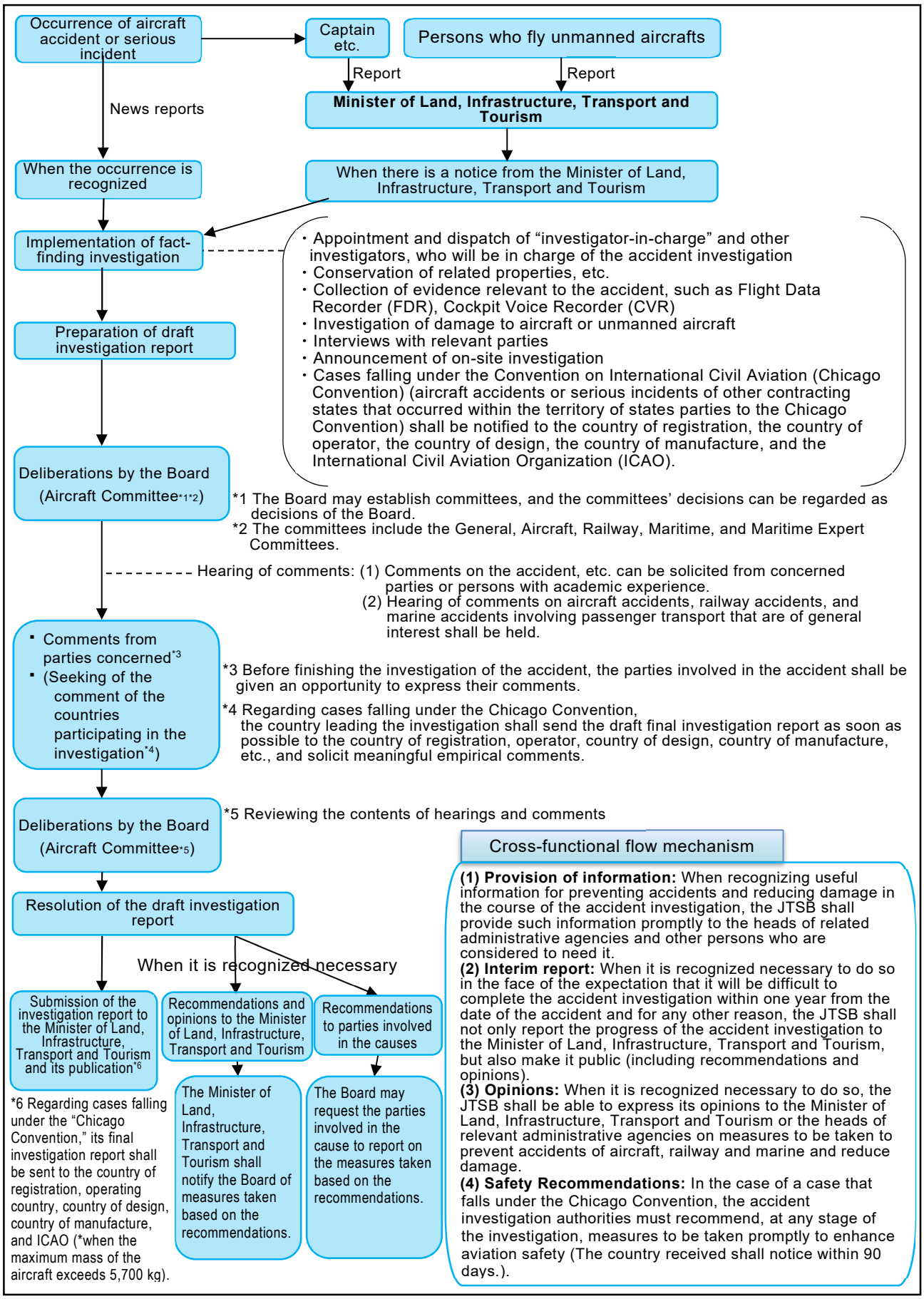
(*cases listed in each items of Article 236-86 of the Regulation for Enforcement of the Civil Aeronautics Act)

(i) injury to persons caused by an unmanned aircraft (excluding serious injuries)

(ii) case in which an unmanned aircraft becomes uncontrollable

(iii) case in which an unmanned aircraft ignites (restricted to that occurred during flight)

2 Procedure of aircraft accident/serious incident Investigation



3 Statistics of investigations of aircraft accidents and serious incidents

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

In 2023, 33 accident investigations were carried over from 2022 and 17 accident investigations were newly launched. Besides, 21 investigation reports were published, and thereby 29 accident investigations were carried over to 2024.

Moreover, 21 serious incident investigations were carried over from 2022, and 14 serious incident investigations were newly launched in 2023. Furthermore, 17 investigation reports were published, and thereby 18 serious incident investigations were carried over to 2023.

Among the 38 investigation reports published in 2023, none was issued with recommendations and none was issued with opinions.

Investigations of aircraft accidents and serious incidents in 2023

(Cases)

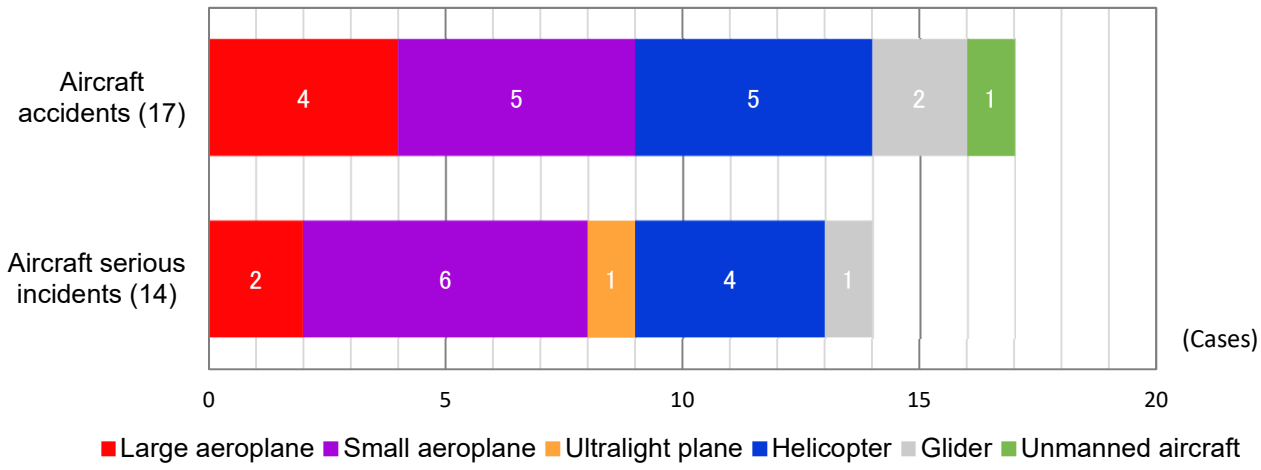
Category	Carried over from 2022	Launched in 2023	Total	Published investigation reports	(Recommendations)	(Safety recommendations)	(Opinions)	Carried over to 2024	(Interim report)
Aircraft accident	33	17	50	21	(0)	(0)	(0)	29	(7)
Aircraft serious incident	21	14	35	17	(0)	(0)	(0)	18	(6)

4 Statistics of investigated aircraft accidents and serious incidents in 2023

The aircraft accidents and serious incidents that were newly investigated in 2023 consisted of 17 aircraft accidents, which decreased by four from 21 for the previous year, and 14 aircraft serious incidents, the same as the previous year.

By aircraft category, the aircraft accidents included four cases involving large aeroplanes, five cases involving small aeroplanes, five cases involving helicopters, two cases involving gliders, and one case involving unmmaned aircraft. The aircraft serious incidents included two cases involving large aeroplanes, six cases involving small aeroplanes, one case involving ultralight plane, four cases involving helicopters, and one case involving glider.

Number of investigated aircraft accidents and serious incidents by aircraft category in 2023



* Large aeroplane refers to an aircraft of a maximum take-off mass of over 5,700 kg.
* Small aeroplane refers to an aircraft of a maximum take-off mass of under 5,700 kg except for ultralight plane and self-made aircraft.
* Ultralight planes include self-made aircraft in the form of ultralight planes.

The number of fatal injuries, missing and injuries were 13, including one fatal injury and 12 injuries.

The number of casualties (aircraft accident)

(Persons)

2023							
Aircraft category	Fatal Injuries		Missing		Serious/Minor Injuries		Total
	Crew	Passengers and others	Crew	Passengers and others	Crew	Passengers and others	
Large aeroplane	0	0	0	0	0	6	6
Small aeroplane	0	0	0	0	1	1	2
Helicopter	0	0	0	0	0	3	3
Ultralight plane	0	0	0	0	0	0	0
Glider	1	0	0	0	0	0	1
Unmanned aircraft	0	0	0	0	1	0	1
Total	1	0	0	0	2	10	13
	1		0		12		

*The above statistics include incidents under investigation so may change depending on the status of the investigation and deliberation. In addition, for the number listed as “passengers” on the website in the number of injuries of an aircraft accident currently under investigation, the minimum number of pilots required to fly the aircraft are counted as “crew.”

5 Summaries of aircraft accidents and serious incidents which occurred in 2023

The aircraft accidents and serious incidents which occurred in 2022 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.

(Aircraft accidents)

1	Date and location	Operator	Aircraft registration number and aircraft type
	January 7, 2023 Over near the sea about 80 km east-northeast of Miyazaki Airport	Japan Airlines Co., Ltd.	JA307J Boeing 737-800 (Large aeroplane)
	Summary	See “6 Publication of investigation reports” (No.21 on page 45).	
2	Date and location	Operator	Aircraft registration number and aircraft type
	January 7, 2023 On the taxiway at Chubu Centrair International Airport	Jetstar Japan Co., Ltd.	JA14JJ Airbus A320-232 (Large aeroplane)
	Summary	The aircraft took off from Narita International Airport and started flying to Fukuoka Airport but changed its destination and landed at Chubu Centrair International Airport due to a bomb threat. During the evacuation using the escape slide, one passenger was seriously injured, and four passengers sustained minor injuries.	
3	Date and location	Operator	Aircraft registration number and aircraft type
	January 25, 2023 On the apron at Narita International Airport	ALL NIPPON AIRWAYS CO., LTD.	JA603A Boeing 767-300 (Large aeroplane)

	Summary	After landing on Runway 34L at Narita International Airport, the aircraft was taxiing on the apron when it skidded on a spot and came in contact with a ground support vehicle parked nearby, causing damage to the aircraft.		
4	Date and location		Operator	Aircraft registration number and aircraft type
	March 2, 2023 On the spot at Okayama Airport		All Nippon Helicopter CO., LTD.	JA37NH Eurocopter EC135T2 (Rotorcraft)
	Summary	After landing at Okayama Airport, the aircraft landed hard and stopped at the spot.		
5	Date and location		Operator	Aircraft registration number and aircraft type
	April 9, 2023 In Naganohara Town, Agatsuma-gun, Gunma Prefecture		Privately owned	JA2502 PZL-Bielsko SZD-55-1 (Glider)
	Summary	The aircraft was found near the above location.		
6	Date and location		Operator	Aircraft registration number and aircraft type
	April 18, 2023 In a rice field in Usa City, Oita Prefecture		Japan Coast Guard	JA395A Textron Aviation 172S (Small aeroplane)
	Summary	After taking off from Kitakyushu Airport, the aircraft experienced a decrease in engine output during the flight and made an emergency landing near the above location.		
7	Date and location		Operator	Aircraft registration number and aircraft type
	May 3, 2023 Near a temporary airfield in Toyama City, Toyama Prefecture		Privately owned	JA7875 Robinson R22 Beta (Rotorcraft)
	Summary	After taking off from Noto Airport, the aircraft overturned while landing at the airfield.		
8	Date and location		Operator	Aircraft registration number and aircraft type
	May 6, 2023 On Runway B at Narita International Airport		United Parcel Service Company	N580UP Boeing 747-400F (Large aeroplane)
	Summary	After taking off from Shanghai Pudong Airport, the aircraft approached Runway B at Narita International Airport. However, they executed a go-around due to strong winds and landed on Runway A. Post-arrival inspection revealed damage to the aircraft.		
9	Date and location		Operator	Aircraft registration number and aircraft type
	June 15, 2023 In the mountains of Nantan City, Kyoto Prefecture		AERO ASAHI CORPORATION	JA9678 Aerospatiale AS332L1 (Rotorcraft)
	Summary	While attempting to lift cargo suspended outside the aircraft near the above location, the cargo came in contact with a ground operator, causing injury to the operator.		
10	Date and location		Operator	Aircraft registration number and aircraft type
	June 16, 2023 On the apron at Naha Airport		Privately owned	JA5309 Cessna T303 (Small aeroplane)
	Summary	After starting the engine at the above location, a burnt smell emanated from the No. 1 (left) engine, and a light indicating high temperature within the fire zone of the engine illuminated, leading to the engine being shut down. Subsequently, smoke was observed from the engine, and fire trucks carried out firefighting activities to extinguish the smoke.		
11	Date and location		Operator	Aircraft registration number and aircraft type
	June 28, 2023 Shortly after takeoff from Shimojishima Airport		PD AeroSpace, LTD.	JX0163 PD Aerospace PDAS-X06

			(Pilotless Aircraft) (Small aeroplane)
	Summary	Shortly after takeoff from Shimojishima Airport, the aircraft experienced a malfunction in radio communication between the ground control station and the aircraft, switched to autopilot, and continued flying. As the likelihood of deviating from the designated flight test area increased, the flight termination system automatically activated, causing the aircraft to land on the sea surface approximately 3 km north of Shimojishima Airport.	
12	Date and location	Operator	Aircraft registration number and aircraft type
	July 14, 2023 Kusu-gun, Oita Prefecture	Privately owned	JU32367E6C22 SamiSami Lab. SAMI SAMI AGV2 (Unmanned aircraft)
	Summary	While an individual was operating a UAV for pesticide spraying training from a takeoff location in Kusu-gun, Oita Prefecture, the aircraft came in contact with a nearby utility pole. As the operator approached the aircraft, it came in contact with his right hand and left temple, causing injuries.	
13	Date and location	Operator	Aircraft registration number and aircraft type
	August 14, 2023 On the runway at Oita Airport	HONDA AIRWAYS CO., LTD.	JA51HA Hawker Beechcraft G58 (Small aeroplane)
	Summary	The aircraft landed at Oita Airport, and the bottom of the fuselage came in contact with the runway, causing the aircraft to stop on the runway.	
14	Date and location	Operator	Aircraft registration number and aircraft type
	September 7, 2023 On the taxiway at Kushiro Airport	Civil Aviation College	JA018C Cirrus SR22 (Small aeroplane)
	Summary	After taking off from Obihiro Airport and approaching Kushiro Airport for touch-and-go training, the aircraft landed crossing the taxiway and stopped after hitting a fence.	
15	Date and location	Operator	Aircraft registration number and aircraft type
	September 29, 2023 At an altitude of approximately 10 meters above the summit of Mt. Daisen, in Daisen Town, Saihaku-gun, Tottori Prefecture	SHIKOKU AIR SERVICE CO., LTD.	JA6977 Bell 412EP (Rotorcraft)
	Summary	Near the above location, while lowering cargo suspended outside the aircraft to the ground, a ground operator's left foot was caught between the cargo and a wooden walkway, causing injury to the operator.	
16	Date and location	Operator	Aircraft registration number and aircraft type
	November 19, 2023 On the grass beside the runway at Hanyu Glider Field in Hanyu City, Saitama Prefecture	Privately owned	JA36HK Diamond Aircraft HK36R Super Dimona (Glider)
	Summary	After taking off from the above glider field, the aircraft experienced engine trouble shortly after takeoff. The aircraft attempted to land but made an emergency landing on the grass beside the runway, damaging the aircraft.	
17	Date and location	Operator	Aircraft registration number and aircraft type
	December 18, 2023 At an off-airport landing site in Fushimi Ward, Kyoto City, Kyoto Prefecture	Privately owned	JA01CG Robinson R44 (Rotorcraft)
	Summary	After completing a training flight and landing at the above off-airport landing site, the aircraft was conducting hover training at a height of approximately 1-3 meters when it fell to the ground, damaging the aircraft.	

(Aircraft Serious Incident)

1	Date and location	Operator	Aircraft registration number and aircraft type
	January 11, 2023 On Runway 18L at Naha Airport	Okayama Air Service Co., Ltd.	JA35DR Cessna T206H (Small aeroplane)
	Summary	While landing on Runway 18L at Naha Airport, the aircraft became unstable during the landing roll and executed a go-around before landing on the same runway. Post-flight inspection revealed damage to the tips of the propeller blades.	
2	Date and location	Operator	Aircraft registration number and aircraft type
	January 21, 2023 At Naganoshi glider site in Nagano City, Nagano Prefecture	Nagano Gliding Association	JA2524 PZL-Bielsko Model SZD-55-1 “Junior” (Glider)
	Summary	The aircraft landed at Naganoshi glider site in Nagano City, Nagano Prefecture, and the front bottom of the fuselage came in contact with the runway, causing damage to the aircraft.	
3	Date and location	Operator	Aircraft registration number and aircraft type
	March 12, 2023 Near Tamamura Town, Sawa-gun, Gunma Prefecture	Privately owned	JR1250 Rans S-6 Coyote II-R582L (Ultralight plane)
	Summary	See “6 Publication of investigation reports” (No.16 on page 54).	
4	Date and location	Operator	Aircraft registration number and aircraft type
	May 22, 2023 Chubu Centrair International Airport	AERO ASAHI CORPORATION	JA6718 Aerospatiale AS355F2 (Rotorcraft)
	Summary	See “6 Publication of investigation reports” (No.17 on page 55).	
5	Date and location	Operator	Aircraft registration number and aircraft type
	May 29, 2023 Approximately 10 km south of Kochi Airport, at an altitude of about 460 meters	HONDA AIRWAYS CO., LTD.	JA11HA Diamond Aircraft DA42NG (Small aeroplane)
	Summary	After taking off from Oita Airport and approaching Kochi Airport, the aircraft experienced vibrations in the No. 1 (left) engine. Oil leakage from the engine cowl and smoke-like emissions from the muffler were observed, leading to the engine shutting down and the aircraft landing at Kochi Airport. Post-arrival inspection revealed internal parts of the engine were damaged and had penetrated the crankcase.	
6	Date and location	Operator	Aircraft registration number and aircraft type
	June 20, 2023 On the runway at Konan Airport	TAKUMI ENTERPRISE (Aircraft A)	JA01CG Robinson R44 (Rotorcraft)
		Okayama Air Service Co., Ltd. (Aircraft B)	JA10AZ Cessna 172R (Small aeroplane)
	Summary	While Aircraft B was approaching Konan Airport for touch-and-go training, Aircraft A entered the runway, causing Aircraft B to execute a go-around.	
7	Date and location	Operator	Aircraft registration number and aircraft type
	July 3, 2023 At an altitude of approximately 150 meters above Kamiochiai, Aoi Ward, Shizuoka City, Shizuoka Prefecture	Shin Nihon Helicopter Co., Ltd.	JA6686 Aerospatiale AS332L1 (Rotorcraft)

	Summary	After taking off from a temporary airfield in Aoi Ward, Shizuoka City, and flying with an object suspended, part of the object (a piece of wood measuring 2 meters in length, 0.2 meters in width, 0.14 meters in height, and weighing approximately 15 kg) fell near the above location.	
8	Date and location	Operator	Aircraft registration number and aircraft type
	July 12, 2023 Approximately 50 km southwest of New Chitose Airport, at an altitude of about 4,000 meters	Japan Airlines Co., Ltd.	JA614J Boeing 767-300F (Large aeroplane)
	Summary	The aircraft took off from Tokyo International Airport and attempted to land at Hakodate Airport twice but could not land due to poor visibility. It changed its destination to New Chitose Airport. Near the above location, due to low fuel, the aircraft requested priority from air traffic control and landed at New Chitose Airport.	
9	Date and location	Operator	Aircraft registration number and aircraft type
	July 14, 2023 At an altitude of about 240 meters near Konan Airport	Okayama Air Service Co., Ltd.	JA10AZ Cessna 172R (Small aeroplane)
	Summary	After taking off from Konan Airport and approaching for touch-and-go training, the engine stopped near the above location. The aircraft continued its approach with the engine stopped and landed at Konan Airport.	
10	Date and location	Operator	Aircraft registration number and aircraft type
	July 20, 2023 On Runway A at Yao Airport	ASAHI AIRLINES CO., LTD.	JA58GC Textron Aviation G58 (Small aeroplane)
	Summary	During touch-and-go training at Yao Airport, the aircraft bounced twice on Runway A before taking off again and landing on the same runway. Post-arrival inspection revealed damage to the propeller.	
11	Date and location	Operator	Aircraft registration number and aircraft type
	July 20, 2023 Approaching Runway B at Kansai International Airport	China Postal Airlines	B-5156 Boeing 737-800 (Large aeroplane)
	Summary	While a maintenance vehicle was driving on Runway B at Kansai International Airport for inspection, the air traffic controller cleared the aircraft to land on the same runway. After the vehicle left the runway as instructed by the controller, the aircraft landed on Runway B.	
12	Date and location	Operator	Aircraft registration number and aircraft type
	September 17, 2023 On the landing zone at a landing site of a temporary airfield in Bibai City, Hokkaido	Privately owned	JA4059 Cessna 172P (Small aeroplane)
	Summary	After taking off from Sapporo Airport, the aircraft landed at the above temporary airfield, where the rear lower part of the fuselage came in contact with the landing zone.	
13	Date and location	Operator	Aircraft registration number and aircraft type
	October 7, 2023 On the runway at Hida Air Park	Privately owned	JA4083 Christen Industries A-1 (Small aeroplane)
	Summary	The wind caught the aircraft while landing at Hida Air Park, causing the nose and right wing to come in contact with the runway.	
14	Date and location	Operator	Aircraft registration number and aircraft type
	October 19, 2023 On the runway at Tokyo Heliport	Privately owned (Aircraft A)	JA9784 Aerospatiale AS350B

			(Rotorcraft)
		AERO ASAHI CORPORATION (Aircraft B)	JA6725 Aerospatiale AS355F2 (Rotorcraft)
	Summary	While Aircraft B was approaching the runway at Tokyo Heliport, Aircraft A entered the same runway, causing Aircraft B to execute a go-around.	

6 Publication of investigation reports

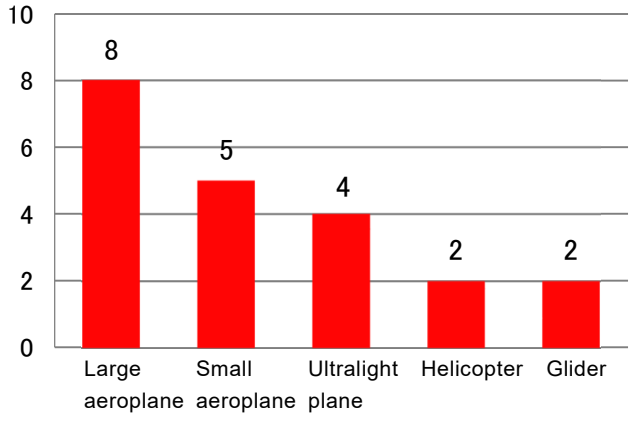
The number of investigation reports of aircraft accidents and serious incidents published in 2023 was 38, consisting of 21 aircraft accidents and 17 aircraft serious incidents.

Breaking them down by aircraft category, the aircraft accidents involved eight large aeroplanes, five small aeroplane, four ultralight planes, two helicopters, and two gliders. The aircraft serious incidents involved four large aeroplanes, six small aeroplanes, one ultralight plane, five helicopters, and one glider.

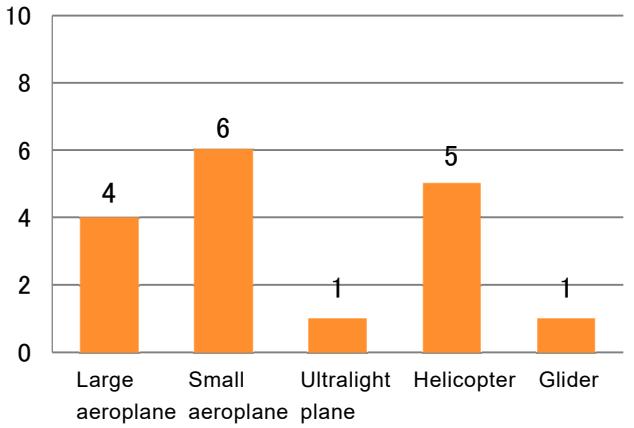
Note: In aircraft accidents and serious incidents, two or more aircraft are sometimes involved in a single case. See pages 34 to 55 for details.

The total number of fatalities, missing persons, and injured persons is 20, with three fatalities and 17 injuries.

Number of published aircraft accident reports (21 cases) by aircraft category in 2023

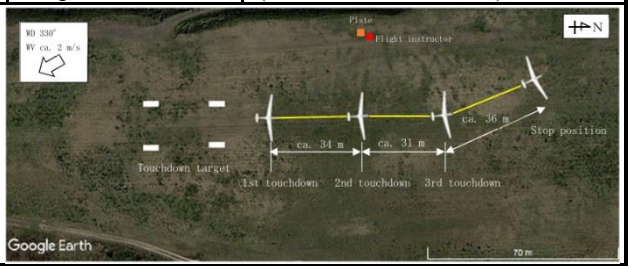


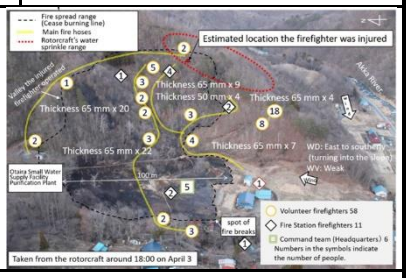
Number of published aircraft serious incident reports (17 cases) by aircraft category in 2023

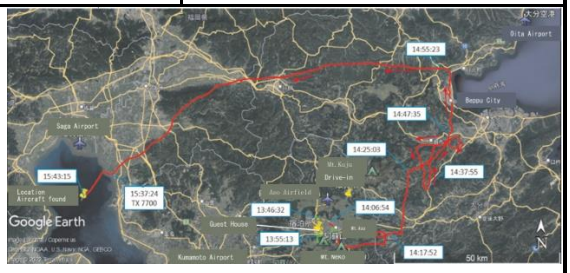


The aircraft accidents and serious incidents which occurred in 2023 are summarized as follows.

Aircraft accident investigation reports published in 2023

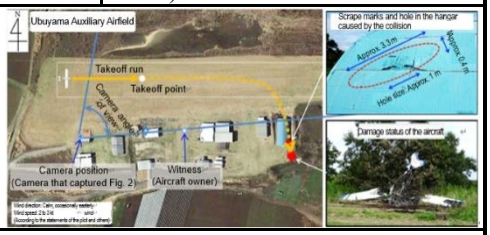
1	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	February 16, 2023	March 21, 2022 Kisogawa Gliding Field, Kaizu City, Gifu Prefecture	Tokai/Kansai Student Aviation League	JA2151 Alexander Schleicher ASK13 (Glider with two seats)
	Summary	The aircraft was launched from Kisogawa Gliding Field, Kaizu City, Gifu Prefecture only with a pilot trainee onboard for solo flight training, and when landing at the Gliding Field, it made a hard landing, and the solo trainee was seriously injured.		

	Probable Causes	The probable cause of this accident was that the trainee made a landing approach on the path higher than usual with the dive brakes*1 fully extended, thus the descent rate became higher than usual, and the flare operation was delayed due to the trainee concentrating on correcting the speed and approach path, which was highly probable in the cause of the glider to make a hard landing and bounce and the trainee to be seriously injured due to the impact of the second touchdown. *1 Dive brakes extend from both the upper and lower surfaces of the wing and help to increase the decent rate by increased aerodynamic drag and decreasing aerodynamic lift.		
	Safety Actions	It is necessary that when granting solo flight to the trainee, their flight skills be confirmed according to the procedures as stipulated by making the stipulated procedures known to all concerned again. In addition, it is desirable to consider the methods for flight instructors to give appropriate instructions depending on the situation. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-1-2-JA2151.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA2151.pdf (English)		
2	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	February 16, 2023	April 3, 2022 Iwaizumi Town, Shimohei District, Iwate Prefecture	Iwate Prefectural Disaster Prevention Aviation Corps (entrusted operation to Toho Air Service Co., Ltd.)	JA10TE Agusta AW139 (Rotorcraft)
	Summary	The aircraft was performing forest firefighting operations in Iwaizumi Town, Shimohei District, Iwate Prefecture, and sprinkling water from the sky, but the sprinkled water directly hit to a volunteer firefighter on the ground, injuring him seriously.		
	Probable Causes	The probable cause of this accident was that the volunteer firefighter was most likely injured because the firefighting water sprinkled from the sky directly hit the volunteer firefighter when the Aircraft was performing aerial firefighting operations using an externally suspended firefighting bucket. It is probable that the water sprinkled from the sky directly hit the volunteer firefighter because the fire was nearly extinguished, and when their firefighting locations were overlapped, the coordination between the Aircraft and the Ground Firefighting Operations Unit was not sufficient.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-1-1-JA10TE.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA10TE.pdf (English)		
3	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	March 30, 2023	November 3, 2021 Shinshinotsu Glider Field in Shinshinotsu Village, Ishikari-gun, Hokkaido	Sapporo Aviation Association	JA100K Alexander Schleicher ASK13 (Glider with two seats)

	Summary	The glider was launched by a winch from Shinshinotsu Gliding Field for a flight training, but the towline was disengaged at a low altitude, resulting in a hard landing. The glider sustained damage and two persons on board suffered serious injuries. 		
	Probable Causes	The probable cause of this accident was most likely that while the glider was launched by a winch, the winch operator misunderstood that the towline was cut and stopped the winch operation, but the glider was not able to recognize it and maintained the climb attitude, thus, it became far below the stall speed, the glider made a hard landing, the glider sustained damage, and the persons on board suffered injuries.		
	Safety Actions	It is necessary to share among the involved parties the awareness of matters required for safe launches such as the pre-flight check of radio communication, the winch launching methods and emergency procedures. In addition, it is desirable to develop a system for proper management in order to perform periodical inspections of equipment such as radio and winches and keep their records. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-2-1-JA100K.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA100K.pdf (English)		
4	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	March 30, 2023	April 18, 2022 Approximately 10 km west of Miike Port in Omuta City, Fukuoka Prefecture, in the Ariake Sea	Privately owned	JA3803 Fuji Heavy Industries FA-200-160 (Small aeroplane)
	Summary	For a flight training, the aircraft ditched into the Ariake Sea about 10 km west of Miike Port in Omuta City, Fukuoka Prefecture, and subsequently submerged under the sea. There were three persons on board the captain as a flight instructor, a student pilot, and a passenger. They were rescued drifting in the sea, the captain and the passenger suffered fatal injuries. 		
	Probable Causes	The probable cause of this accident was that during the flight training, the captain continued flight after he lost the position of the aircraft, the aircraft run out of the fuel over the Ariake Sea, and ditched in the sea, resulting in drowning of the captain and the passenger. The captain lost the position of the aircraft possibly because he did not have sufficient terrain feature familiarization and did not carry flight charts. In addition, the reason why the captain continued flying without taking appropriate emergency responses could not been determined.		
	Safety Actions	Various factors likely contributed to the occurrence of the accident. However, the similar accidents can be more likely prevented by ensuring compliance with existing rules for safe operation for preparation of flight such as familiarization to terrain, onboard fuel, flight charts, and emergency response procedures, and filing a flight plan. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-2-3-JA3803.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA3803.pdf (English)		
5	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	March 30, 2023	November 7, 2022 On the runway at Kagoshima Airport	Japan Air Commuter, Co., Ltd.	JA06JC ATR 72-212A (Large aeroplane)

	Summary	The aircraft (regularly scheduled Flight 3760) took off from Tanegashima Airport, and upon landing at Kagoshima Airport, one passenger was seriously injured, suffering a lumbar compression fracture.
	Probable Causes	The probable cause of this accident was that a seated passenger more likely suffered a lumbar compression fracture during landing due to the impact at touchdown. In addition, it is highly probable that the weather conditions during landing, the flight operations, and the aircraft were not contributing factors to the passenger's injury.
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-2-2-JA06JC.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA06JC.pdf (English)

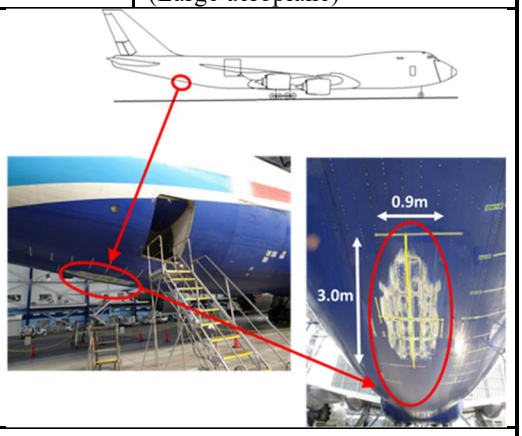
6	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	April 27, 2023	August 28, 2022 Ubuyama temporary airfield in Ubuyama Village, Aso District, Kumamoto Prefecture	Privately owned	JX0135 Rans S-6 Coyote II-R582L modified (Self-made aircraft with two seats)

	Summary	Shortly after taking off from the Ubuyama temporary airfield, the aircraft tilted to the right, pitched down, and crashed. The pilot, the only person on board, was seriously injured. The aircraft was severely damaged, and a fire broke out. 
	Probable Causes	The probable cause of this accident is most likely that because the aircraft stalled shortly after takeoff, and recovery operations were not in time, resulting in a crash. The reason the aircraft stalled is highly probable that the pilot did not check the airspeed indicator and taken off before reaching the appropriate takeoff speed, causing a right roll.
	Safety Actions	Individuals flying self-made aircrafts and ultralight planes must prepare for safe flight, apply for and obtain permission under the Civil Aeronautics Act, and understand and comply with the permission details and aircraft manual content.
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-3-1-JX0135.pdf (Japanese)

7	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	April 27, 2023	October 9, 2022 Namporo Town, Sorachi-gun, Hokkaido	Privately owned	JR1039 Quicksilver GT400SR447L (Ultralight plane with one seat)

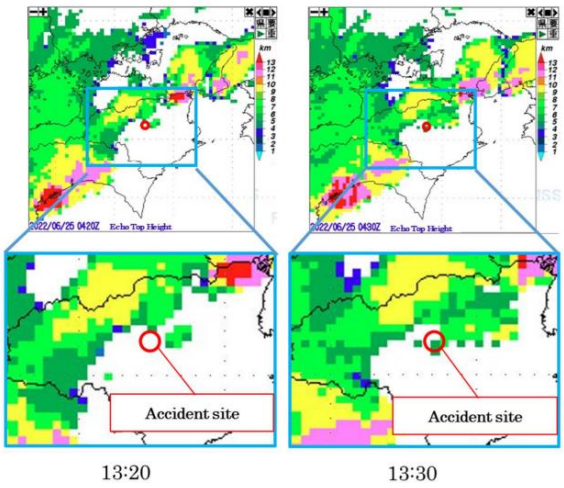
	Summary	With one pilot on board, the aircraft experienced an engine failure during flight. They attempted an emergency landing, colliding with a step in a drainage ditch, resulting in damage to the aircraft and injury to the pilot. 
	Probable Causes	The probable cause of this accident is most likely that, when the engine stopped during flight, and the aircraft attempted an emergency landing but collided with a step in a drainage ditch, resulting in damage to the aircraft and injury to the pilot. The reason that the engine stopped during the flight is highly probable that inadequate maintenance leading to deterioration of the rubber socket in the intake system, allowing air to

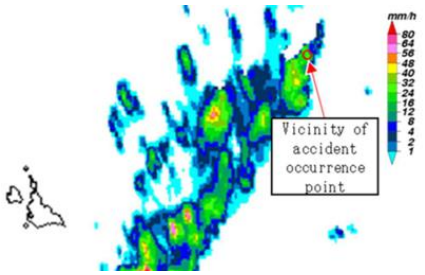
		enter and causing a lean fuel mixture. This caused the front cylinder to overheat, temporarily seizing the piston in the cylinder.		
	Safety Actions	Ultralight plane users must follow the maintenance manual to inspect and maintain the airframe and engine thoroughly. It is crucial to check the condition and history of the airframe and engine upon acquisition and manage usage time appropriately. If any defects or signs of issues are found during pre-flight inspections, operations should be halted, and necessary troubleshooting and maintenance should be performed.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-3-2-JR1039.pdf (Japanese)		
8	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	June 29, 2023	January 16, 2022 At FL 280 over Kurashiki City, Okayama Prefecture	Star Flyer Inc.	JA24MC Airbus A320-214 (Large aeroplane)
	Summary	The aircraft took off from Tokyo International Airport as scheduled Flight 87. While flying for Kitakyushu Airport, the aircraft was shaken, and a passenger was injured.		
	Probable Causes	In this accident, the aircraft was probably shaken to the left when encountering clear air turbulence created by the jet stream. Therefore, the passenger hit their right side against the armrest on the right side of the seat, resulting in a serious injury.		
	Safety Actions	For the further safety of passengers, it is desirable that while informing the passengers that they should always fasten the seat belt at a low waist position with no slack when seated and paying attention to each body size of the passengers, the cabin crewmembers of the company shall check carefully whether the passengers properly fasten their seat belts.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-4-1-JA24MC.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA24MC.pdf (English)		
9	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	June 29, 2023	September 10, 2022 Tamamura Town, Sawa-gun, Gunma Prefecture	Privately owned	JR0878 Kolb Twinstar MKII R503L (Ultralight plane with two seats)
	Summary	With one pilot on board for leisure, the aircraft experienced an engine failure while flying near Tamamura Town, Sawa-gun, Gunma Prefecture. The aircraft attempted an emergency landing but collided with trees and crashed. The aircraft was severely damaged, and the pilot was seriously injured. 		
	Probable Causes	The probable cause of this accident is highly probable when the engine failed during flight, and the aircraft attempted an emergency landing on a riverbank, but the left-wing bottom came in contact with the trees, resulting in a crash. The reason the engine stopped because a self-made molded plate detached during flight and collided with the carburetor, which was loosely attached due to poor maintenance, caused the carburetor to detach and the fuel supply to the engine to cease.		
	Safety Actions	Pilots must assemble and inspect the aircraft according to the manufacturer's manual to prevent similar accidents.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-4-2-JR0878.pdf (Japanese)		
10	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type

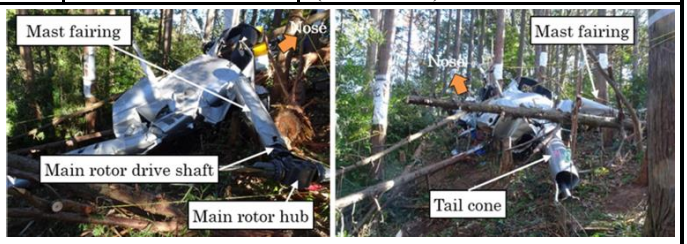
	August 31, 2023	February 1, 2021 At Runway 16R of Narita International Airport	Nippon Cargo Airlines Co., Ltd.	JA13KZ Boeing 747-8F (Large aeroplane)
	Summary	The aircraft experienced a bounce and became unstable attitude when landing at Runway 16R of Narita International Airport. Therefore, the aircraft executed a go-around, but the lower aft fuselage contacted with the runway, which resulted in damage to the airframe. There were two persons on board, consisting of the pilot in charge (PIC), one crewmember, but no one was injured.		
	Probable Causes	The probable cause of this accident was that when the aircraft made a go-around while becoming unstable attitude after touching down and bouncing, the pitch angle became excessively large with an inadequate aircraft speed, which more likely resulted in the lower aft fuselage contacting with the runway. The aircraft bounced after the touchdown is because it was likely insufficient to deal with the crosswind. The pitch angle became excessively large with an inadequate aircraft speed is probably because the PIC reflexively moved the reverse thrust levers after the touchdown, therefore, in the situation where it took time for the aircraft speed to increase due to the go-around operation, while being anxious about the runway-remaining length and others and trying to get off the ground as quickly as possible, the PIC performed the nose-up operation without checking the aircraft speed.		
	Safety Actions	Regarding the procedures for stabilized approach and go-around, it is probably necessary for the Company to have the flight crew members comply with the rules in the AOM[*1]. In addition, it is required for the Company to enhance the Company's CRM/TEM education/training by studying this accident and reflecting it in the contents of CRM/TEM education/training so that the flight crew members would be able to demonstrate the CRM skills appropriately and practice the TEM. *1 "AOM" is a set of regulations concerning the aircraft performance, aircraft operations, and operation procedures for crew, which is provided for each type of aircraft and issued by airlines after review based on manuals issued by aircraft manufacturers. The AOM specifies operating limitation, normal operations, emergency response procedures / procedures in case of malfunction, various systems and the system operations, performance, special operations, weight and balance and others.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-5-1-JA13KZ.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA13KZ.pdf (Englsih)		
11	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	August 31, 2023	September 22, 2022 Yao Airport, Yao City, Osaka Prefecture	Privately owned	JA3969 Cessna 172P (Small aeroplane)

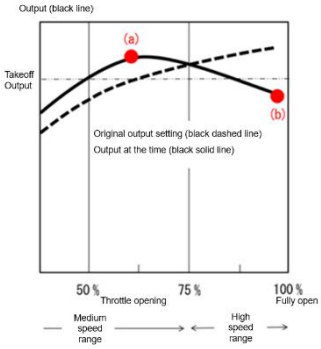
	Summary	The Aircraft landed at Yao Airport, and it contacted with an equipment storage box attached to the pole of the apron floodlighting installed in the vicinity of the apron while taxing toward the spot, resulting in damage to the left wing leading edge. There were two persons on board the aircraft, but no one was injured. 		
	Probable Causes	The probable cause of this accident was that the left wing leading edge highly probable came in contact with the equipment storage box attached to the pole of the apron floodlighting and sustained damage because the aircraft mistakenly entered the GSE Service Road[*1]. It is most likely that the reason why the Aircraft mistakenly entered the GSE Service Road is because the fellow pilot, who was piloting the aircraft, missed the entrance to the Lead-in Lines for Spot H while the time limit for the spot use time was looming, continued taxiing without stopping the aircraft and confirming a new travel route, in addition, did not know that the GSE Service Road was the exclusive one for vehicles and not the zone for aircraft to travel. *1 "GSE Service Road" refers to the route provided for airport Ground Support Equipment (GSE) to travel.		
	Safety Actions	(1) It is required for a person in charge of pilotage of an aircraft to taxi after sufficiently confirming the travel route to the Spot, the Spot location, and the aircraft maneuvering areas. (2) In case of taking a wrong travel route, it is required for a person in charge of pilotage of an aircraft to share the situation of its own aircraft with the ATC facilities and others and taxi after sufficiently confirming the travel route to the spot to park.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-5-2-JA3969.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA3969.pdf (English)		
12	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	August 31, 2023	December 10, 2022 At an altitude of about 150 ft (45 m) about 0.5 nm (900 m) west of Kohnan Aerodrome, Okayama City, Okayama Prefecture	Okayama Air Service Co., Ltd.	JA123R Cessna 172R (Small aeroplane)
	Summary	The Aircraft sustained damage due to bird strike when making a landing approach to the Aerodrome. There were four people on board, consisting of the captain and other three passengers. No one was injured. 		
	Probable Causes	The probable cause of this accident was that the Aircraft most likely sustained damage due to bird strike when making a landing approach. However, as the bloodstains attached to the Aircraft was not collected, the species of bird that struck the Aircraft was unable to be determined.		
	Safety Actions	In order to proceed more effective measures for Bird Strike prevention according to the birdlife, it shall be recommended to appropriately handle the carcass and bloodstains of the birds collided with aircraft, such as collecting them as samples and identifying. the species of the birds. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-5-3-JA123R.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA123R.pdf (English)		
13	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type

	August 31, 2023	December 26, 2022 On the runway at Amakusa Airfield, Kumamoto Prefecture	Japan General Aviation Service	JA01TC Cirrus SR20 (Small aeroplane)
	Summary	The aircraft tried to execute a go-around when approaching Runway 31 at Amakusa Airfield in Kumamoto Prefecture for touch-and-go training, but touched down on the runway on the nose landing gear first, resulting in damage to the airframe. 		
	Probable Causes	The probable cause of this accident was most likely that because the nose went down when the Aircraft tried to execute a go-around, the lower structure of the right central fuselage (Longeron) was damaged when the broken landing gear hit the lower fuselage after the Aircraft touched down on its nose landing gear first on the runway. Regarding the fact that the aircraft's nose went down, Trainee A probably pushed the control yoke forward when trying to execute a go-around, and it is possible that Trainee A in the right pilot seat moved the control yoke handled by the right hand forward instead of the power lever.		
	Safety Actions	(1) It is probable necessary for the Company to provide an environment conducive to flight training after sorting out the differences in flight operations between the right and left pilot seats including that when trainees conduct flight operations in the right pilot seat, their left and right hands operate different devices, and how different looks have the instrument displays between the right and left pilot seats, and preparing well in advance. (2) It is necessary for the Company to verify the points to be noted when a trainee takes flight training in the right pilot seat, clarify the procedures for the trainee to control the airplane sitting in the right pilot seat as well as reeducate about the takeover by the instructor during the flight training.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-5-4-JA01TC.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA01TC.pdf (English)		
14	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	September 28, 2023	July 19, 2020 Minamifurano-cho, Sorachi-gun, Hokkaido	Privately owned	JA3825 Cessna 172R RAM (Small aeroplane)
	Summary	The aircraft was conduct flight training, but crashed into the mountain slope in Minamifurano-cho, Sorachi-gun, Hokkaido. The two persons onboard the aircraft suffered serious injuries. The Aircraft was destroyed but no fire broke out. 		
	Probable Causes	This accident is presumed to have occurred because the aircraft unintentionally approached the mountain and crashed on the mountainside without enough time to avoid it while conducting flight training at a low altitude in a mountainous area. The lack of time to avoid the mountain due to insufficient altitude during flight training is presumed to be due to a lack of awareness of safe flight.		
	Safety Actions	To prevent the recurrence of similar accidents, selecting safe training locations based on the training content and ensuring sufficient altitude during training flights are necessary. (See "3. ANALYSIS" on the Investigation Report.)		

	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-6-1-JA3825.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA3825.pdf (English)		
15	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	October 26, 2023	March 26, 2022 At an altitude of approximately 8,500 meters (FL280) over Nakatsugawa City, Gifu Prefecture	Japan Airlines Co., Ltd.	JA603J Boeing 767-300 (Large aeroplane)
	Summary	The aircraft, as scheduled flight 669, took off from Tokyo International Airport and flew to Oita Airport, where the aircraft encountered turbulence and a flight attendant was seriously injured by falling down.		
	Probable Causes	The probable cause of this accident was that the aircraft was shaken as it encountered turbulence that was difficult to predict, therefore the flight attendant working in the aft galley probably lifted into the air, lost her balance and fell, resulting in injuries.		
	Safety Actions	It is probably useful to re-disseminate and call attention to the characteristics and countermeasures of the case of this accident and similar cases in the past in order to prevent the recurrence of similar accidents. (See “3. ANALYSIS” on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-7-1-JA603J.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA603J.pdf (English)		
16	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	October 26, 2023	June 25, 2022 At FL170 over Yoshinogawa City, Tokushima Prefecture	ANA WINGS Co., Ltd.	JA854A Bombardier DHC-8-402 (Large aeroplane)
	Summary	The aircraft, as a scheduled flight 1626 of All Nippon Airways Co., Ltd., as the joint undertaking for transport, was flying from Kumamoto Airport to Osaka International Airport, the aircraft was shaken, causing a cabin crew member to sustain an injury.		
	Probable Causes	The probable cause of this accident was that while the Belt Sign was off, the aircraft encountered an airflow disturbance due to convective clouds*1 and was violently shaken, while working in the galley in the aft side of the aircraft, resulting in getting out of balance to fall down on the floor and most likely sustaining the injury. It is possible that the aircraft encountered airflow turbulence caused by convective clouds because of inadequate maneuvering to avoid them, and besides because it was difficult to detect developing convective clouds from onboard weather radar, the aircraft was likely not to be able to maintain an adequate distance from them.  13:20 13:30 *1 “Convective Clouds” refer to clouds that are formed when updraft develops vertically.		
	Safety Actions	It is desirable for the Company to make known the overview of this accident to all flight crew members in order to let them reconfirm how to avoid echoes*2 and how to operate the Belt Sign. *2 “Echoes” refer to the reflective waves captured on the radar as radio waves emitted from a metrological radar are reflected by raindrop and ice particle, etc. The reflective waves allow to observe the distribution of precipitation area and the intensity, and this precipitation area may be also called “Echoes.”		

	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-7-2-JA854A.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA854A.pdf (English)		
17	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	October 26, 2023	July 16, 2022 Approximately 120 km southwest of Naha Airport, around FL260	Solaseed Air Inc.	JA807X Boeing 737-800 (Large aeroplane)
	Summary	The aircraft, as a scheduled flight 41 of the Company, was flying from Naha Airport to New Ishigaki Airport, the aircraft was shaken, causing a cabin crew member to sustain an injury.		
	Probable Causes	The probable cause of this accident was that when the aircraft passed over the developing convective clouds*1, occurred the shaking as if to hold the body down, due to which cabin crew fell down in a position like sitting sideways with left leg down, resulting in the injury in the left foot. It is highly probable that the reason why the aircraft passed over the developing convective clouds is because as it was unable to anticipate the possibility that the clouds seen below would rapidly develop, the aircraft passed over.  *1 “Convective Clouds” refer to clouds that are formed when updraft develops vertically.		
	Safety Actions	In order to avoid a cumulonimbus, it is probably necessary to select the flight route based on the meteorological information and analysis obtained before flight, grasp the change in the weather conditions during flight and clouds conditions by visual sighting but also using the airborne radar, and reconfirm how to select a safer avoidance method. (See “3. ANALYSIS” on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-7-3-JA807X.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA807X.pdf (English)		
18	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	October 26, 2023	October 3, 2022 About 56 km southeast of Miho Airport, at an altitude of approximately 11,300 meters (FL370)	Japan Transocean Air Co., Ltd.	JA07RK Boeing 737-800 (Large aeroplane)
	Summary	The aircraft was flying from Naha Airport to Komatsu Airport. The aircraft was shaken, causing a cabin crew member to sustain an injury.		
	Probable Causes	The probable cause of this accident was most likely that as the aircraft was shaken violently in lateral direction during cruising, a heavy load was applied on the sole of the right foot of the cabin crew who was standing in the aisle in the aft cabin section, resulting in the serious injury to the cabin crew. The reason why the aircraft was shaken laterally was probably because the aircraft flew through the airspace where the wind velocity changed locally, which was not forecast according to the weather data the flight crew members confirmed in advance.		
	Safety Actions	It is desirable for the Company to continue to implement their ongoing preventive measures against similar accidents. (See “3. ANALYSIS” on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-7-4-JA07RK.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA07RK.pdf (English)		
19	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type

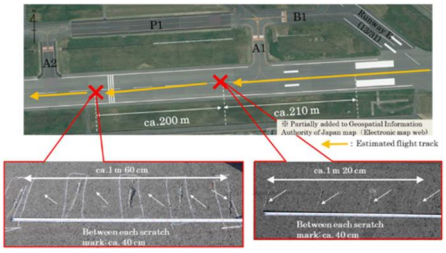
	November 30, 2023	December 30, 2020 Ojiro, Shimada City, Shizuoka Prefecture	Privately owned	JA77AR Robinson R66 (Rotorcraft)
	Summary	The aircraft took off from Isewan Heliport in Tsu City, Mie Prefecture, and crashed into a mountain forest near Ojiro, Shimada City, Shizuoka Prefecture, while flying toward Hodogaya Imai Temporary Operation Site, Yokohama City, Kanagawa Prefecture. Only a captain was on board the aircraft, and fatally injured in the crash. The Aircraft was destroyed, but there was no outbreak of fire. 		
	Probable Causes	The probable cause of this accident was that during flight in a mountain region under strong winds, when the aircraft encountered a downdraft caused by a roll-shaped thermal convection and fell into a low-G condition, it is highly probable that the aircraft was resulted in the mast bumping and the loss of flight control failure when the aircraft's attitude was not properly controlled, it crashed. The mast bumping occurred leading to the loss of flight control failure was probably because the Aircraft continued flying due to encountering turbulence while maintaining airspeed.		
	Safety Actions	1. It is required for a pilot flying a semi-rigid rotor*1 helicopter must keep the following in mind to prevent mast bumping that could lead to loss of control. (1) In order to avoid flying in low-G flight conditions, it is necessary to take into account the area where turbulence occurs and set appropriate airspeed and flight altitude. In particular, when temperatures rise, strong downdrafts occur due to roll-shaped thermal convection, and in mountainous region, downdrafts tend to be larger than in flat areas due to the influence of the topography. So do not wait until feeling turbulence, therefore, it is important to slow down and fly before entering an area where turbulence occurs. (2) When a low-G flight condition occurs, it is important to predict the occurrence of a right roll and prepare for an appropriate recovery maneuver as per the flight manual. 2. It is important for a captain to obtain the weather information necessary for the relevant flight at Confirmation before departure and make flight decisions about whether to depart or not and perform flight operation according to a reasonable flight plan, if weather conditions impeding the flight operation are expected. *1 “Semi-rigid rotor type” refers to a rotor system in which the blades are fixed to the hub, but flapping and feathering are flexible, there are such as teeter ring type and under sling (seesaw) type.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-8-1-JA77AR.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA77AR.pdf (English)		
20	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	November 30, 2023	Novembe 7, 2021 Fukamizo Temporary Airfield in Yamaguchi City, Yamaguchi Prefecture	Privately owned	JR1347 Quicksilver MXII Sprint Top-R582L (Ultralight plane with two seats)
	Summary	The aircraft landed hard shortly after liftoff during an aborted takeoff at the Fukamizo Temporary Airfield in Yamaguchi City, Yamaguchi Prefecture. The pilot, who was the only person on board, was seriously injured.		

	Probable Causes	The probable cause of this accident was probably because the throttle lever was returned during the aborted takeoff operation, causing the engine output to increase to takeoff power at mid-range speeds, resulting in the aircraft suddenly lifting off. When the pilot attempted to land, they pushed the control stick forward, causing a nose-down attitude and a hard landing on the nose wheel. The impact damaged the aircraft, and the pilot was injured. The sudden increase in engine output to takeoff power and the lift-off at mid-range speeds is considered to have occurred because the throttle lever was slowly returned from the full-open position. When it reached the mid-range, the engine output possibly exceeded takeoff power due to a reverse output condition between high and mid-range speeds. The reverse output condition between high and mid-range speeds is likely due to maintenance deficiencies, such as using parts not specified in the maintenance manual and parts catalog issued by the engine designer and manufacturer when replacing carburetor components. 
	Safety Actions	Ultralight plane users must properly maintain their aircraft and engines using the specified parts according to the maintenance manual and parts catalog issued by the designers and manufacturers. Additionally, it is important to adhere to the procedures specified in the flight manual when operating the aircraft.
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-8-2-JR1347.pdf (Japanese)

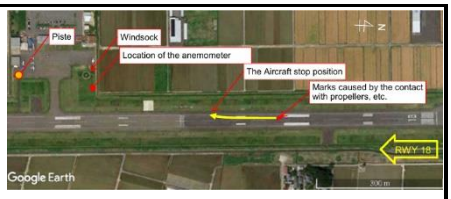
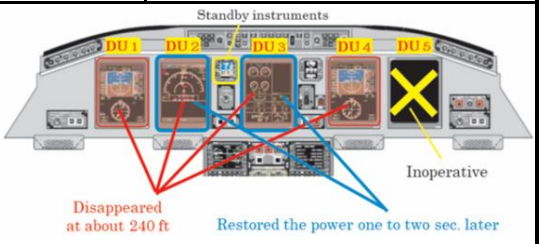
21	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	November 30, 2023	January 7, 2023 Approximately 80 km east-northeast of Miyazaki Airport, over the sea	Japan Airlines Co., Ltd.	JA307J Boeing 737-800 (Large aeroplane)
	Summary	The aircraft took off from Tokyo International Airport on a scheduled Flight 687 of the company. While the aircraft was making approach for landing at Miyazaki Airport, it was shaken, causing the side of a passenger to hit hard against the armrest of the seat, resulting in injury to the passenger. 		
	Probable Causes	The probable cause of this accident was that the left side of the passenger most likely hit hard against the armrest of the seat (39H), resulting in injury as the upper body of the passenger was swung to the left because the lateral acceleration changed due to the translational movement and yawing of the aircraft when the aircraft skimmed the cumulus clouds after the seat belt sign was turned on.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-acci/AA2023-8-3-JA307J.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA307J.pdf (English)		

Aircraft serious incident investigation reports published in 2023

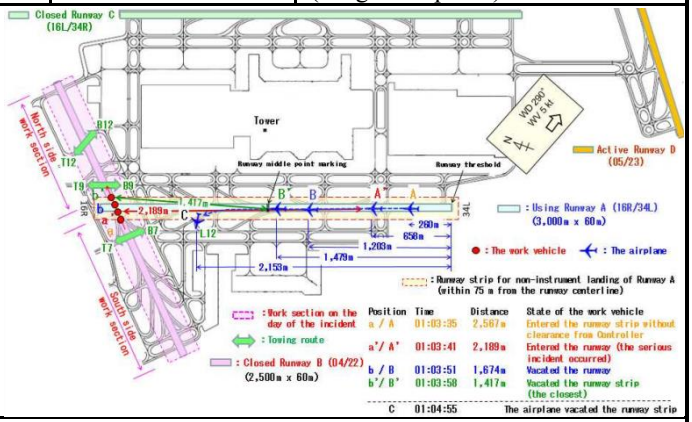
1	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	January 19, 2023	March 13, 2021 Kohnan airport, Okayama Prefecture	Okayama Air Service Co., Ltd.	JA01HJ Honda Aircraft HA-420 (Small aeroplane)
	Summary	The aircraft ran off to the left side (south side) of Runway 27 at Kohnan Airport when landing, and was unable to perform taxiing after stopping in a grassy area. There were two persons on board in total, consisting of the captain and a trainee and they were not injured. 		
	Probable Causes	The probable cause of this serious incident was that as the tires skidded during the landing roll and the aircraft was unable to control its travel direction, the aircraft more likely ran off the side of the runway, stopped in a grassy area, and was unable to perform taxiing. It is probable that the tires skidded and the travel direction could not be controlled because the aircraft was tilted and large lateral acceleration was generated due to the excessive corrections on the travel direction, resulting in the reduced capability of steering control and the main landing gear braking control, and leading to the lost control of the travel direction.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-1-1-JA01HJ.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA01HJ.pdf (English)		

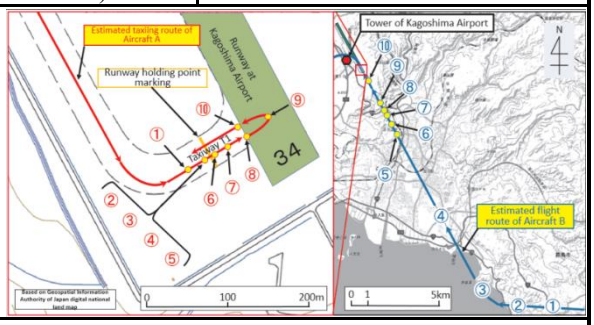
2	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	February 16, 2023	March 6, 2022 Yao Airport, Yao City, Osaka Prefecture	Privately owned	JA007Z SOCATA TBM700 (Small aeroplane)
	Summary	The aircraft repeated bouncing*1 on Runway A at Yao Airport when landing, then executed a go-around, and landed on the runway. The inspection conducted after the aircraft's landing found the damage of the propeller blade tip and scratch marks on the runway. The only person on board the aircraft was the captain, who did not sustain any injuries.  *1 "Bouncing" is a phenomenon where an aircraft bounces back into the air after the aircraft touched down during landing.		
	Probable Causes	The probable cause of this serious incident was that after the aircraft touched down and bounced with a greater than normal impact while the descent rate could not be reduced in the strong wind blowing from the northwest, it was unable to establish a proper attitude and touched down again with a nose-low attitude. It is probable that the aircraft touched down again with a nose-low attitude because the change in the Aircraft's attitude after the touchdown was not properly recognized.		
	Safety Actions	It is important for pilots to execute a go-around without hesitation, if a bounce occurs after the touchdown with a greater than normal impact while the descent rate cannot be reduced.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-2-2-JA007Z.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA007Z.pdf (English)		

3	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	February 16, 2023	April 23, 2022 Fukui Airport	Tokai/Kansai Student Aviation League	JA01KT Scheibe SF25C (Powred glider with two seats)

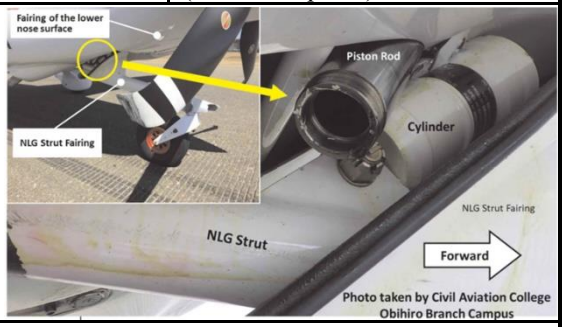
<table>
<tr><td rowspan="3"></td><td>Summary</td><td colspan="3">The aircraft touched down hard when landing on Runway 18 at Fukui Airport, and the tip part of the propeller blades and the right main wheel cover contacted with the runway surface.
On board the aircraft were two persons in total with a captain as a flight instructor and a student pilot, but no one was injured.
  </td></tr>
<tr><td>Probable Causes</td><td colspan="3">The probable cause of this serious incident was that because the wind direction and velocity changed and the tailwind component increased immediately before the touchdown, the lift decreased, the aircraft touched down hard, and the tip part of the propeller blades and the right main wheel cover contacted with the runway surface.</td></tr>
<tr><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-2-1-JA01KT.pdf (Japanese)
https://www.mlit.go.jp/jtsb/eng-air_report/JA01KT.pdf (English)</td><td></td></tr>
<tr><td rowspan="4">4</td><td>Date of publication</td><td>Date and location</td><td>Operator</td><td>Aircraft registration number and aircraft type</td></tr>
<tr><td>March 30, 2023</td><td>December 23, 2019
Approximately 2.3 km south of New Chitose Airport, at an altitude of about 240 ft</td><td>Privately owned (entrusted flight operation to Sino Jet)</td><td>B-3203
Embraer ERJ 190-100ECJ</td></tr>
<tr><td>Summary</td><td colspan="3">The aircraft was on the final approach to New Chitose Airport, the destination aerodrome, with 24 persons on board, consisting of the captain, four other crewmembers and 19 passengers, but at a pressure altitude of approximately 240 ft (AGL: about 165ft), the indication on all the display units powered by multiple systems temporarily disappeared in the cockpit. The aircraft landed without any change.
  </td></tr>
<tr><td>Probable Causes</td><td colspan="3">The probable cause of this serious incident was that when the Aircraft was on the final approach, the IDG*1 2 was tripped off from the power supply system due to the false detection of an Overfrequency condition by the general control unit (GCU) 2, and then the IDG1 was also tripped off from the power supply system due to the false detection of an Undervoltage condition by the GCU1, which most likely resulted in the power loss of the both two main power supply systems of the aircraft.
Regarding the fact that the both two IDGs were tripped off due to the false detections of the Overfrequency and Undervoltage, the two GCUs involved in the event did not have the Service Bulletins (to correct the faults) incorporated, which probably contributed to it.

*1 “IDG”, which stands for Integrated Drive Generator, is an electrical generator installed in each of the left and right engine gear boxes, which provides stable 3-phase AC power at 400Hz, 115/200VAC, and 30/40KVA.</td></tr>
<tr><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-3-2-B-3203.pdf (Japanese)
https://www.mlit.go.jp/jtsb/eng-air_report/B-3203.pdf (English)</td><td></td></tr>
<tr><td rowspan="3">5</td><td>Date of publication</td><td>Date and location</td><td>Operator</td><td>Aircraft registration number and aircraft type</td></tr>
<tr><td rowspan="2">March 30, 2023</td><td rowspan="2">August 26, 2021
Kumamoto Airport</td><td>The Educational Corporation Kimigafuchi Gakuen (Sojo University)
(Aircraft A)</td><td>JA31UK
Cessna 172S
(Small aeroplane)</td></tr>
<tr><td>Kumamoto Prefectural Disaster</td><td>JA90MT
Airbus Helicopters AS365N3</td></tr>
</table>

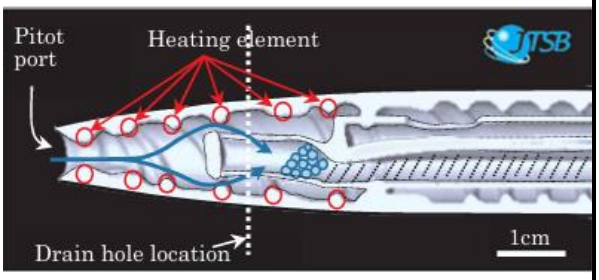
			Prevention and Firefighting Air Unit (Aircraft B)	(Rotorcraft)
	Summary	At Kumamoto Airport, Aircraft A executed a touch-and-go*1 on the runway being used by Aircraft B, although the air traffic controller instructed Aircraft A to go around as Aircraft B rejected its take-off when it was on the final approach to Runway 25 after being cleared to land (touch-and-go). *1 "Touch-and-go" is an aircraft maneuver that the aircraft takes off again without stopping on the runway or evacuating the runway after landing.		
	Probable Causes	The probable cause of this serious incident was that although the air traffic controller instructed Aircraft A, the succeeding arriving aircraft, to execute a go-around, when visually recognizing that Aircraft B, the preceding departure aircraft, had aborted its take-off, Aircraft A was most likely unable to hear the go-around instruction and executed a touch-and-go. The reason why Aircraft A was unable to hear the go-around instruction is probably because the captain was concentrating on instructing trainee.		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-3-1-JA31UK_JA90MT.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA31UK_JA90MT.pdf (English)		
6	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	April 27, 2023	November 30, 2019 On Runway 34L (Runway A) at Tokyo International Airport	Peach Aviation Limited	JA806P Airbus A320-214 (Large aeroplane)
	Summary	The aircraft was making a landing approach to Runway 34L at Tokyo International Airport with a landing clearance, during which a work vehicle entered the runway. 		
	Probable Causes	The probable cause of this serious incident was that when the aircraft was making a landing approach to Runway A at Tokyo International Airport with a landing clearance, a work vehicle entered and crossed the runway without clearance from Controller, which highly probably caused the aircraft to land on the runway where the work vehicle was present. Probable contributors to the fact that the work vehicle entered and crossed the runway without clearance from Controller are as follows: Workers did not understand sufficiently that clearance from Controller shall be necessary for crossing the runway; and the intersection part between Runway A and Runway B was described as a closed status in the diagram they referred to.		
	Safety Actions	It is necessary for the parties concerned to consider and implement the safety actions regarding such as the education/qualification management for the construction workers, how to describe in the drawing to be used, the hold positions when entering runways, and safety management activities. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-4-1-JA806P.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA806P.pdf (English)		
7	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type

	April 27, 2023	January 8, 2022 Kagoshima Airport	New Japan Aviation Co., LTD. (Aircraft A)	JA4061 Cessna 172P (Small aeroplane)
			Japan Air Commuter, Co., Ltd. (Aircraft B)	JA04JC ATR 42-500 (Large aeroplane)
	Summary	At Kagoshima Airport, when Aircraft B was on final approach to Runway 34 with the landing clearance, Aircraft A entered the runway without the clearance from an air traffic controller. 		
	Probable Causes	The probable cause of this serious incident is certainly that Aircraft A, which had been instructed to hold short of the runway, entered the runway, when Aircraft B was cleared to land on the runway. The reason why Aircraft A, which had been instructed to hold short of the runway, entered the runway is because Trainee A (pilot of Aircraft A) most likely inferred from the ATC instructions that Trainee A had received a clearance of entering the runway, which Trainee A had expected while unable to understand the holding instruction.		
	Safety Actions	Regarding radio communications with the Controllers especially related to the runway use, it is more likely necessary for the parties concerned to consider and implement the safety actions to ensure to certify whether or not the student pilot masters the aeronautical skills required for solo flight. (See “3. ANALYSIS” on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-4-2-JA4061_JA04JC.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA4061_JA04JC.pdf (English)		
8	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	July 27, 2023	March 7, 2022 Kumamoto Airport	Kumamoto Prefectural Disaster Prevention and Firefighting Air Unit (entrusted operation to Amakusa Airlines Co., Ltd.) (Aircraft A)	JA90MT Airbus Helicopters AS365N3 (Rotorcraft)
			The Educational Corporation Kimigafuchi Gakuen (Sojo University) (Aircraft B)	JA47UK Textron Aviation 172S (Small aeroplane)

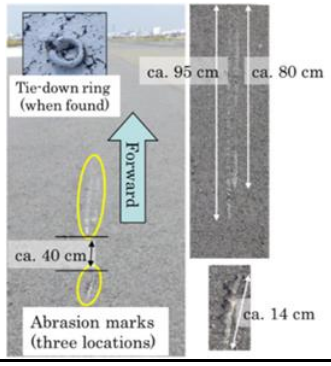
	Summary	At Kumamoto Airport, Aircraft A was on the approach to Runway 07 being cleared to land (touch-and-go*1 clearance), Aircraft B entered the runway without the clearance from an air traffic controller at the time of the take-off from the airport *1 "Touch-and-go" means that after the touchdown, the aircraft takes off again without stopping or leaving the runway. 
	Probable Causes	The probable cause of this serious incident was certainly that Aircraft A, which had been instructed to hold short of the runway, entered the runway where Aircraft B was approaching as cleared to make a touch-and-go. It is highly probable that Aircraft A mistakenly recognized the ATC instruction as the holding on the runway instruction and entered the runway is because it failed to correct the erroneous recognition caused by a false assumption about the ATC instruction.
	Safety Actions	1. It is important for flight crewmembers to be clearly aware of the difference between the two ATC phraseology such as "LINE UP AND WAIT" and "HOLD SHORT OF RUNWAY" and correctly listen to the ATC phraseology. 2. It is desirable that in order to ensure the safe flight operations with two pilots, the KFFDPAC should continue to consider the measures for safe flight that take advantage of the two-pilot system, such as clarifying the confirmation method of the tasks requiring for mutual confirmation to ensure a smooth crew coordination between the pilots, and promoting the creation of an environment that facilitates assertions.
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-5-1-JA90MT_JA47UK.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA90MT_JA47UK.pdf (English)

9	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	September 28, 2023	April 17, 2020 Obihiro Airport	Civil Aviation College	JA017C Cirrus SR22 (Small aeroplane)
	Summary	When the aircraft landed at Obihiro Airport, the nose landing gear (NLG) was damaged and it stopped on the runway. After that, the aircraft became unable to continue its taxiing. 
	Probable Causes	It is certain that the probable cause of this serious incident was that the Aircraft landed with the Piston Rod separated from the NLG Oleo*1 cylinder, and the aircraft was excessively tilted downward during the landing roll. The reason why the Piston Rod was separated from the NLG Oleo cylinder is probably because in the manufacturing operation for the Oleo that was installed on the aircraft, the assembly work for the Piston Rod and the Piston Rod Locknut was not conducted appropriately, and as take-offs and landings were repeated, the Piston Rod Locknut was detached from the Piston Rod. *1 "Oleo" refers to a shock absorber used to cushion the impacts applied through the nose landing gear of aircraft at the time of taking off, landing and taxiing.
	Safety Actions	The Oleo manufacturer shall improve the manufacturing procedures to ensure the Oleo assembly work. (See "3. ANALYSIS" on the Investigation Report.)

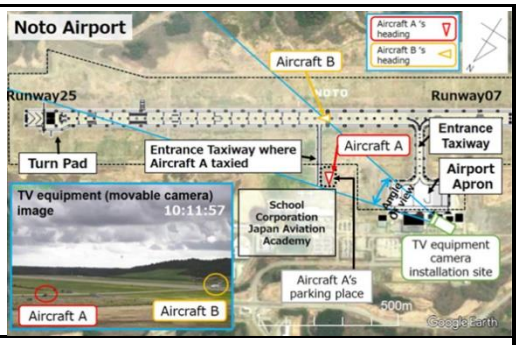
<table>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-6-1-JA017C.pdf (Japanese)
https://www.mlit.go.jp/jtsb/eng-air_report/JA017C.pdf (English)</td></tr>
<tr><td rowspan="5">10</td><td>Date of publication</td><td>Date and location</td><td>Operator</td><td>Aircraft registration number and aircraft type</td></tr>
<tr><td>September 28, 2023</td><td>April 18, 2022
At an altitude of approx. FL 360 over Oda City, Shimane Prefecture</td><td>IBEX Airlines Co., Ltd.</td><td>JA07RJ
Bombardier CL-600-2C10
(Large aeroplane)</td></tr>
<tr><td>Summary</td><td colspan="3">The aircraft, as scheduled flight 18, took off from Sendai Airport, however, while the airplane was flying over Oda City, Shimane Prefecture toward Fukuoka Airport at FL 360[*1], unreliable airspeed indication occurred temporarily on both Primary Flight Displays for the Pilot in Charge and the First Officer. For that reason, the Pilot declared a state of emergency, continued the flight, and landed at Fukuoka Airport.

*1 “FL” means a pressure altitude in the standard atmosphere. FL is expressed in the value obtained by dividing the reading on the altimeter (unit: ft) by 100 when the altimeter is set to 29.92 in Hg. Flight altitude over 14,000 ft is generally expressed in FL in Japan. For instance, FL360 stands for an altitude of 36,000 ft.</td></tr>
<tr><td>Probable Causes</td><td colspan="3">It is most likely that the probable cause of this serious incident was that the right and left sides of the pitot system became blocked while the aircraft was flying at FL 360, the failure airspeed indication temporarily occurred on both sides of the Pilot in Charge and the First Officer.
 

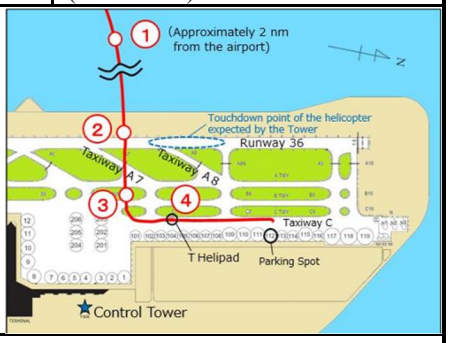
Regarding the pitot system being blocked, it is probable that the aircraft flew in an area where ice crystals existed.</td></tr>
<tr><td>Safety Actions</td><td colspan="3">This serious incident occurred during the night, and in spite that visually recognizable information such as topography and others was unable to be obtained, the flight crewmembers continued to fly with their calm response and made a safe landing. It was difficult for weather prediction and airborne weather radar to detect the airspace presented ice crystals, and it is possible that ice crystals are suddenly encountered during flight. As there is a past event where wrong responses by flight crewmembers led to a serious accident, even if similar it is necessary to be prepared so as to address appropriately should a similar situation arise.</td></tr>
<tr><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-6-2-JA07RJ.pdf (Japanese)
https://www.mlit.go.jp/jtsb/eng-air_report/JA07RJ.pdf (English)</td></tr>
<tr><td rowspan="4">11</td><td>Date of publication</td><td>Date and location</td><td>Operator</td><td>Aircraft registration number and aircraft type</td></tr>
<tr><td>September 28, 2023</td><td>April 22, 2022
Kansai International Airport</td><td>Japan Coast Guard</td><td>JA687A
Eurocopter EC225LP
(Rotorcraft)</td></tr>
<tr><td>Summary</td><td colspan="3">At Kansai International Airport, when the aircraft was on an approach to the take-off/landing field for helicopters (helipad) with landing clearance from an air traffic controller, an inspection vehicle cleared for entering from another air traffic controller entered the helipad.</td></tr>
<tr><td>Probable Causes</td><td colspan="3">The probable cause of this serious incident was certainly that when the aircraft was on an approach to the helipad with landing clearance from the Tower, the inspection vehicle belonging to Kansai Airports (hereinafter referred to as “Vehicle B”) entered the helipad as cleared by the Ground.
The reason why the Ground issued a clearance to enter the helipad to Vehicle B is most likely because while the coordination including the approval related to the use of the helipad</td></tr>
</table>

		were not made in an explicit manner mutually between the Tower and the Ground, the Ground recognized that the Tower had approved of Vehicle B entering the helipad.		
	Safety Actions	When coordinating about the approvals between control positions, it is important that the air traffic controller who seeks an approval shall state clearly to that effect, and that the air traffic controller who is asked to coordinate with shall state clearly whether it is approved or not approved for the coordination. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-6-3-JA687A.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA687A.pdf (English)		
12	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	September 28, 2023	October 18, 2022 Yao Airport, Yao City, Osaka Prefecture	ASAHI AIRLINES CO., LTD.	JA80AP Cessna 172S (Small aeroplane)
	Summary	The aircraft executed a go-around due to an instable attitude during the continuous touch-and-go training for the trainee, with a captain as an instructor on board, and the underside of the aft fuselage contacted on the surface of Runway27 at Yao Airport. On board the aircraft were the instructor and the trainee, who were not injured.		
	Probable Causes	The probable cause of this serious incident was that during the training, even after the aircraft was flared, came into floating state to meet the go-around criteria, the approach was continued because the go-around decision was not made, and then the sink rate increased rapidly at the time of the landing maneuver, therefore, a go-around was executed, but, the aircraft did not stop sinking, probably causing the underside of the aft fuselage to contact the runway surface before it climbed. The reason why the aircraft continued to approach without making a go-around decision after the aircraft met the go-around criteria was because the Instructor's intention to allow the trainee to experience a landing, even as the Instructor assisted the trainee in controlling the aircraft, was probably a contributing factor.		
	Safety Actions	1. It is necessary for the Company to take following safety actions. (1) If the go-around criteria are met, a go-around shall be executed. (2) Clarify the purpose and procedure of the Assist in flight. 2. As described in the ANALYSIS, it is desirable for the Company to maintain a state in which flight data can be recorded at all times. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-6-4-JA80AP.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA80AP.pdf (English)		
13	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	November30, 2023	December 12, 2022 Saga Airport	SGC Saga Aviation Co., Ltd.	JA4121 Cessna 172P (Small aeroplane)
	Summary	While the aircraft was making a landing approach to Saga Airport for a flight training, a vehicle entered the runway, causing the aircraft to execute a go-around.		
	Probable Causes	The probable cause of this serious incident was that the vehicle most likely entered the runway without obtaining runway entry permission while the aircraft was making landing approach. It is highly probable that as the Bird Sweep[*1] Staff misunderstood instruction to hold		

		position and thought that runway entry permission was obtained, because he wanted to complete bird sweep as soon as possible. *1 “Bird sweep” refers to removal work of harmful birds and beasts to prevent them from striking aircraft using firearms and fireworks.		
	Safety Actions	When entering a runway, it is necessary to ensure that the runway entry permission has been obtained. (See “3. ANALYSIS” on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-7-1-JA4121.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA4121.pdf (English)		
14	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	December 21, 2023	May 20, 2022 Hyakuri Airfield	Fuji Dream Airlines Co., Ltd.	JA10FJ Embraer ERJ 170-200STD (Large aeroplane)
	Summary	At Hyakuri Airfield, after receiving a landing clearance from an air traffic controller, the aircraft attempted to land on Runway 21R where there was a vehicle.		
	Probable Causes	The probable cause of this serious incident was certainly that when the Vehicle was conducting the barrier inspection on Runway 21 and its vicinity after receiving the runway entry permission, Controller A issued a landing clearance for the runway to the aircraft, therefore the aircraft attempted to landing on the runway. Controller A gave the aircraft the landing clearance for the runway where there was the Vehicle was most likely because Controller A had forgot the existence of the Vehicle, and Controller B in charge of the ground control position had also forgot the existence of the Vehicle and was unable to complement the services of tower control position. Regarding to Controllers A and B forgetting the existence of the Vehicle, after the Vehicle was comprehensively permitted to enter the runway, there was no communication between the Vehicle and the airfield traffic control tower for about 40 minutes, in addition, as multiple on-the-job trainings were conducted at the airfield traffic control tower, the system to complement their ATC services one another became fragile and others, which probably contributed to it.		
	Safety Actions	It is important for the Controllers engaged in the services at the tower control position to grasp the conditions of obstacles on the runway and its vicinity surely and continuously, and always be prepared to take appropriate actions if necessary. Besides, when the runway entry is comprehensively permitted to the Vehicle for long hours, it is necessary to consider and take effective measures to prevent forgetting such as instruction of fixed-point reporting and others. (See “3. ANALYSIS” on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-8-1-JA10FJ.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA10FJ.pdf (English)		
15	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	December 21, 2023	October 15, 2022 Noto Airport	JANET CORPORATION (Aircraft A)	JA6113 Bell 206B (Rotorcraft)
			Japan Coast Guard (Aircraft B)	JA871B Textron Aviation B300C (Small aeroplane)

	Summary	At Noto Airport, Aircraft A took off from the runway where Aircraft B was taxiing toward the apron. 	
	Probable Causes	The probable cause of this serious incident that it is certain that even though Aircraft B had not yet vacated the runway it had landed on, Aircraft A took off from the runway. It is probable that Aircraft A took off because the captain of Aircraft A had assumed that there would be no other aircraft on the runway, and the captain did not fully conduct visual safety check for the runway with a desire to keep the time schedule for the repeatedly continuing sightseeing flights. The captain of Aircraft A had assumed that there would be no aircraft on the runway is most likely because with the increasing workload, Noto Radio, who had forgotten the existence of the Aircraft B having landed on the runway, provided Aircraft A with the information that ”RUNWAY IS CLEAR” without fully confirming there was no traffic on the runway.	
	Safety Actions	Flight crew members have to surely keep watch for the runway by themselves at the time of take-off and landing, and it is necessary to follow the procedures to implement this thoroughly. Besides, in the case where several aircraft use the same aerodrome, in order to have common recognition among them regarding the air traffic condition, it is desirable for flight crew members of each aircraft to make efforts to grasp other aircraft movements by monitoring not only the information provided by AFIS but also the radio communication with other aircraft as much as possible. Furthermore, in the case of the flight operation for sightseeing flight and others that would be repeated continuously in a short time, it is important to plan with plenty of time. In the case where those engaged in AFIS provide the information “RUNWAY IS CLEAR”, it is important to implement thoroughly the procedures to ensure that there is no relevant aircraft on the runway. (See “3. ANALYSIS” on the Investigation Report.)	
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-8-2-JA6113_JA871B.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA6113_JA871B.pdf (English)	

16	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	December 21, 2023	March 12, 2023 Tamamura Town, Sawa-gun, Gunma Prefecture	Privately owned	JR1250 Rans S-6 Coyote II-R582L (Ultralight plane with two seats)
	Summary	During a leisure flight near Tamamura Town, Sawa-gun, Gunma Prefecture, the aircraft experienced a decrease in engine output and made an emergency landing on a riverbank. The aircraft had one pilot on board, but no one was injured, and there is no damage for the aircraft. 		
	Probable Causes	The probable cause of this serious incident is most likely because the fuel supply to the engine decreased during the flight, leading to a continuous loss of engine output. It is highly probable that the reduction in fuel supply to the engine during the flight is caused by debris adhering to the fuel filter, obstructing the fuel flow, and an incomplete closure of the check valve inside the fuel pump, resulting in insufficient fuel pressure. According to the manufacturer’s manual, the failure to recognize debris adherence to the		

		fuel filter and reduced fuel pump performance before the continuous loss of engine output during flight is considered to have resulted from inadequate inspection and maintenance.		
	Safety Actions	Ultralight plane users must conduct proper inspections and maintenance following the manufacturer's manual. Additionally, maintenance records should be kept whenever inspections and maintenance are performed. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-8-3-JR1250.pdf (Japanese)		
17	Date of publication	Date and location	Operator	Aircraft registration number and aircraft type
	December 21, 2023	May 22, 2023 Chubu Centrair International Airport	AERO ASAHI CORPORATION	JA6718 Aerospatiale AS355F2 (Rotorcraft)
	Summary	When landing at Chubu Centrair International Airport, the helicopter landed at the take-off/landing field for helicopters (helipad) on a taxiway that was different from the runway assigned by the air traffic controller. 		
	Probable Causes	The probable cause of this serious incident was that when the helicopter was cleared to land on Runway 36 by the Tower, the captain most likely mistakenly believed that it was cleared to land at T Helipad and it landed at the helipad.		
	Safety Actions	It is important for pilots to acquire sufficient knowledge related to ATC phraseology and correctly recognize the transmission contents from air traffic controllers. (See "3. ANALYSIS" on the Investigation Report.)		
	Report	https://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2023-8-4-JA6718.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-air_report/JA6718.pdf (English)		

7 Provision of factual information in 2023 (aircraft accidents and serious incidents)

The JTSB provided no factual information in 2023.

Column

Participation in the Annual Meeting of the International Society of Air Safety Investigators (ISASI 2023)

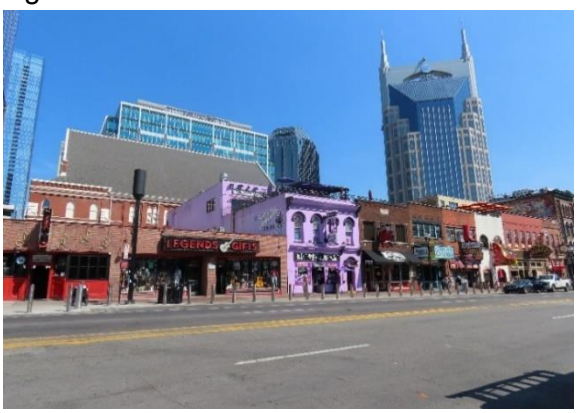
Aircraft Accident Investigators, Analysis, Recommendation and Opinion Office

The International Society of Air Safety Investigators (ISASI) is an organization aimed at sharing information and enhancing the skills of international aircraft accident investigators. It comprises aircraft accident investigation authorities from various countries, airlines, aircraft manufacturers, and flight/cabin crew associations. ISASI holds an annual meeting every year, and in 2023, it was held in Nashville, Tennessee, USA, in August. Nashville is the holy land of country music, with music museums, famous concert halls, and numerous music studios. It is a city where the music industry stands out, attracting fans worldwide. The downtown area of Broadway is especially impressive, where live performances continue day and night.

ISASI 2023 saw the participation of 325 individuals from about 30 countries and regions. The event featured three keynote speeches and 25 presentations from a wide range of fields, including unique accident investigation cases and investigation methods. Among them, JTSB would like to study and incorporate the new analytical methods introduced in the presentations on the investigation techniques of various countries. Additionally, the US Federal Aviation Administration (FAA), where private sector space development has been active in recent years, lectured on the approach to space accident investigations. We also participated in the simultaneous meetings of the Asian Society of Air Safety Investigators (AsiaSASI) and the Government Air Safety Investigators Group (GASIG), exchanging information and discussing the status of activities and aviation accident investigation-related information. The Japan Transport Safety Board has participated in the annual meeting since establishing the Aircraft Accident Investigation Commission in 1974 and supported the event in Sapporo in 2010.

By utilizing the knowledge and information gained from this meeting in our accident investigations, we aim to improve our investigative techniques further and continue to conduct accurate accident investigations.

Moreover, for this meeting, one young staff member from the Analysis, Recommendation and Opinion Office, who is in their second year of employment, participated to gain experience in international conferences. In addition to acquiring knowledge and information on accident investigations, they had many encounters with investigators from other countries, making this a fruitful business trip for their future career development. We hope the knowledge and international exchange experience gained by the young staff members at this conference will be applied to their daily work and contribute to their future success as an aviation accident investigator.



Broadway in Nashville

The venue of ISASI 2023

Chapter 4 Railway accident and serious incident investigations

1 Railway accidents and serious incidents to be investigated

<Railway accidents to be investigated>

◎Article 2, paragraph (3), of the Act for Establishment of the Japan Transport Safety Board (Definition of railway accident)

"Railway accidents" mean accidents of (1) to (3) and serious accidents of (4) below.

(1) Accidents occurred during the operation of a train or vehicle (Article 19* of the Railway Business Act)

(2) Train collision, fire, or other accident during the operation of a train or vehicle occurred on dedicated railways

(3) Train collision, fire, or other accident during the operation of a train or vehicle occurred on tramways

(4) Serious accidents prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism (Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board)

*Train collision, fire, or other accidents during the operation of a train or vehicle, which is prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism (Paragraph 1, Article 3 of the Ordinance on Report on Railway Accidents)

○Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board (Serious accidents)

1 Accidents listed in items (1) to (3) in Article 3, paragraph 1 of the Ordinance on Report on Railway Accidents

(1) Train collision: An accident in which a train collides or contacts with another train or a vehicle.

(2) Train derailment: An accident in which a train derails (excluding those related to snowplows in operation).

(3) Train fire: An accident in which a train catches fire.

2 Accidents listed in items (4) to (6) in Article 3, paragraph 1 of the same Ordinance, which are listed in any of (a) to (d) below.

(4) Level crossing accident: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a level crossing road.

(5) Accident against road traffic: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.

(6) Other accidents with casualties: An accident causing injury or death in the operation of a train or vehicle.

(a) An accident involving the death of any passenger, crew member, etc.

(b) An accident involving five or more casualties with at least one of the casualties dead.

(c) A fatal accident that occurs at a level crossing with no automatic barrier machines.

(d) Accident found to have likely been caused by a railway worker's error in procedure or due to the malfunction, damage, destruction, etc. of vehicles or railway facilities, which resulted in the death of a person.

3 Accidents listed in items (2) and (4) to (7) in Paragraph 1, Article 3 of the same Ordinance, which are recognized as particularly exceptional.

(2) Train derailment: An accident in which a train derails
(4) Level crossing accident: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a level crossing road.
(5) Accident against road traffic: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.
(6) Other accident with casualties: An accident causing injury or death in the operation of a train or vehicle.
(7) Heavy property loss without casualties: An accident in which the operation of a train or vehicle causes damage to property of 5 million yen or more.

4 Accidents equivalent to those listed in items (1) to (7) in Paragraph 1, Article 3 of the same Ordinance occurred in dedicated railways, which are recognized particularly exceptional. (Accidents related to dedicated railways)

(1) Train collision: An accident in which a train collides or contacts with another train or a vehicle.
(2) Train derailment: An accident in which a train derails.
(3) Train fire: An accident in which a train catches fire.
(4) Level crossing accident: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a level crossing road.
(5) Accident against road traffic: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.
(6) Other accidents with casualties: An accident causing injury or death in the operation of a train or vehicle.
(7) Heavy property loss without casualties: An accident in which the operation of a train or vehicle causes damage to property of 5 million yen or more.

5 Accidents specified by the public notice of the Japan Transport Safety Board as an accident equivalent to the above 1 to 3 accidents that occurred on tramways (accident under Article 3, Item 5 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation under Article 4, Item 7 of the same Ordinance) (Accidents related to tramways)

・Article 1 of the public notice stipulating the accident specified in Article 3, Item 5 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation specified in Article 4, Item 7 of the same Ordinance (Accidents related to tramways)

1 Accidents specified in (1) to (6) in Article 1, Paragraph 1 of the Ordinance for Report on Track Accidents, etc., which are listed in any of (a) to (c).
(1) Vehicle collision accident: An accident in which a vehicle operating on the main track collides with or contacts with another vehicle.
(2) Vehicle derailment: An accident in which a vehicle operating on the main track derails.
(3) Vehicle fire accident: An accident in which a vehicle operating on the main track catches fire.
(4) Level crossing accident: An accident where a vehicle collides or contacts with a person or vehicle on a level crossing road.
(5) Accident against road traffic: An accident in which a vehicle collides or contacts with a person or vehicle on a road other than a level crossing.
(6) Other accidents with casualties: An accident causing injury or death in the operation of a vehicle.

(a) An accident involving the death of a passenger, crew member, etc.

(b) An accident involving five or more casualties with at least one of the casualties dead

(c) A fatal accident that occurs at a level crossing with no automatic barrier machines

2. Accidents specified in the items (1) to (7) of the same Ordinance, which are recognized as particularly exceptional

(1) Vehicle collision accident: An accident in which a vehicle operating on the main track collides or contacts with another vehicle.
(2) Vehicle derailment: An accident in which a vehicle operating on the main track derails.
(3) Vehicle fire accident: An accident in which a vehicle operating on the main track catches fire.
(4) Level crossing accident: An accident in which a vehicle collides or contacts with a person or vehicle passing on a level crossing road.
(5) Accident against road traffic: An accident in which a vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.
(6) Other accidents with casualties: An accident causing injury or death in the operation of a vehicle.
(7) Heavy property loss without casualties: An accident in which the operation of a vehicle causes damage to property of 5 million yen or more.

3. The operation of new tramways and shared tramways that are laid other than on the road surface shall follow the items (1) to (3) in Paragraph 1, Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

Railway accidents to be investigated

<table>
<tr><td>Category</td><td>Train collision</td><td>Train derailment</td><td>Train fire</td><td>Level crossing accident</td><td>Accident against road traffic</td><td>Other accidents with casualties</td><td>Heavy property loss without casualties</td></tr>
<tr><td rowspan="2">Railway
[Act 2-3]
(including tramway operated as equivalent to railway)
[Notice 1-3]</td><td colspan="3">All accidents*1
[Ordinance 3-1]</td><td colspan="3">・Accidents involving the death of a passenger, crew member, etc.
・Accidents involving five or more casualties with at least one of the casualties dead
・Fatal accidents that occur at level crossings with no automatic barrier machines
・Accidents found to have likely been caused by a railway worker's error in procedure or due to the malfunction, damage, destruction, etc. of vehicles or railway facilities, which resulted in the death of a person
[Ordinance 3-2]</td><td></td></tr>
<tr><td></td><td colspan="2">Accidents that are particularly rare and exceptional [Ordinance 3-3]</td><td colspan="4">Accidents that are particularly rare and exceptional [Ordinance 3-3]</td></tr>
<tr><td>Dedicated railway</td><td colspan="7">Accidents that are particularly rare and exceptional [Ordinance 3-4]</td></tr>
<tr><td rowspan="3">Tramway
[Ordinance 3-5]</td><td>Train collision</td><td>Train derailment</td><td>Train fire</td><td>Level crossing accident</td><td>Accident against road traffic</td><td>Other accidents with casualties</td><td>Heavy property loss without casualties</td></tr>
<tr><td colspan="6">・Accidents involving the death of a passenger, crew member, etc.
・Accidents involving five or more casualties with at least one of the casualties dead
・Fatal accidents that occur at level crossings with no automatic barrier machines
[Notice 1-1]</td><td></td></tr>
<tr><td colspan="7">Accidents that are particularly rare and exceptional [Notice 1-2]</td></tr>
</table>

*1 Except for derailment accidents of working snowplows. [Ordinance 3-1] However, accidents that are particularly rare and exceptional are to be investigated. [Ordinance 3-3]

(Note) In the table, “Act” refers to the Act for Establishment of the Japan Transport Safety Board; “Ordinance” refers to the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board; “Notice” refers to the Public Notice by the Japan Transport Safety Board; and the numbers refer to the Article and Item numbers. (*In “Act,” the Article and Paragraph are abbreviated)

<Railway serious incidents to be investigated>

◎Article 2, paragraph (4), item (ii), of the Act for Establishment of the Japan Transport Safety Board (Definition of railway serious incident)

"Railway serious incident" is a situation prescribed by Order of the Ministry of Land, Infrastructure, Transport and Tourism (Article 4 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board), which may obviously cause a railway accident.

○Article 4 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board

*The names of the situations listed in 1 to 6 are abbreviations.

1 "Incorrect management of safety block"
A situation where a train starts moving for the purpose of operating in the relevant block section before completion of the block procedure and another train or vehicle had existed in the zone.

2 "Incorrect indication of signal"
A situation where a signal indicates that a train should proceed even though there is an obstacle in the route of the train or the route of the train is obstructed while the signal indicates that the train should proceed and a train had entered into the route.

3 "Violating red signal"
A situation where a train proceeds regardless of a stop signal, thereby obstructing the route of another train or vehicle and another train or vehicle had entered into the protected area of the signal which protects the zone of the route.

4 "Dangerous damage in facilities"
A situation that causes a malfunction, damage, destruction, etc., of tracks, safety facilities etc., and which caused malfunction, damage, destruction, etc. bearing particularly serious risk of collision or derailment of or fire in a train.

5 "Dangerous trouble in vehicle"
A situation that causes a malfunction, damage, destruction, etc., of running device, braking device, electrical device, coupling device, train protection system etc. of a vehicle, and caused malfunction, damage, destruction, etc., bearing particularly serious risk of collision or derailment of or fire in a train.

6 Any of "Incorrect management of safety block," "Incorrect indication of signal," "Violating red signal," "Main track overrun[*1]," "Violating closure section for construction[*2]," "Vehicle derailment[*3]," "Dangerous damage in facilities," "Dangerous trouble in vehicle," "Heavy leakage of dangerous object[*4]" and "A situation equivalent to the prior 9 items (others)," which is recognized as particularly exceptional.

*1 "Main track overrun" refers to a situation in which a train or vehicle overruns a main track between stations.
*2 "Violating closure section for construction" refers to a situation in which a train runs in a section during construction or maintenance work that should be done by stopping train operation.
*3 "Vehicle derailment" refers to a situation in which a vehicle derails, and includes the following situations;
・A vehicle derailed on a main track.
・A vehicle derailed on a side track and disrupted a main track.
・A vehicle derailed on a side track, and the cause can be attributed to a cause other than the equipment or handling specific to the side track.
*4 "Heavy leakage of dangerous object" refers to a situation in which hazardous materials, explosives, etc., leak significantly from a train or vehicle.

7 Situations which are specified by the public notice (Article 2 of the Public Notice which

defines the accident of Item 5, Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation of Item 7, Article 4 of the same Ordinance), as those equivalent to the situations of the items 1 to 6 above occurred on tramways.

・Article 2 of the Public Notice which defines the accident of Item 5, Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation of Item 7, Article 4 of the same Ordinance (Serious incident related to tramways)

*The names of the situations listed in 1 to 4 are abbreviations.

1 “Incorrect management of safety block”
A situation where a vehicle is operating on a main track for the purpose of operating in the relevant safety zone before the completion of safety system procedures and another vehile operating on the main track had existed in the zone.
2 “Dangerous damage in facilities”
A situation that causes malfunction, damage, destruction, etc., of tracks, safety facilities, etc. that disrupts the safety of a vehicle operating on a main track, and caused malfunction, damage, destruction, etc., bearing a particularly serious risk of collision, derailment, or fire in the vehicle operating on the main track.
3 “Dangerous trouble in vehicle”
A situation that causes a malfunction, damage, destruction, etc., of running device, braking device, electrical device, coupling device, etc. of a vehicle, that disrupts the safety of a vehicle operating on a main line and caused malfunction, damage, destruction, etc., bearing a particularly serious risk of collision, derailment, or fire in the vehicle operating on the main track.
4 “Incorrect management of safety block” “Violating red signal[*1],” “Overrun on main track[*2],” “Dangerous damage in facilities,” “Dangerous trouble in vehicle,” “Heavy leakage of dangerous object[*3]” and “A situation equivalent to the prior 6 items (others),” which is recognized as particularly exceptional.

*1 “Violating red signal” refers to a situation in which a vehicle operating on a main track overruns a stop signal and obstructs a course of another vehicle.
*2 “Overrun on main track” refers to a situation in which a vehicle overruns a main track.
*3 “Heavy leakage of dangerous object” refers to a situation in which hazardous materials, explosives, etc., leak significantly from a vehicle.

5 The operation of new tramways and shared tramways that are laid other than on the road surface shall follow the items 1 to 6 in Article 4 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

Serious incidents to be investigated

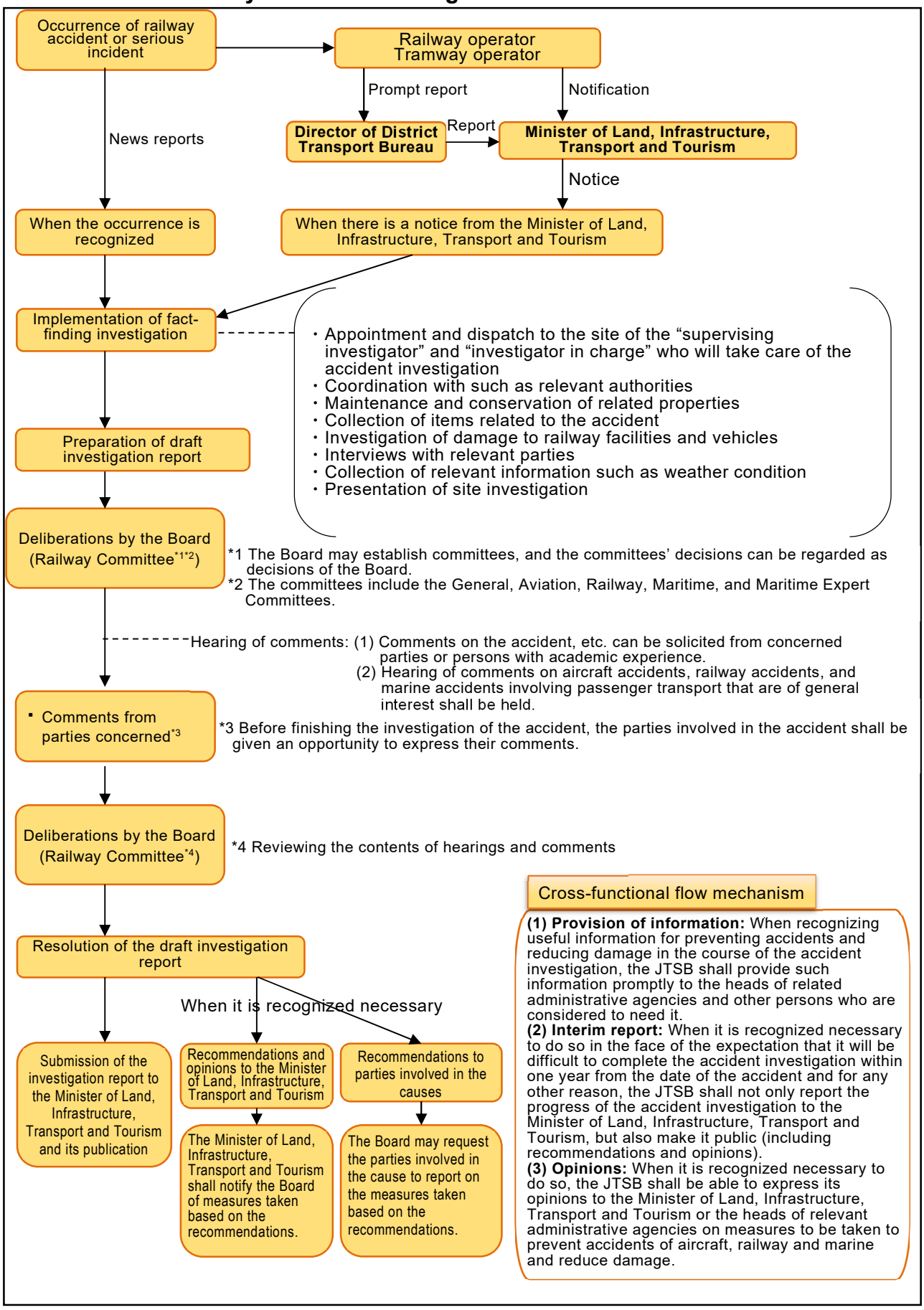
<table>
<tr><td>Category</td><td>Incorrect management of safety block</td><td>· Incorrect indication of signal
· Violating red signal</td><td>Dangerous damage in facilities</td><td>Dangerous trouble in vehicle</td><td>· Main track overrun
· Violating closure section for construction
· Vehicle derailment
· Heavy leakage of dangerous object
· Others</td></tr>
<tr><td rowspan="2">Railway
[Act 2-4-2]
(including tramway operated as equivalent to railway
[Notice 2-5])</td><td colspan="2">Certain conditions such as the presence of another train
[Ordinance 4-1, 4-2, 4-3]</td><td colspan="2">Risk of collision, derailment or fire
[Ordinance 4-4, 4-5]</td><td></td></tr>
<tr><td colspan="5">Incidents that are particularly rare and exceptional [Ordinance 4-6]</td></tr>
<tr><td></td><td>Incorrect management of safety block</td><td>Violating red signal</td><td>Dangerous damage in facilities</td><td>Dangerous trouble in vehicle</td><td>· Main track overrun
· Heavy leakage of dangerous object
· Others</td></tr>
<tr><td rowspan="2">Tramway
[Ordinance 4-7]</td><td>Certain conditions such as the presence of a vehicle
[Notice 2-1]</td><td></td><td colspan="2">Particularly remarkable risk of collision, derailment or fire [Notice 2-2, 2-3]</td><td></td></tr>
<tr><td colspan="5">Incidents that are particularly rare and exceptional [Notice 2-4]</td></tr>
</table>

(Note) In the table, “Act” refers to the Act for Establishment of the Japan Transport Safety Board; “Ordinance” refers to the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board; “Notice” refers to the Public Notice by the Japan Transport Safety Board; and the numbers refer to the Article and Item numbers. (*In “Act,” the Article, Paragraph, and Item are abbreviated)

*For details, see each case on the website of the JTSB.

https://www.mlit.go.jp/jtsb/example.pdf (Japanese)

2 Procedure of railway accident investigation



3 Statistics of investigations of railway accidents and serious incidents

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

From 2022, 16 accident investigations were carried over, and 11 were newly launched in 2023. Among these, 17 investigation reports were published in 2023, and 10 accident investigations were carried over to 2024.

Moreover, two railway serious incident investigations were carried over from 2022, and two serious incident investigations were newly launched in 2023. Among these, one investigation report was published in 2023, and three investigations were carried over to 2024.

Among the 18 investigation reports published in 2023, one was issued with recommendations, and none was issued with opinions.

Investigations of railway accidents and serious incidents in 2023

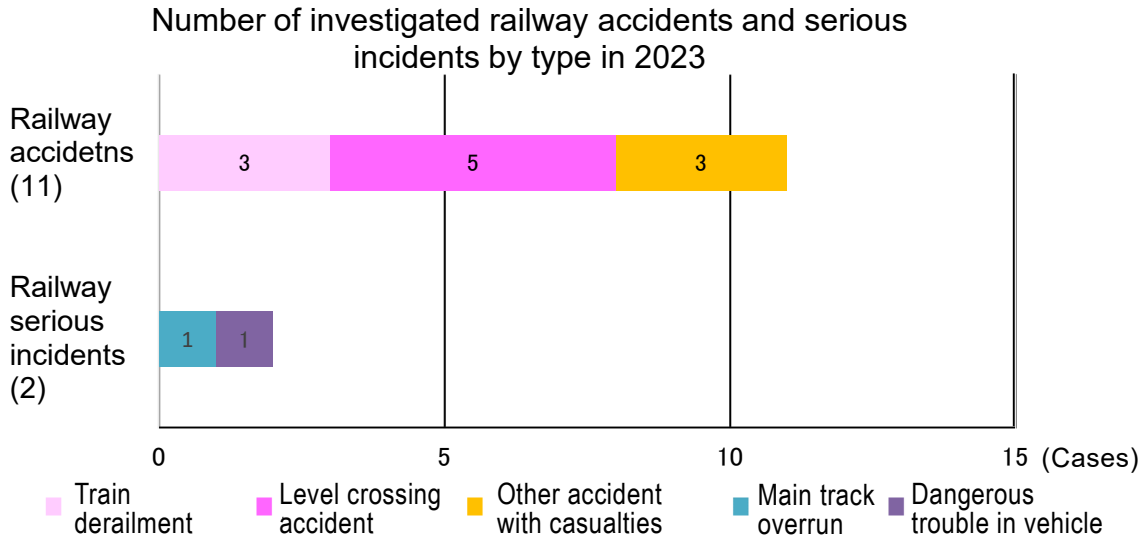
(Cases)

Category	Carried over from 2022	Launched in 2023	Total	Published Investigation reports	(Recommendations)	(Opinions)	Carried over to 2024	(Interim report)
Railway accident	16	11	27	17	(1)	(0)	10	(1)
Railway serious incident	2	2	4	1	(0)	(0)	3	(1)

4 Statistics of investigated railway accidents and serious incidents in 2023

Regarding the number of railway accidents and incidents investigated in 2023, there were 11, a decrease of three from 14 in the previous year, and there were two serious railway incidents remained the same as the previous year.

The breakdown by type of accidents and serious incidents is as follows: The railway accidents consisted of three derailments, five level crossing accidents, and three other accident with casualties. As for railway serious incidents, there were one main track overrun and one dangerous trouble in vehicle.



There were 11 persons killed or injured in 11 accidents, seven of whom were killed and four were injured.

The number of casualties (in railway accidents)

(Persons)

2023							
Category	Dead			Injured			Total
	Crew	Passenger	Others	Crew	Passenger	Others	
Casualties	0	0	7	1	3	0	11
Total	7			4			

*The above statistics include incidents under investigation so may change depending on the status of the investigation and deliberation.

5 Summaries of railway accidents and serious incidents which occurred in 2023

The railway accidents and railway serious incidents 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.

(Railway accidents)

1	Date and accident type	Railway operator	Line section (location)
	March 2, 2023 Level crossing accident	TAKAMATSU-KOTOHIRA ELECTRIC RAILROAD Co., Ltd.	Between Hazama Station and Enai Station on the Kotohira Line (Kagawa Prefecture) Shimomura-Kamisho Crossing (Class 4 level crossing without crossing gate nor road warning device)
	Summary	See “6 Publication of investigation reports” (No.16 on page 81).	
2	Date and accident type	Railway operator	Line section (location)
	March 23, 2023 Train derailment	West Japan Railway Company	Between Bingo-Yawata Station and Uchina Station on the Geibi Line (Hiroshima Prefecture)
	Summary	While the train was running between Bingo-Yawata and Uchina Station, the train hit fallen rocks, causing the front two axles of its four axles to derail.	
3	Date and accident type	Railway operator	Line section (location)
	April 10, 2023 Level crossing accident	WILLER TRAINS, Inc.	Between Shisho Station and Nishimaizuru Station on the Miyazu Line (Kyoto Prefecture) Shimoyuri Crossing (Class 4 level crossing without crossing gate nor road warning device)
	Summary	See “6 Publication of investigation reports” (No.17 on page 82).	
4	Date and accident type	Railway operator	Line section (location)
	April 11, 2023 Other accident with casualties	TOYAMACHIHO RAILROAD CO., LTD.	Between Etchu-Ebara Station and Etchu-Sango Station, Main Line (Toyama Prefecture)
	Summary	The train driver recognized a maintenance worker working on the track while running in the section and initiated an emergency stop, but the train collided with the worker. The death of the maintenance worker was later confirmed.	
5	Date and accident type	Railway operator	Line section (location)
	June 2, 2023 Train derailment	Tosa Kuroshio Tetsudo Co., Ltd.	Between Tosa-Shirahama Station and Ariigawa Station on the Nakamura Line (Kochi Prefecture)
	Summary	While the train was running between Tosa-Shirahama Station and Ariigawa Station, the train hit a landslide, causing the front two axles of its four axles to derail.	

6	Date and accident type	Railway operator	Line section (location)
	July 2, 2023 Level crossing accident	Kyushu Railway Company	Between Kubota Station and Ogi Station on the Karatsu Line (Saga Prefecture) Niju-no-Tsubo Crossing (Class 4 level crossing without crossing gate nor road warning device)
	Summary	The driver of the train recognized a person entering the crossing from the left side of the direction of travel and initiated an emergency stop, but the train collided with the person. The death of the person was later confirmed.	
7	Date and accident type	Railway operator	Line section (location)
	August 5, 2023 Other accident with casualties	East Japan Railway Company	In the premises of Ofuna Station on the Tokaido Line (Kanagawa Prefecture)
	Summary	While the train was running in the premises of Ofuna Station, the train collided with an electrification pole, injuring passengers and crew.	
8	Date and accident type	Railway operator	Line section (location)
	August 6, 2023 Train derailment	Konan Railway Company	Between Owani Station and Shukugawara Station on the Owani Line (Aomori Prefecture)
	Summary	While the train was running between Owani Station and Shukugawara Station, the fifth and sixth axles of the third bogie derailed.	
9	Date and accident type	Railway operator	Line section (location)
	September 3, 2023 Level crossing accident	West Japan Railway Company	Between Suo-Takamori Station and Yonekawa Station on the Gantoku Line (Yamaguchi Prefecture) Nakahara Crossing (Class 3 level crossing without crossing gate, but with road warning device)
	Summary	The driver of the train recognized a light vehicle entering the crossing from the left side of the direction of travel and initiated an emergency stop, but the train collided with the vehicle. The death of the person in the vehicle was later confirmed.	
10	Date and accident type	Railway operator	Line section (location)
	November 18, 2023 Level crossing accident	Kyushu Railway Company	Between Sashiu Station and Kozaki Station on the Nippo Line (Oita Prefecture) Sekiden Crossing (Class 4 level crossing without crossing gate nor road warning device)
	Summary	The driver of the train recognized a person entering the crossing from the left side of the direction of travel and initiated an emergency stop, but the train collided with the person. The death of the person was later confirmed.	
11	Date and accident type	Railway operator	Line section (location)
	December 5, 2023 Other accident with casualties	West Japan Railway Company	Between Satosho Station and Kasaoka Station on the Sanyo Line (Okayama Prefecture)
	Summary	The driver of this train initiated an emergency stop after hearing an unusual noise while running in this section. Upon inspection, the train was found to have come in contact with a maintenance worker, whose death was later confirmed.	

(Railway serious incidents)

1	Date and accident type	Railway operator	Line section (location)
	November 28, 2023 Dangerous trouble in vehicle	Oigawa Railway Co., Ltd.	In the premises of Ieyama Station of Oigawa Main Line (Shizuoka Prefecture)
	Summary	After the train departed from Ieyama Station, the coupler between the locomotive and passenger car separated while running near the switch, causing the train to stop.	
2	Date and accident type	Railway operator	Line section (location)

	December 12, 2023 Main track overrun	Sapporo Transportation Service Promotion Corporation	Between Nakajima-Koen-Dori Stop and Yamahana-Ku-Jo Stop on the Yamahana Line (Hokkaido)
	Summary	When the train was stopped at the Nakajima-Koen-Dori Stop, the driver got off to communicate for business purposes. While the driver was off, the tram was seen entering an intersection with a red signal. The driver immediately boarded the tram and tried to stop it, but it had run off about 20 meters.	

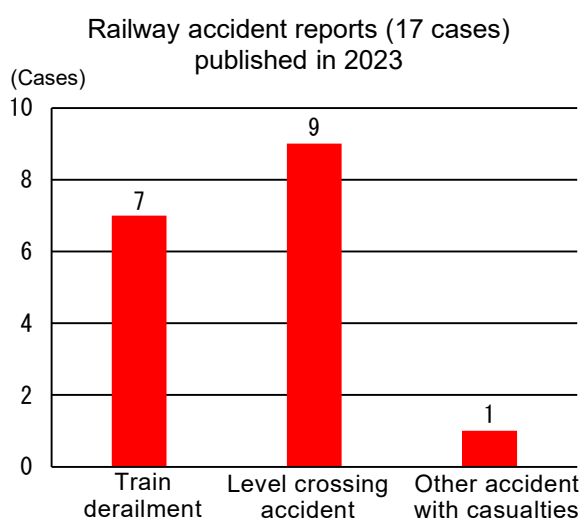
6 Publication of investigation reports

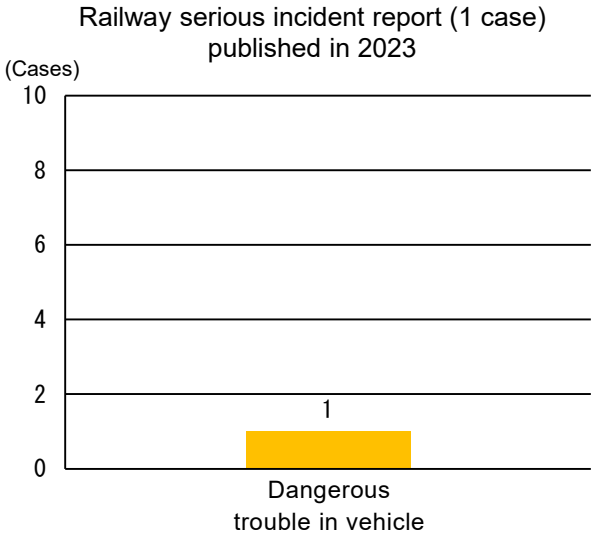
The number of investigation reports of railway accidents and serious incidents published in 2023 was 18, consisting of 17 railway accidents and one serious incident.

Breaking them down by type, the railway accidents contained seven train derailment accidents, nine level crossing accidents, and one other accident with casualties while the railway serious incidents contained one dangerous trouble in vehicle.

The number of casualties was 24, consisting of 10 deaths and 14 injuries.

The investigation reports on railway accidents and serious incidents published in 2023 are summarized as follows.





Railway accident investigation reports published in 2023

1	Date of publication	Date and accident type	Railway operator	Line section (location)
	January 19, 2023	February 7, 2022 Train derailment	OHMI Railway Co., Ltd.	In the premises of Takamiya Station, Taga Line (Shiga Prefecture)
	Summary	The driver of the train stopped the train due to feeling an impact while passing through a right-hand curve with a radius of 160 m at the premises of Takamiya Station. When the driver checked the train after stopping, he discovered that the lead axle of the lead bogie of the lead vehicle, the lead axle of the rear bogie of the lead vehicle, and the lead axle of the lead bogie of the rear vehicle had been derailed. About 100 passengers and one driver were onboard the train, and there were no injuries.		

	Probable causes	It is probable that the right wheels of the lead axle of the lead bogie of the lead vehicle, the rear bogie of the lead vehicle, and the lead bogie of the rear vehicle fell into the gauge due to the gauge widening significantly while the train was passing through a right-hand curve with a radius of 160 m. It is more likely that the gauge widened significantly due to a large amount of static irregularity of gauge along this curve, and that a series of defective sleepers and poor rail fastening status resulted in lateral movement of the rails and rail tilt due to lateral force when the train was running, which caused the gauge to widen dynamically. It is probable that the static irregularity of gauge was large due to the standard value for maintenance for irregularity of gauge being larger than the appropriate value. The series of defective sleepers and poor rail fastening status is more likely because inspection methods and judgment criteria were not clarified, preventing proper maintenance from being performed. It is more likely that this accident may have occurred because the slack*1 on this curve was relatively large, which resulted in a smaller margin for derailment by gauge widening, and there were places where the guard rail*2 was not fastened to the sleepers, causing rail tilt*3, etc. to occur from inward lateral force from the right wheel, etc., which dynamically increased the flangeway width, causing the derailment prevention function not to work sufficiently. Another factor probable to be involved was that the countermeasures implemented in response to the Japan Transport Safety Board UN-I-SAN No. 43, dated June 28, 2018, "Opinions Related to the Prevention of Train Derailment Accidents Caused by Gauge Widening*4," were insufficient. *1 "Slack" means the amount to widen the gauge beyond the predetermined size in order to drive smoothly along a curve. *2 "Guard rails" are rails installed on the insides of the gauges of the inner rails to prevent derailment. *3 "Rail tilt" refers to a phenomenon where a rail is tilted due to the load exerted on it by wheels. *4 "Gauge widening" means a state where the gauge has widened due to damage to the rail fastening device from lateral force (force where the wheels press on the rail in the lateral direction) or due to increased rail wear. When the gauge spreads beyond a certain point, it creates a state where either the left or right wheel cannot be supported by the rail head, resulting in derailment. In this context, gauge widening due to lateral force in conjunction with the train running means "dynamic gauge widening."
	Safety actions	**(1) Steady implementation of track maintenance** (i) About the standard value for maintenance for track irregularity It would be preferable to revise the standard value for maintenance for irregularity of gauge to make it the appropriate value and to have a clear deadline set for performing track maintenance as action to be taken when track irregularity reaches the standard value for maintenance. (ii) About sleeper inspection The inspection methods and judgment criteria manual for sleeper inspection need to be enhanced, and track maintenance needs to be performed along with this. It is also necessary to perform maintenance in a planned manner for locations that require it, regardless of which type of sleepers are installed there. (iii) About rail fastening status inspection and maintenance When inspecting track members, such as during a sleeper inspection, and when conducting a permanent way inspection tour, etc., it's necessary to check for things like wooden sleeper corrosion, floating dog spikes, cracked PC sleepers, and broken fastening devices, and replace or add dog spikes, adjust fastening torque, replace plate springs, replace sleepers, install gauge ties, etc. according to the status. In addition, because the danger of derailment by gauge widening increases in particular when these issues occur in a series or when it happens on a sharp curve with a large amount of slack, care must be taken to prioritize maintenance in these status. In addition, when it comes to managing sleepers, rail fasteners, etc., on curves, in general, more attention tends to be paid to the outer rail side where it's easy for large amounts of lateral force to occur, but because lateral force also occurs on the inner rail side in the direction in which the curve turning lateral force*5, etc., pushes the rails toward the outside, it needs to be managed with attention equal to that devoted to the

outer rail side.

(iv) About rail fastening methods

It would be preferable to implement countermeasures such as double spikes while prioritizing locations where there are concerns about gauge widening on sharp curves, etc., to increase rail fastening force. Also, it would be preferable for them to establish the standard number of dog spikes to be driven in by curve radius, as well as the method for doing this.

(2) Consideration of slack reduction

It would be preferable to reduce slack as much as possible in conjunction with improving the track in order to increase the clearance for derailment by gauge widening.

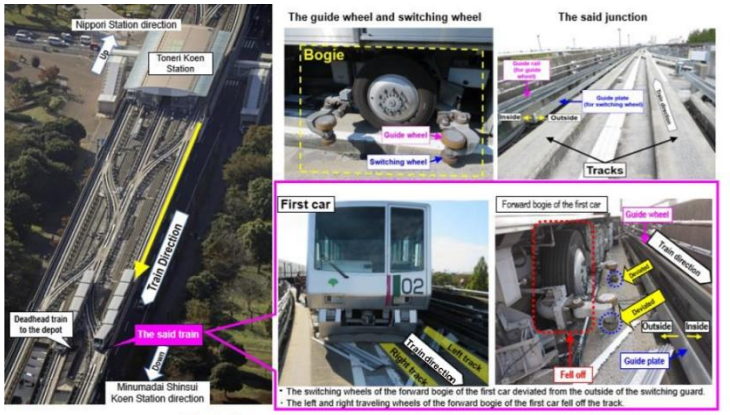
(3) Guard angle*6 installation

It would be preferable to install guard angles instead of guard rails, which are impossible to fasten at locations with PC sleepers, so that the derailment prevention function is fully utilized.

*5 "Curve turning lateral force" means the lateral force generated on a bogie traveling on a curve when the wheels on the outer rail side of the front axle of the bogie are pushed against the inner rail side and the wheels on the inner rail side resist this due to friction.

*6 "Guard angles" are L-shaped steel guard devices installed on the insides of the gauges of the inner rails to prevent derailment.

	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-1-1.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2023-1-1e.pdf (English)		
2	Date of publication	Date and accident type	Railway operator	Line section (location)
	February 16, 2023	October 7, 2021 Train derailment	Bureau of Transportation Tokyo Metropolitan Government	In the premises of Toneri-Koen Station on the Nippori-Toneri Liner (Tokyo Metropolitan)
	Summary	The train departed Toneri-Koen Station on schedule. Shortly after, the dispatcher in the command center felt the earthquake tremor and pressed the button to stop all train departures, halting all trains at the stations. Immediately afterward, the Early Earthquake Warning System*1 confirmed the earthquake originating in the northwestern part of Chiba Prefecture, and the dispatcher pressed the emergency stop button, stopping all moving trains. As a result, this train stopped at the switch on the premises of Toneri-Koen Station. Upon inspection by staff on site, it was found that the front wheels of the first car (hereinafter, cars are counted from the front, and front, back, left, and right are based on the train's direction) had derailed to the right side of the track. There were 29 passengers on the train, and eight of them were injured.		
	Probable causes	It is probable that this accident was caused by the train derailing due to the seismic motion from the earthquake in the northwestern part of Chiba Prefecture. It is probable that the derailment process was as follows: the seismic motion caused the train		

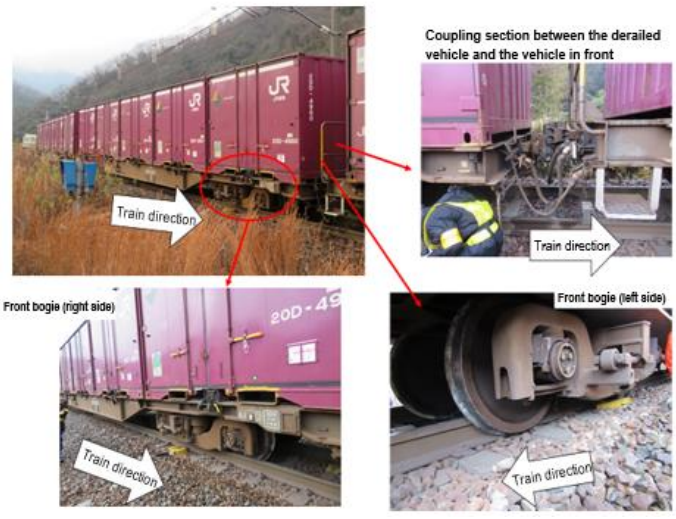


*The leftmost figure was created using a photo provided by Kyodo News.

Situation of the accident site

*1. The Early Earthquake Warning System alerts the dispatcher when forecast information from a disaster-prevention technology company (ANET) predicts an earthquake with a seismic intensity of 4 or higher on the Japanese scale of 7 along the Nippori-Toneri Liner. When this system activates, it performs an emergency stop of all trains.

<table>
<tr><td></td><td></td><td colspan="4">to sway significantly in the roll direction[*2], causing the right switching wheel of the front bogie of the first car to ride up onto the guide rail, which then dislodged. As a result, the bogie traveled along the right side of the track, and the left switching wheel of the bogie deviated outside the fixed guide plate[*3] installed on the left side of the track, causing the derailment.

*2. The “roll direction” refers to the rotational movement around the axis in the direction of the train’s travel.
*3. The “fixed guide plate” is a stationary guide plate for switching wheels, installed at the switch and fixed to the track.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="4">The following measures need to be taken to prevent the recurrence of this accident:
(1) The emergency train stop operation should be automated when the Early Earthquake Warning System activates.
When the Early Earthquake Warning System activates, stopping the trains as quickly as possible is necessary to minimize earthquake damage. Therefore, the emergency train stop operation of this system should be automated.
(2) Measures to prevent train derailment near the accident site during an earthquake should be taken.
For the area near the accident site, where the natural frequency of the structures perpendicular to the train’s path likely matches the rolling natural frequency of the vehicle, and the rotational behavior of the structures during an earthquake is significant, measures should be taken to prevent the train's guide wheels and switching wheel from riding up onto the guide rail due to
seismic motion. It is also desirable to check for similar risks in other locations and take the same measures if necessary.
(3) Organize abnormal situation responses with passenger safety as the top priority.
In the event of an earthquake with a seismic intensity of 5 lower or higher, confirm the condition of all vehicles and facilities in the entire section. Do not re-electrify until the verification is complete. The evacuation guidance methods and procedures prioritizing passenger safety should be organized, included in the abnormal situation response manual, and thoroughly communicated to all relevant personnel.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-2-1.pdf
(Japanese)</td><td></td></tr>
<tr><td>3</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td colspan="2">Line section (location)</td></tr>
<tr><td></td><td>March 30, 2023</td><td>December 28, 2021
Train derailment</td><td>Japan Freight Railway Company</td><td colspan="2">Between Seno Station and Hachihommatsu Station on the Sanyo Line (Hiroshima Prefecture)</td></tr>
<tr><td></td><td>Summary</td><td colspan="4">Due to the snowfall in Shiga Prefecture the previous day, the train departed Hiroshima Freight Terminal 22 hours and 22 minutes behind schedule. After passing through Seno Station, the lead locomotive was set to notch 13, and the auxiliary locomotive at the rear was set to notch 12, running at approximately 52 km/h. The driver of the lead locomotive observed a sudden drop and rise in the brake pipe pressure[*1], and the brakes activated, stopping the train. Upon inspection, as directed by the transport dispatcher, the driver found that the front bogie of the 12th car (cars are counted from the front, including locomotives, with directions based on the train’s direction of travel) had derailed to the left.
 
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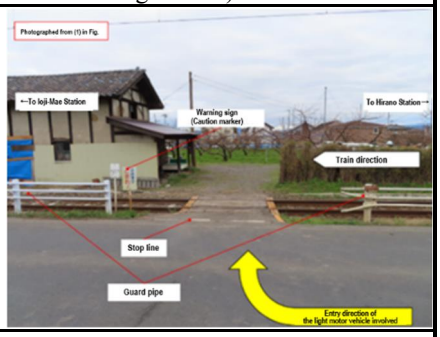
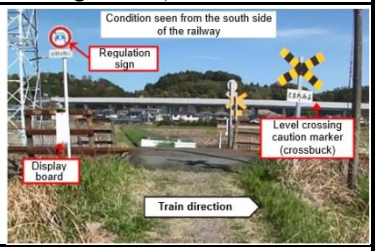
</table>

		The train had one crew member in the lead locomotive and one in the auxiliary locomotive, but there were no injuries. *1. “Brake pipe pressure” refers to the air pressure in the brake pipe that controls the brake force. It is usually maintained at a constant pressure of 490 kPa, reducing the pressure applied to the brakes and increasing the pressure that releases them.
	Probable causes	It is probable that this accident occurred when the train passed through a right curve with a radius of 300 meters. Near the accident site, the weight on the outer rail side of the first axle of the front bogie of a Koki 106-type freight car decreased. Additionally, the weight on the inner rail side increased the lateral pressure on the outer rail side, causing the outer rail side wheel to climb onto the rail and derail. It is probable that the reduction in the weight on the outer rail side was due to multiple loaded containers that significantly exceeded the left-right load imbalance rate of 10% for managing a single 12-foot container, resulting in an expanded imbalance of wheel load. The occurrence of the left-right load imbalance is more likely due to: (1) There was a lack of shared information about load imbalance among related companies, such as freight forwarders, shippers, and loading companies (2) The system was insufficient for checking load imbalance after loading and sealing containers. (3) The absence of a system to investigate causes and implement measures to prevent recurrence when load imbalance was detected led to these factors’ accumulation.
	Safety actions	It is probable that this accident occurred primarily due to container load imbalance. Although measures to prevent load imbalance, based on the Esashi Line derailment accident*2, have been implemented, they were insufficient. Therefore, the following measures are necessary: (1) Although guidelines and manuals for container loading were created and disseminated to freight forwarders after the Esashi Line derailment accident, it is probable that there was low awareness of load imbalance among shippers and loading companies, and information about load imbalance was not shared. Therefore, Japan Freight Railway Company (“JR Freight” for short) and freight forwarders need to ensure that important information, such as the contents of the guidelines, is thoroughly shared and disseminated among all companies involved in cargo transportation. Additionally, JR Freight should establish a system to disseminate the contents of the guidelines among related companies, including loading companies, not only through requests to freight forwarders via the All Japan Railway-Freight Forwarders Association but also in cooperation with Nippon Express headquarters, a major freight forwarder. (2) The method used to check the load during the accident made it difficult to detect load imbalance. Therefore, it is necessary to establish a system that can effectively and frequently check the loading status, thoroughly understand the actual loading methods and requests, and ensure that load imbalance is prevented in advance. (3) In the past, there was no system to share information, investigate causes, and implement measures to prevent recurrence when load imbalance was detected. To prevent load imbalance in advance, JR Freight needs to establish a system to investigate causes and implement measures to prevent recurrence when load imbalance is confirmed, in cooperation with related companies such as freight forwarders and loading companies. (4) The Otake Station, where the containers were loaded onto the freight train, did not have equipment to check for load imbalance, such as portable scales or wheel load measuring devices. Therefore, it is necessary to enhance hard measures that can detect load imbalance early by utilizing portable scales, top lifters, wheel load measuring devices, and truck scales. Furthermore, it is desirable to develop hard measures at all freight stations handling containers to prevent accidents caused by load imbalance. Additionally, freight forwarders transporting containers loaded with cargo to freight stations must be thoroughly informed about checking for load imbalance by measuring the height difference between the left and right sides of the truck before and after loading the containers onto the truck using the load imbalance prevention manual. *2. The Esashi Line derailment accidents involved three JR Freight trains on the Esashi Line between April 2012 and June 2014.

<table>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-3-1.pdf
(Japanese)</td></tr>
<tr><td rowspan="5">4</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>March 30, 2023</td><td>April 5, 2022
Level crossing accident</td><td>Fukushima Transportation, Inc.</td><td>Between Hirano Station and Iojimae Station on the Iizaka Line (Fukushima Prefecture)
6k961m crossing (Class 4 level crossing without crossing gate nor road warning device)</td></tr>
<tr><td>Summary</td><td colspan="3">While the train ran approximately 50 km/h between Hirano Station and Iojimae Station, the driver recognized a light vehicle entering the crossing (Class 4 level crossing) from the left. The driver immediately sounded the horn and applied the emergency brake, but the train collided with the light vehicle.
The driver of the light vehicle involved in this accident was killed, and the passenger was seriously injured.
  </td></tr>
<tr><td>Probable causes</td><td colspan="3">It is certain that this accident occurred because the light vehicle entered the 6k961m crossing (Class 4 level crossing without gates or road warning devices) while the train was approaching, resulting in a collision.
It is probable that the light vehicle driver did not notice the approaching train, but the details could not be clarified as the driver was deceased.</td></tr>
<tr><td>Safety actions</td><td colspan="3">Class 4 level crossings, which lack crossing gates and road warning devices, should be abolished or equipped with proper safety equipment.
Railway operators and stakeholders such as orchard owners need to proceed with discussions to reach an agreement on abolishing or equipping this crossing with safety equipment and implementing safety measures.
Until these measures are implemented, it is desirable to restrict passage through the crossing only when necessary.
Furthermore, since the company has many other Class 4 level crossings, it is recommended that railway operators, landowners, municipalities, and residents conduct discussions to abolish or equip these crossings with safety equipment.</td></tr>
<tr><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-3-2.pdf
(Japanese)</td></tr>
<tr><td rowspan="5">5</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>March 30, 2023</td><td>April 5, 2022
Level crossing accident</td><td>Tenryu Hamanako Railroad Co., Ltd.</td><td>Between Gansuiji Station and Miyaguchi Station on the Tenryu Hamanako Line (Shizuoka Prefecture)
Kubota Crossing (Class 4 level crossing without crossing gate nor road warning device)</td></tr>
<tr><td>Summary</td><td colspan="3">While running at approximately 70 km/h between Miyaguchi Station and Gansuiji Station, the driver of the train recognized a person at Kubota Crossing (Class 4 level crossing), sounded the horn, and applied the emergency brake, but the train collided with the person.
As a result of this accident, the person was killed.
  </td></tr>
<tr><td>Probable causes</td><td colspan="3">It is probable that this accident occurred because the person and the train collided at Kubota Crossing, Class 4 level crossing without crossing gate nor road warning device.</td></tr>
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<tr><td></td><td></td><td colspan="3">It is probable that the person was trying to cross the crossing on the way to work, but the details could not be clarified as the person was deceased.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">Class 4 level crossings, which lack crossing gates and road warning devices, should be abolished or equipped with proper safety equipment. The company has been working on abolishing or improving the safety of Class 3 and Class 4 level crossings since December 2018, and it is desirable to promote these efforts further.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-3-3.pdf
(Japanese)</td></tr>
<tr><td rowspan="5">6</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>May 25, 2023</td><td>July 19, 2022
Other accident with casualties</td><td>West Japan Railway Company</td><td>In the premises of Nada Station on the Tokaido Line (Hyogo Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The train departed Rokkomichi Station about 31 minutes late.
The driver recognized a collision sound while passing through Nada Station at approximately 92 km/h and applied the emergency brake to stop. The train had collided with one passenger, and the passenger who was hit and thrown by the train collided with four other passengers on the platform, causing injuries. Approximately 750 passengers and two crew members were on board the train, but no injuries were reported. The death of the passenger who was thrown was later confirmed.
The train's left-side front window and the glass of the interconnecting door (front, back, left, and right are based on the train's direction of travel) were severely damaged.</td></tr>
<tr><td>Probable causes</td><td colspan="3">It is highly probable that this accident occurred when a passenger entered the tracks of platform 3 at Nada Station from the down platform just before the train passed, collided with the train, and was thrown by the impact, subsequently hitting other passengers one after another on the platform.
It is possible that the passenger who collided with the train entered the tracks of the passenger's own accord, but the reason for this could not be determined.</td></tr>
<tr><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-4-1.pdf
(Japanese)</td></tr>
<tr><td rowspan="4">7</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>June 29, 2023</td><td>February 7, 2022
Train derailment</td><td>Iyo Railway Co., Ltd.</td><td>In the premises of Minara Station on the Yokogawara Line (Ehime Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The train departed Ehime Univ. Hospital Station on the Yokogawa Line on Schedule.
The driver of the train confirmed the caution signal of the home signal*1 at Minara Station and entered the station, where they noticed that the right tongue rail*2 of switch 51, which is normally not attached to the right stock rail (front, back, left, and right are based on the derailed train's direction of travel), was attached to the right stock rail about 5 meters before the switching point. The driver immediately applied the brakes but felt a lateral shaking shortly afterward.
The front bogie of the first car (cars are counted from the front) had entered the down track instead of the up track that was scheduled, and the wheels of both axles of the front bogie had derailed, straddling the right rail of the down track.
The train had 13 passengers and two crew members on board, but there were no injuries.
 
*1. "Home signal" is a signal that indicates whether trains entering a station can proceed.
*2. "Tongue rail" is a pointed rail used at switching points to guide trains onto different tracks.</td></tr>
<tr><td>Probable causes</td><td colspan="3">It is probable that this accident occurred because the switch rod*4 of the spring switch machine*3 was broken, causing both tongue rails to adhere to the stock rails on the respective sides. When the driver confirmed the caution signal of the home signal, the train entered the</td></tr>
</table>

switch facing[*5] it, causing the flanges of both front bogie wheels to be caught between the tongue rails. As a result, the first axle of the front bogie entered the down track, while the second axle entered the up track, leading to the derailment.

It is highly probable that the switch rod was broken because fatigue cracks developed from the boundary between the welded and unwelded sections at the weld ends on two upper corners of the fracture surface, extending to the center, eventually leading to a complete break without plastic deformation on the lower side of the fracture surface.

It is probable that the fatigue cracks in the switch rod were caused by the front end of the right tongue rail lifting and hitting a U-shaped protrusion welded to the iron plate of the switch rod every time a train passed over the switch in the trailing direction[*6], striking the upper surface of the right switch rod against the bottom of the right stock rail.

The company had conducted penetration inspections[*7] on all switch rods during regular inspections, but because the paint on the switch rods was not removed during these inspections, the penetrant did not sufficiently penetrate the cracks, and the indicators of the cracks did not appear, making it likely that the cracks were not detected.

Regarding the home signal displaying a caution signal, normally, it should display a stop signal unless the switch's tongue rails on both sides are set to the default position[*8]. However, due to the broken switch rod, both tongue rails adhered to the stock rails. The switch involved in the incident lacked a circuit controller to detect the right tongue rail's adherence to the right stock rail. As a result, it is highly probable that it failed to detect this, only detecting the left tongue rail's adherence, leading the home signal to display a caution signal.

*3. "Spring switch machine" uses the rebound force of a spring and is typically set to the default position, which is the mainline direction. However, if a train approaches from the reverse direction (against the mainline direction, in this case, the down track), the train's wheels push the tongue rail to the reverse position. After the train passes, the spring force returns the tongue rail to the default position.

*4. "Switch rod" is a component that transmits the switching force from the switch machine to the tongue rail via a switch adjuster.

*5. The term "facing" refers to approaching the switch from the diverging side, which in this case means from Yokogawara Station toward Matsuyama City Station.

*6. The term "trailing" refers to approaching the switch from the converging side, which in this case means from Matsuyama City Station toward Yokogawara Station.

*7. "Penetration inspection," a color check, is a widely used surface inspection method in the industrial field. This non-destructive testing method involves applying a penetrant to detect surface-breaking flaws, followed by a developer to draw the penetrant out of the flaw for observation.

*8. The term "default position" refers to the direction in which the switch is normally set, which is the up track.

Safety actions

The switch rod is a critical component connecting both tongue rails. If it breaks, the tongue rails can no longer move in unison, creating a dangerous situation that can cause a train derailment. Therefore, it is crucial to prevent fatigue cracks in the switch rod and, if they occur, detect them early and perform appropriate maintenance before they lead to a complete break.

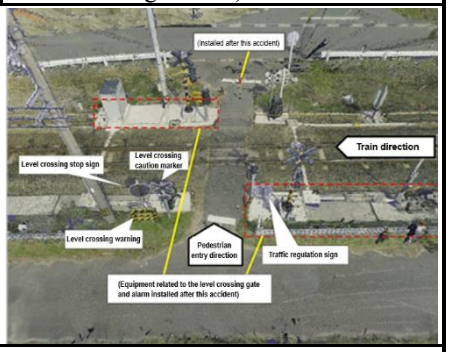
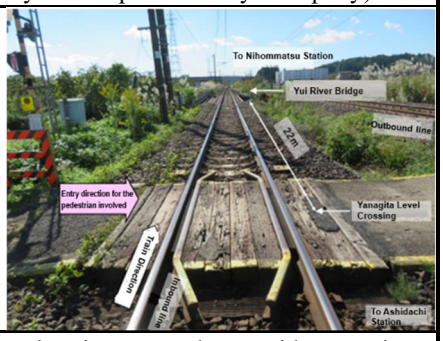
It is advisable to inspect the upper surface of the switch rod during regular inspections to prevent fatigue cracks. If contact marks with the bottom of the stock rail, such as a peeled black oxide scale, are observed, the cause of the contact must be analyzed, and appropriate measures implemented.

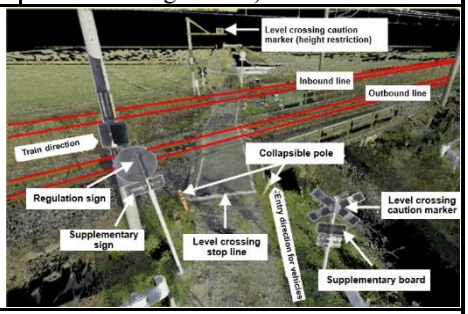
Additionally, to reliably detect fatigue cracks in the switch rod, it is essential to carefully observe the surface for cracks during regular inspections and conduct penetration inspections. During penetration inspections, proper pre-treatment, such as removing paint from the switch rod to ensure the penetrant seeps into any cracks, is necessary.

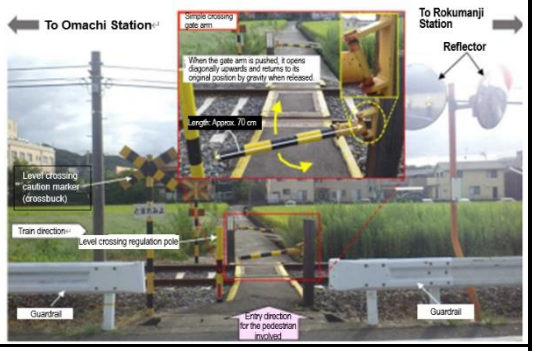
Report

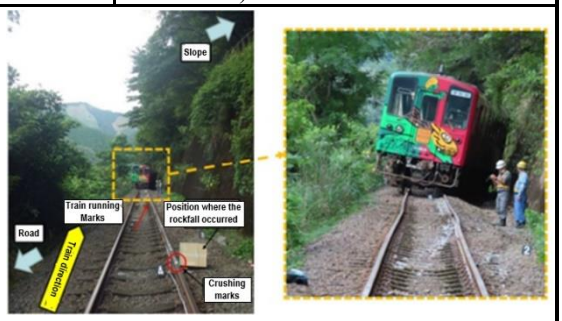
https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-3.pdf
(Japanese)

8	Date of publication	Date and accident type	Railway operator	Line section (location)
	June 29, 2023	September 26, 2022 Level crossing accident	West Japan Railway Company	Between Nakahama Station and Takamatsucho Station on the Sakai

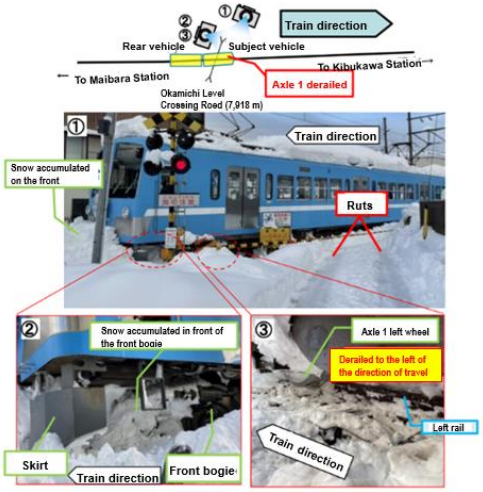
				Line (Tottori Prefecture) Araya 4th Crossing (Class 4 level crossing without crossing gate nor road warning device)
	Summary	The driver of the train, traveling at approximately 55 km/h between Nakahama Station and Takamatsucho Station, recognized a pedestrian entering Araya 4th Crossing (Class 4 level crossing) from the left side and immediately applied the emergency brake, but the train collided with the pedestrian. As a result of this accident, the pedestrian was killed.		
	Probable causes	It is certain that this accident occurred because the pedestrian entered Araya 4th Crossing (Class 4 level crossing without crossing gate nor road warning device) while the train was approaching, resulting in a collision. The reason for the pedestrian entering the crossing while the train was approaching could not be clarified as the person was deceased.		
	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-4.pdf (Japanese)		
9	Date of publication	Date and accident type	Railway operator	Line section (location)
	June 29, 2023	October 17, 2022 Level crossing accident	Japan Freight Railway Company	Between Adachi Station and Nihonmatsu Station on the Tohoku Line (Fukushima Prefecture) Yanagida Crossing (Class 3 level crossing without crossing gate, but with road warning device) (managed by East Japan Railway Company)
	Summary	The driver of the train, while traveling between Adachi Station and Nihonmatsu Station on the Tohoku Line managed by East Japan Railway Company, recognized a pedestrian entering Yanagida Crossing from the left side of the direction of travel and applied the emergency brake, but the train collided with the pedestrian. As a result of this accident, the pedestrian was killed.		
	Probable causes	It is certain that this accident occurred because the pedestrian entered Yanagida Crossing, Class 3 level crossing equipped with a road warning device, while the train was approaching and the warning device was active, resulting in a collision. The reason for the pedestrian entering the crossing while the warning device was active could not be clarified as the person was deceased.		
	Safety actions	It is desirable to abolish Class 3 level crossings without crossing gates. If abolition is impossible, crossing gates should be installed to upgrade them to Class 1 level crossings. Until abolition or upgrading to Class 1 level crossings is implemented, it is recommended to promote various safety measures for Class 3 level crossings, such as strengthening traffic regulations and installing warning signs.		
	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-1.pdf (Japanese)		
10	Date of publication	Date and accident type	Railway operator	Line section (location)

	June 29, 2023	October 31, 2022 Level crossing accident	Kyushu Railway Company	Between Saga Station and Igaya Station on the Nagasaki Line (Saga Prefecture) Ipponyanagi Crossing (Class 4 level crossing without crossing gate nor road warning device)
	Summary	While traveling between Saga Station and Igaya Station, the train driver recognized a car entering Ipponyanagi Crossing (Class 4 level crossing) from the right side and applied the emergency brake, sounding the horn, but the train collided with the car. As a result of this accident, the driver of the car was killed.		
	Probable causes	It is highly probable that this accident occurred because the car entered Ipponyanagi Crossing, Class 4 level crossing without crossing gate nor road warning device, just before the train, traveling at approximately 85 km/h, reached the crossing. The collision could not be avoided despite the train driver applying the emergency brake. It is probable that the car entered the crossing while the train was approaching because the driver did not notice the approaching train. It is possible that this was due to the driver not performing safety checks or being inaccurate. It is possible that the safety check was ultimately inaccurate, preventing the driver from noticing the approaching train. Several factors might have contributed to the difficulty in seeing the train if the driver of the vehicle had performed a safety check near the right-side entrance of the crossing: The crossing angle caused the train to approach from behind the vehicle, the train's direction nearly coincided with the sun's position, and if the safety check was brief, the vehicle's structure might have obstructed the view. However, the detailed reasons could not be clarified as the driver of the vehicle was deceased.		
	Safety actions	Class 4 level crossings without crossing gates nor road warning devices should be abolished or equipped with proper safety equipment. To prevent the recurrence of crossing accidents, it is crucial for crossing users to obey traffic laws, but fundamental measures are also important. After the accidents at Ipponyanagi Crossing in April 2021 and this incident, the company and Saga City proposed abolishing the crossing for residents. It held discussions, but no agreement had been reached as of January 2023. The company and the city should continue discussions using the Local Level Crossing Improvement Council and strive for early agreement and cooperation from residents. As an urgent and provisional measure, the company and the city should collaborate with the police and other authorities to conduct awareness campaigns for drivers to obey traffic laws and, where traffic regulation enforcement is difficult, to encourage avoiding the crossing. The company should continue measures such as laying weed control sheets, spraying herbicides, and mowing grass to ensure crossing users can easily notice approaching trains. On the other hand, crossing users should carefully perform safety checks and accurately grasp the situation.		
	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-2.pdf (Japanese)		
11	Date of publication	Date and accident type	Railway operator	Line section (location)
	July 27, 2023	September 20, 2022 Level crossing accident	TAKAMATSU-KOTOHIRA ELECTRIC RAILROAD Co., Ltd.	Between Omachi Station and Rokumanji Station on the Shido Line (Kagawa Prefecture) Nakadai 1st Crossing (Class 4 level crossing without crossing gate nor road warning device)

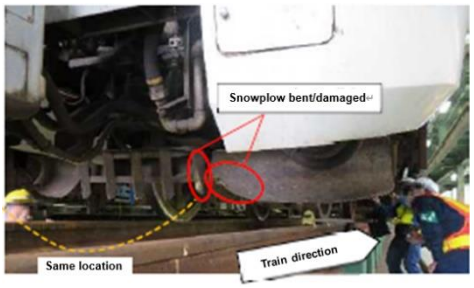
	Summary	The driver of the train, coasting at approximately 55 km/h between Omachi Station and Rokumanji Station, recognized a pedestrian entering Nakadai 1st Crossing from the right side, sounded the horn, and applied the emergency brake, but the train collided with the pedestrian. As a result of this accident, the pedestrian was killed. 
	Probable causes	It is certain that this accident occurred because the pedestrian entered Nakadai 1st Crossing (Class 4 level crossing without crossing gate nor road warning device) while the train was approaching, resulting in a collision. The reason for the pedestrian entering the crossing while the train was approaching is likely the pedestrian was crossing the crossing while looking at a mobile phone and did not notice the approaching train until just before the collision. However, the details could not be clarified as the pedestrian was deceased.
	Safety actions	Class 4 level crossings without crossing gates nor road warning devices should be abolished or upgraded to Class 1 level crossings. Since no discussions had been held about abolishing or upgrading this crossing to a Class 1 level crossing before this accident, the company and Takamatsu City need to conduct discussions to agree with residents and implement concrete measures to abolish or upgrade the crossing. Until concrete measures are implemented, the company and Takamatsu City should cooperate and promote various safety measures for Class 4 level crossings by installing warning signs and conducting awareness campaigns about the dangers of Class 4 level crossings.
	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-6-1.pdf (Japanese)

12	Date of publication	Date and accident type	Railway operator	Line section (location)
	August 25, 2023	August 25, 2022 Train derailment	Shikoku Railway Company	Between Hage Station and Ekawasaki Station on the Yodo Line (Kochi Prefecture)
	Summary	While the train was traveling at approximately 70 km/h on a straight section between Hage Station and Egawasaki Station, the driver saw a stone about 70 cm in size ahead and applied the emergency brake. However, the train collided with the stone and continued running for about 65 meters before stopping. After stopping, the driver inspected the train and found that all axles of the front bogie and the rear axle of the rear bogie had derailed. Five passengers and one driver were on the train, and one passenger was slightly injured. 
	Probable causes	It is highly probable that this accident occurred because the train collided with a stone that had fallen onto the tracks from the slope, causing the right wheel of the front axle of the front bogie to ride over the rail to the right and derail. It is possible that the stone fell from the slope due to the gradual weathering of the stones over time.
	Safety actions	(1) Removal of sediment accumulation and restoration of the tree utilization fence It is necessary to restore the tree utilization fence to a functional state by removing the accumulated sediment and repairing the fence to ensure its effective height. (2) New installation of a tree utilization fence If it is difficult to remove the sediment accumulation from the existing tree utilization fence, it is necessary to install a new tree utilization fence.

		(3) Raising the height of the rockfall prevention fence and rockfall detection wire The height of the rockfall prevention fence near the accident site was insufficient, so it is necessary to raise the height of the rockfall prevention fence and the position of the rockfall detection wire. (4) Inspection and measures for slopes similar to the accident site Based on this accident, the company should identify slopes along the tracks similar to the accident site that have tree utilization fences, rockfall prevention fences, or rockfall detection wires installed, inspect whether these facilities are functioning effectively, and take measures such as removing sediment accumulation or repairing the facilities to prevent accidents.		
	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-7-1.pdf (Japanese)		
13	Date of publication	Date and accident type	Railway operator	Line section (location)
	October 26, 2023	December 27, 2021 Train derailment	OHMI Railway Co., Ltd.	In the premises of Hikoneguchi Station, Main Line (Shiga Prefecture)
	Summary	Due to heavy snowfall, train operations were suspended between Hikone Station and Yokaichi Station. However, as the snow had stopped, this train departed from Hikone Station as a test run train before resuming operations. When the train was traveling at about 10 km/h through Okamichi Crossing, the driver heard an abnormal noise and applied the emergency brake to stop the train. After the train stopped, the staff got off and checked, finding that the first axle of the front bogie of the lead car had derailed to the left. One driver, four staff members responsible for clearing snow from the switches south of Takamiya Station, three drivers working at Yokaichi Station and other locations, and two station staff members were on board, but no one was injured.		
	Probable causes	It is possible that this accident occurred when the front bogie of the lead car swiveled to the left, reducing the wheel load on the front bogie, and the first axle of the front bogie rode up on the compacted snow on the rails and flange way[*1] of the crossing, leading to derailment. It is possible that the reduction in the wheel load on the front bogie of the lead car was caused by the accumulation of snow entering from both the lower and upper parts of the skirt, increasing the upward load on the front bogie of the lead car as the train pushed through a large amount of snow on the tracks. The front bogie of the lead car likely swiveled to the left due to the snow accumulating in front of the lead car and the front bogie pushing the front parts of the car body and bogie. A large amount of snow on the tracks is likely due to the snow that fell before the train's passage not melting due to low temperatures and heavy snowfall, in addition to the snow that remained on the tracks from the last train passage the previous day. It is possible that the compacted snow on the crossing was caused by vehicles repeatedly compacting the snow as they passed over the crossing between the last train passage the previous day and the train's passage under low temperatures and heavy snowfall. Additionally, the snow on the tracks and the compacted snow on the rails and flangeway of the crossing were not cleared before the train passed. It is probable that the decision to operate the train without a snowplow[*2]-equipped vehicle and without conducting snow removal have been based on the assumption by the Chief Safety Management Officer that the snow accumulation on the tracks and the compacted snow conditions at the crossing were similar to those on January 24, 2017, when the train had previously run without issues. However, it is highly probable that the snow accumulation and compacted snow conditions differed at the time of the accident. It is probable that the final decision on the necessity of snow removal and whether to operate the train was made based on		



<table>
<tr><td></td><td></td><td colspan="3">past experiences rather than the actual conditions at the time of the accident. Additionally, the company's internal regulations did not provide objective criteria or conditions for determining the necessity of snow removal, the use of snowplow-equipped vehicles, or the operation of trains under varying snow conditions. The company also did not check the compacted snow conditions at the crossings. This lack of objective standards and insufficient information gathering likely contributed to inadequate decision-making regarding snow removal and train operation.
*1. The "flangeway" refers to the space provided for the wheel flanges to pass through.
*2. The "snowplow" is a snow removal device attached to the lead car to clear snow from the tracks within the vehicle's clearance.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">Accurate information collection regarding snowfall, snow accumulation, and compacted snow conditions is necessary to clearly define objective criteria and conditions for determining the need for snow removal on the tracks and crossings, snowplow-equipped vehicles, and the feasibility of train operations.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-8-1.pdf
(Japanese)</td><td></td></tr>
<tr><td>14</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td></td><td>December 21, 2023</td><td>September 6, 2022
Train derailment</td><td>West Japan Railway Company</td><td>In the premises of Mukomachi Station on the Tokaido Line (Kyoto Prefecture)</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">The train departed from the departure track of the Mukomachi Station train depot (Kyoto Branch of the Suita General Rolling Stock Office). The driver did not notice that a wheel chock*1 was attached to the second axle of the rear bogie of the seventh car (cars are counted from the front, with front, back, left, and right based on the train's direction of travel). The train departed, and the wheel rode up on the wheel chock, leading to derailment. The derailed wheel subsequently rode over concrete blocks laid on the staff passage within the station premises, re-railing itself.
There were no passengers on the train, and one driver was on duty, who was not injured.

*1. "Wheel chock" is a wedge-shaped object between the wheel and rail to prevent the vehicle from moving when parked at a station or depot.
 
</td></tr>
<tr><td></td><td>Probable causes</td><td colspan="3">It is probable that this accident occurred because the train driver did not notice that a wheel chock was attached to the second axle of the rear bogie of the seventh car when the train departed. As a result, the wheel rode up on the wheel chock and derailed shortly afterward. The derailed wheel then rode over concrete blocks laid on the staff passage within the station premises, re-railing itself.
The train departed without the driver noticing the wheel chock attached to the second axle of the rear bogie of the seventh car because the yard driver had attached the wheel chock after the temporary coupling operation before departure. However, it is probable that the train and yard drivers did not communicate the wheel-chock attachment status. It is likely that a contributing factor to this lack of communication was the unclear confirmation procedures between the vehicle operation duty officer and the crew operation duty officer when planning and executing vehicle or crew operation changes or temporary yard work.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">It is probable that this accident occurred because the wheel chock handling and the implementation of the departure inspection were unclear when temporary work was performed, which led to the train departing with the wheel chock still attached. Therefore, it is necessary to establish a system that clarifies the items to be mutually confirmed by the relevant parties (the vehicle operation duty officer and the crew operation duty officer) to prevent omissions or discrepancies in the work content when planning and executing changes in vehicle or crew operations or temporary yard work.
Additionally, the company should implement necessary measures to prevent similar incidents in the future, considering that the wheel chock usage tag*2 did not function effectively during</td></tr>
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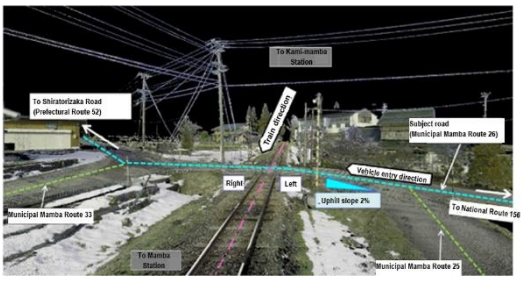
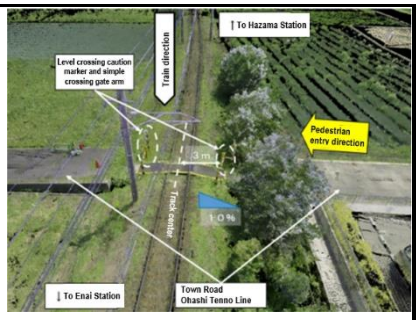
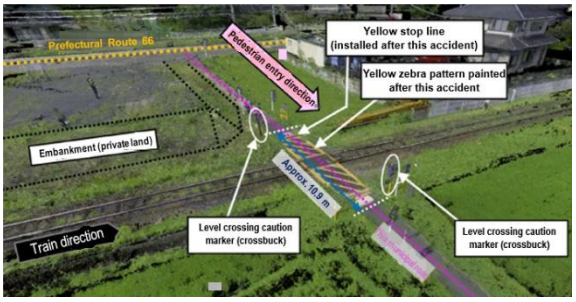
<table>
<tr><td></td><td></td><td colspan="3">this accident.

*2. The “wheel chock usage tag” is a tag placed on the master controller handle of the operating cab to indicate that a wheel chock is in use.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-2.pdf
(Japanese)</td><td></td></tr>
<tr><td rowspan="5">15</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>December 21, 2023</td><td>December 21, 2022
Level crossing accident</td><td>Nagaragawa Railway Co., Ltd.</td><td>Between Kamimamba Station and Mamba Station on the Etsumi-Nan Line (Gifu Prefecture)
Nakamamba Crossing (Class 3 level crossing without crossing gate, but with road warning device)</td></tr>
<tr><td>Summary</td><td colspan="3">The driver of the train, traveling at approximately 50 km/h between Kamimamba Station and Mamba Station, recognized a regular car entering Nakamamba Crossing (Class 3 level crossing) from the left side (based on the train’s direction of travel), sounded the horn, and applied the emergency brake, but the train collided with the car.
As a result of this accident, the driver of the car was killed.
 
</td></tr>
<tr><td>Probable causes</td><td colspan="3">It is higly probable that this accident occurred because the car entered Nakamamba Crossing, Class 3 level crossing equipped with a road warning device, while the train was approaching, leading to a collision between the train and the car.
The car likely entered the crossing while the train was approaching because the driver did not notice the approaching train, but the detailed reasons could not be clarified as the driver was deceased.</td></tr>
<tr><td>Safety actions</td><td colspan="3">This crossing is Class 3 level crossing without crossing gate, and it is desirable to abolish the crossing for safety improvement. If abolition is impossible, the crossing should be upgraded to Class 1 level crossing by installing crossing gates.
Until these safety measures are implemented, it is desirable to install highly visible red flashing lights that can be confirmed from all directions to ensure that crossing users can reliably recognize the operation of the road warning device when a train is approaching. Furthermore, the company and Gujo City should cooperate with the police and other authorities to conduct awareness campaigns and install warning signs to encourage crossing users to perform safety checks when crossing.</td></tr>
<tr><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-1.pdf
(Japanese)</td><td></td></tr>
<tr><td rowspan="2">16</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>December 21, 2023</td><td>March 2, 2023
Level crossing accident</td><td>TAKAMATSU-KOTOHIRA ELECTRIC RAILROAD Co., Ltd.</td><td>Between Hazama Station and Enai Station on the Kotohira Line (Kagawa Prefecture)
Shimomura-Kamisho Crossing (Class 4 level crossing without crossing gate nor road warning device)</td></tr>
</table>

	Summary	While the driver of the train was traveling at approximately 68 km/h between Hazama Station and Enai Station, they noticed a pedestrian entering Shimomura-Kamisho Crossing (Class 4 level crossing) from the left side (front, back, left, and right are based on the train's direction of travel). The driver immediately sounded the horn and applied the emergency brake, but the train collided with the pedestrian. As a result of this accident, the pedestrian was killed. 
	Probable causes	It is certain that this accident occurred because the pedestrian entered Shimomura-Kamisho Crossing, Class 4 level crossing without crossing gate nor road warning device, while the train was approaching, resulting in a collision. The reason for the pedestrian entering the crossing while the train was approaching, it is possible that the pedestrian did not check for the approaching train before entering the crossing. However, the detailed reasons could not be clarified as the pedestrian was deceased.
	Safety actions	The company and Manno Town should implement the planned upgrade of this crossing to a Class 1 level crossing as scheduled to improve the safety of this crossing. Additionally, since there are other Class 4 level crossings besides this one, the company and related parties from municipalities along the line should continue discussions to agree on abolishing or upgrading these Class 4 level crossings. Until concrete measures are implemented, the company and related parties from municipalities along the line should cooperate in promoting various safety measures for Class 4 level crossings, such as installing warning signs and conducting awareness campaigns about the dangers of Class 4 level crossings to encourage crossing users to perform safety checks.
	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-3.pdf (Japanese)

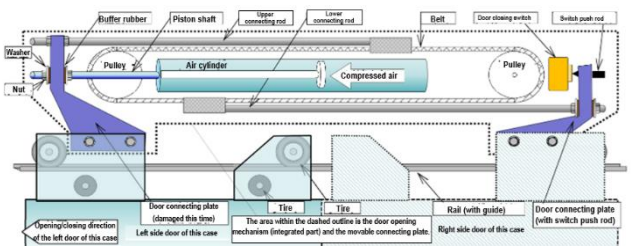
17	Date of publication	Date and accident type	Railway operator	Line section (location)
	December 21, 2023	April 10, 2023 Level crossing accident	WILLER TRAINS, Inc.	Between Shisho Station and Nishimaizuru Station on the Miyazu Line (Kyoto Prefecture) Shimoyuri Crossing (Class 4 level crossing without crossing gate nor road warning device) (managed by Kitakinki Tango Railway Co., Ltd.)

	Summary	While the driver of the train was traveling at approximately 70 km/h between Shisho Station and Nishimaizuru Station, they noticed a pedestrian in a handle-operated electric wheelchair[*1] entering Shimoyuri Crossing (Class 4 level crossing) from the left side (front, back, left, and right are based on the train's direction of travel). The driver applied the emergency brake and sounded the horn, but the train collided with the pedestrian.  As a result of this accident, the pedestrian was killed. *1. The "handle-operated electric wheelchair" refers to an electric wheelchair that can change direction using a handle and includes similar structures. Handle-operated electric wheelchairs are also known as "electric carts" or "senior cars" and are recognized as vehicles used by older people.
	Probable causes	It is highly probable that this accident occurred because the pedestrian in the handle-operated electric wheelchair (senior car) entered Shimoyuri Crossing, Class 4 level crossing without crossing gate nor road warning device, from the left side. At the same time, the train approached, leading to a collision. The pedestrian entered the crossing while the train was approaching, and it is possible that the pedestrian did not notice the approaching train when entering the crossing. Possible reasons

		include the pedestrian not stopping temporarily near the crossing warning sign and not performing safety checks. However, the detailed reasons could not be clarified as the pedestrian was deceased.	
	Safety actions	Abolishing Class 4 level crossings without crossing gates nor road warning devices to enhance safety is desirable. If abolition is impossible, they should be upgraded with safety equipment to become Class 1 level crossings. Given that a fatal accident occurred at this crossing in 2004 and there is an alternative route through Class 1 level crossing, the railway operator and road administrator should abolish this crossing for safety improvement. If abolition is not feasible, the crossing should be upgraded to Class 1 level crossing. Therefore, the railway operator and road administrator need to work on gaining the understanding and cooperation of crossing users and residents, establish a policy early, and implement concrete safety measures. Until concrete safety measures are implemented, the railway operator and road administrator should encourage the users to use the alternative Class 1 level crossing actively and promote safety measures such as installing warning signs and stop lines. Furthermore, considering this accident may have occurred because the pedestrian did not stop and perform a safety check, the railway operator and road administrator should raise awareness among crossing users to ensure that safety checks are performed when crossing.	
	Report	https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-4.pdf (Japanese)	

Published investigation report on a serious railway incident (2023)

1	Date of publication	Date and incident type	Railway operator	Line section (location)
	December 21, 2023	July 24, 2022 Dangerous trouble in vehicle	Enoshima Electric Railway Co., Ltd.	In the premises of Shonan-kaigan-koen Station on the Enoshima Electric Railway Line (Kanagawa Prefecture)
	Summary	The conductor of this train was informed by a passenger that a door was open just before arriving at Kugenuma Station. Upon checking inside the train, the conductor confirmed that one of the two-panel passenger doors (each panel sliding in opposite directions) at the front right side of the rear car (based on the train's direction of travel) was open. The conductor reported this to the train driver after stopping. The train driver reported the situation to the operations control center, restricted passenger access to the affected car, and continued the commercial operation of the train in the order of Fujisawa Station, Kamakura Station, and finally, Gokurakuji Station, where the train was taken to the depot. The train had approximately 50 passengers and two crew members (one driver and one conductor) on board, but there were no injuries from falling, etc. Subsequent investigation revealed that the door was also open at Shonan-kaigan-koen Station just before the incident was discovered. However, the door status indicator light*1 was off, and the train departed with the door open. *1. The "door status indicator light" is a light that informs crew members of the door's open/close status. One is installed on outside of left and right of each car, and it lights up on the side where any door is open.		
	Probable causes	It is certain that this serious incident occurred because the door coupling plate on one side of the two-panel passenger door broke, causing the door to remain open while the train was running. It is certain that the train ran with one door open because the door coupling plate on the other door, functioning normally, pressed the door-close switch, detecting the door as closed. It is probable that the breakage of the door coupling plate was caused by fatigue failure due		



		to repeated stress on the welded area near the stress concentration from the opening and closing of the two-panel door. Additionally, the damage to the door coupling plate was not discovered until it broke, more likely due to the insufficient inspection of the door coupling plate during regular inspections, such as not opening the inspection cover above the passenger door for inspection. Furthermore, regarding the fact that the open door was not noticed until a passenger reported it while the train was running, it is more likely related to the continuation of operations without taking appropriate measures, despite multiple unexplained door operation abnormalities being confirmed at several stations before this serious incident occurred.	
	Safety actions	The company needs to ensure thorough inspections of the door coupling plates on the same type of vehicles, considering the possibility of fatigue failure due to the opening and closing of passenger doors. Additionally, as observed in this incident, the company should review and update the operational handling standards to account for failures on one side of the two-panel door.	
	Report	https://www.mlit.go.jp/jtsb/railway/rep-inci/RI2023-1-1.pdf (Japanese)	

7 Provision of factual information in 2023 (railway accidents and serious incidents)

The JTSB provided no factual information in 2023.

Column

Utilization of Drones and 3D Scanners in Railway Accident Investigation

Railway Accident Investigators

Railways that run through mountainous areas can sometimes experience derailment accidents caused by landslides from the slopes beside the tracks, especially after heavy rain. These landslides can flow onto the tracks, causing trains to run over the debris and derail. Investigating such accidents is challenging due to the narrow and often extensive areas of collapsed slopes, making it difficult to grasp the entire terrain of the site. An accurate understanding of the terrain is crucial for improving analysis accuracy.

In the investigation of the train derailment accident on June 2, 2023, on the Tosa Kuroshio Railway, drones and 3D scanners were used to recreate a 3D model of the site's terrain, including the collapsed slopes.

In accident investigations, drones and 3D scanners are differentiated based on their capabilities. 3D scanners capture images from the ground, which means they cannot capture narrow, inaccessible areas or shadows of objects.

In contrast, drones can capture images from the air, allowing them to photograph areas that 3D scanners cannot reach. Additionally, 3D scanners directly measure objects in three dimensions, whereas drones require converting captured 2D images into 3D models using software.

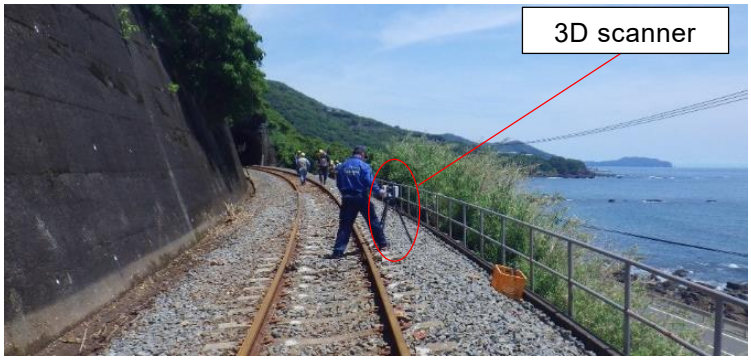
Given the distinct characteristics of drones and 3D scanners, it is necessary to combine these technologies.

We will strive to produce objective and scientific investigation reports using drones and 3D scanners for advanced analysis.

Drone

Drone footage in progress

3D scanner



3D scanner footage in progress

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.

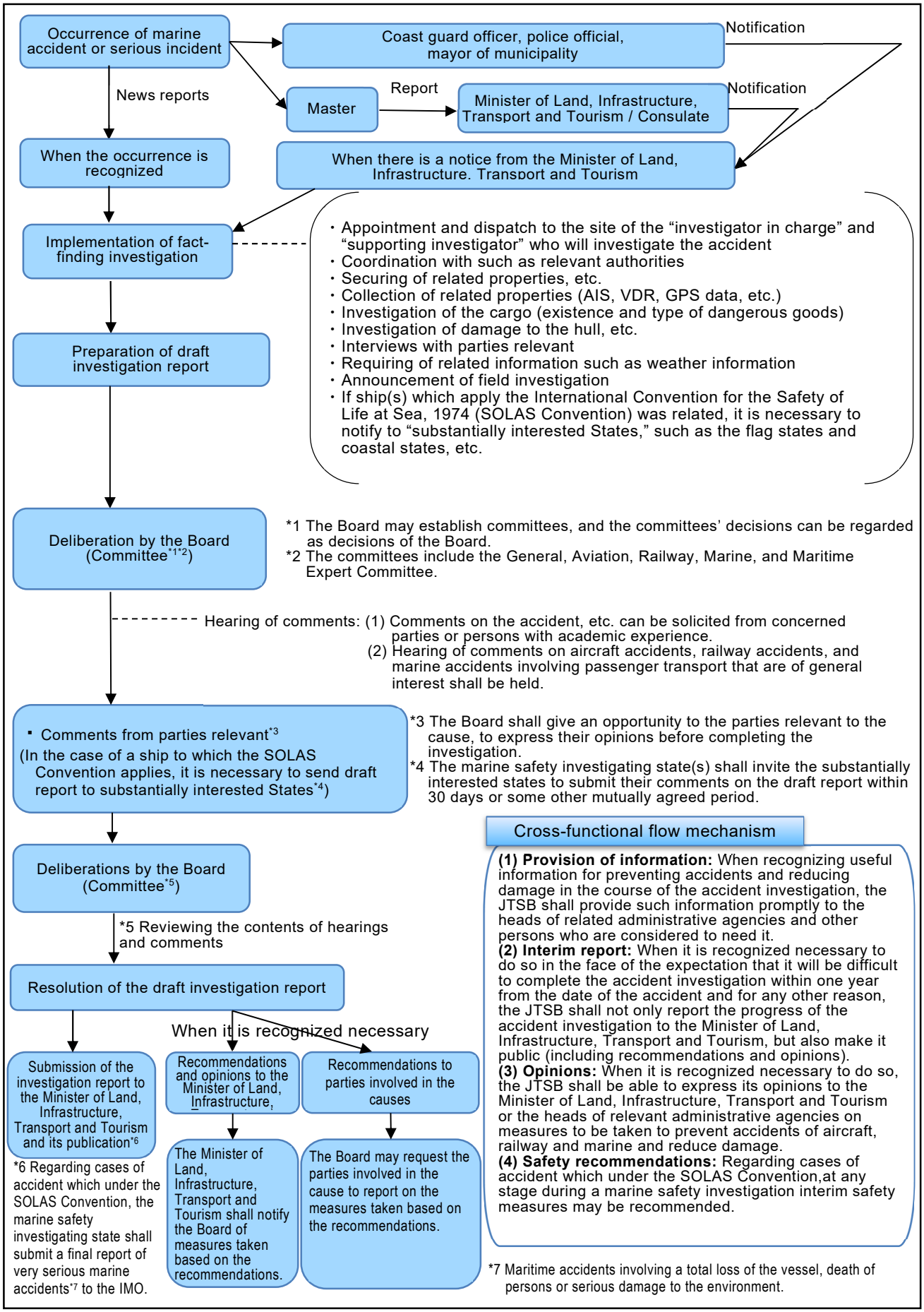
○Article 5 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board

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.

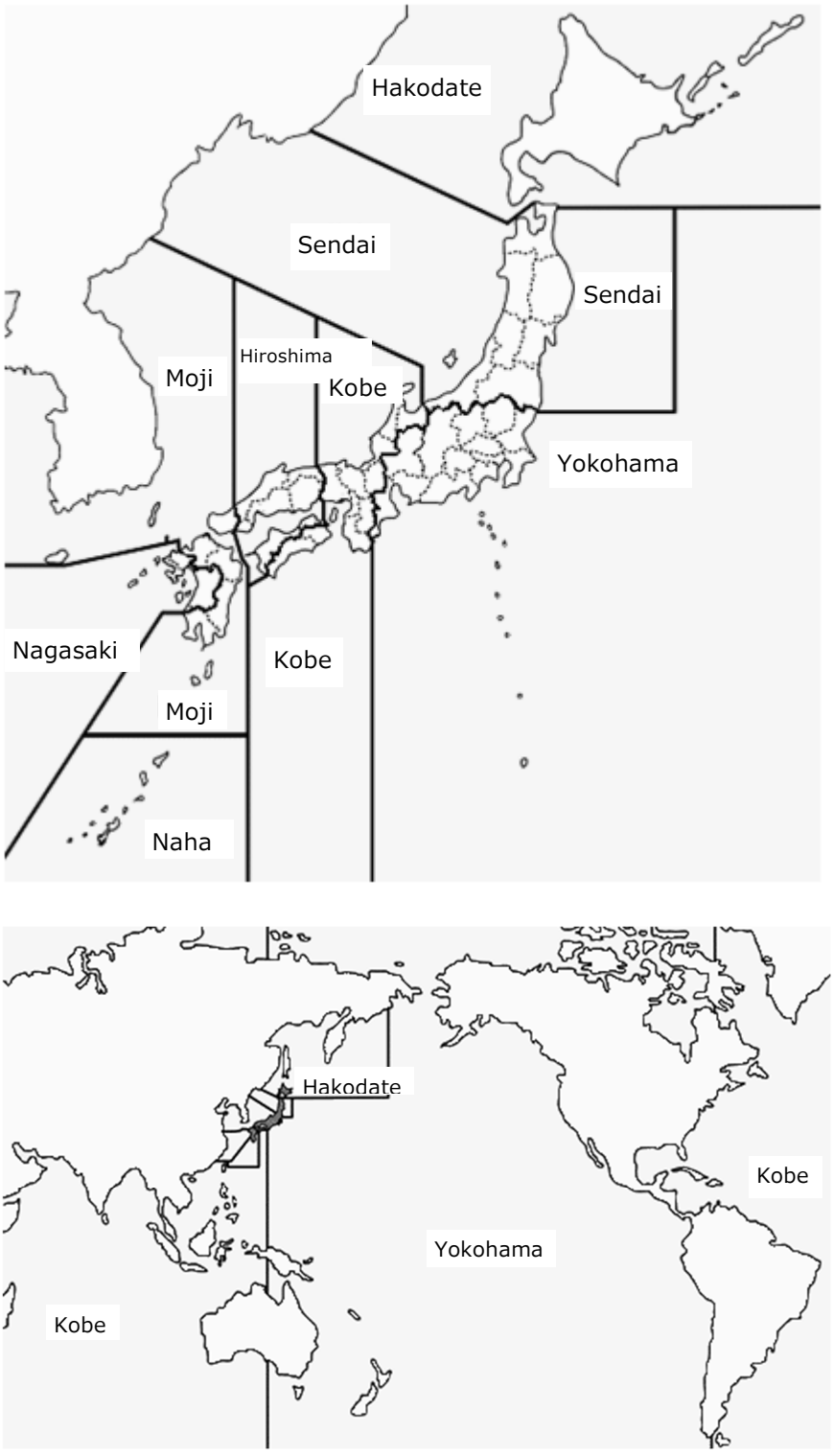
*1 The General Committee is responsible for matters related to the following particularly serious accidents (aircraft accidents, railway accidents, and marine accidents, excluding those deliberated by the Aircraft Committee, the Railway Committee, the Marine Committee, and the Maritime Expert Committee) 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).

<table>
<tr><td>Serious marine accidents and incidents</td><td>Office in charge of investigation: Marine accident investigators in the Headquarters
Committee in charge of deliberation and adoption: Marine Committee</td></tr>
<tr><td colspan="2">Definition of "serious marine accidents and incidents" (Article 9, Ordinance on Organization of Secretariat of the Japan Transport Safety Board)
・accident involving two or more passengers killed, missing or seriously injured
・accident involving five or more persons killed or missing
・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.
*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.
・accident which caused a serious impact on environment by spilling of oil, etc.
・marine accident, etc. or a marine accident as a result of which any unprecedented damage has arisen
・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
a) accident which had particularly serious influence on the society
b) accident the identification of the cause of which is extremely difficult; and
c) accident which would teach an important lesson for prevention of marine accident, etc. and for alleviating damage in the cases where marine accident takes place.</td></tr>
<tr><td>Marine accidents and incidents</td><td>Office in charge of investigation: Regional investigators in the regional offices
Committee in charge of deliberation and adoption: Maritime Expert Committee</td></tr>
</table>

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)
Total	817	816	-12	0	1,621	860	(0)	(0)	(1)	761	(4)

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.

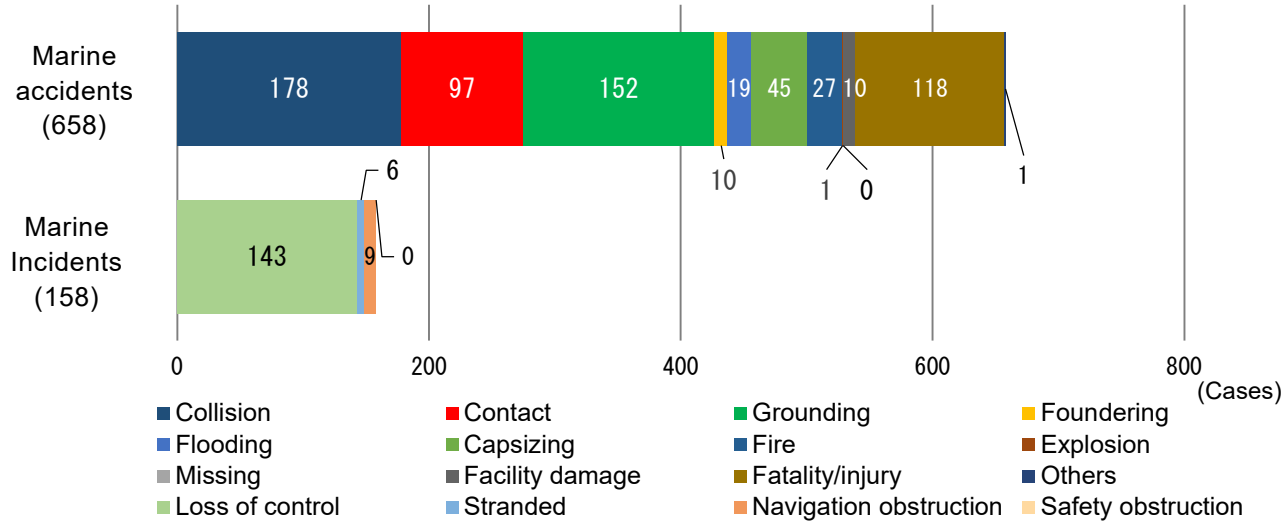
Note 3: The column “Transferred to Tokyo Office” shows the number of cases where the investigation found out that it was serious and the jurisdiction was transferred from the regional office to the Tokyo Office.

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.

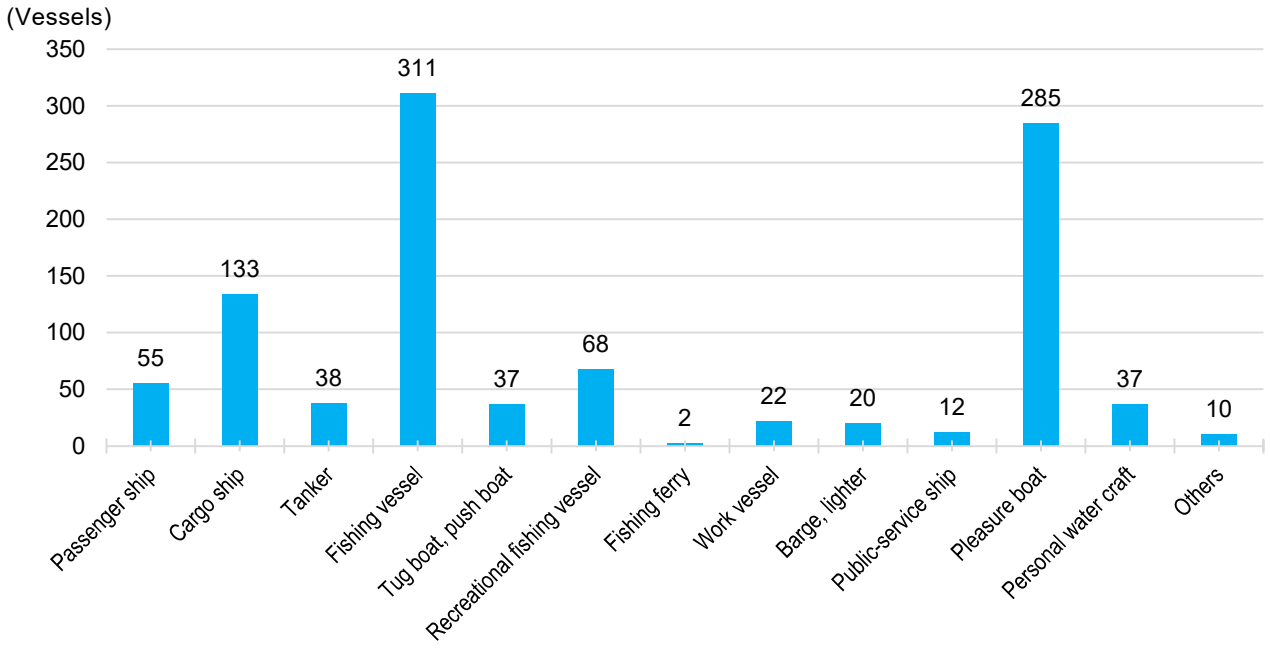
Number of investigated marine accidents and incidents by type in 2023



(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	Date and location	Vessel type and name, accident type
	January 24, 2023 Off the coast of Hama Island, Taketomi Town, Okinawa Prefecture	Cargo ship XIN HAI ZHOU 2 Grounding
	Summary	The vessel ran aground off the coast of Hama Island, Taketomi Town, Okinawa Prefecture.
2	Date and location	Vessel type and name, accident type
	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
	Summary	While heading to the fishing grounds, Vessel A collided with Vessel B, which was returning from a recreational fishing trip.
3	Date and location	Vessel type and name, accident type
	March 28, 2023 Katsura River, Kameoka City, Kyoto Prefecture	Passenger ship No. 9 Capsizing
	Summary	While descending the river, the vessel struck a rock and capsized. Two skippers on board died.
4	Date and location	Vessel type and name, accident type
	April 2, 2023 Off the south coast of Toga Lighthouse, Oga City, Akita Prefecture	Recreational fishing vessel KIMIMARU Fatality
	Summary	During a fishing trip, one angler fell overboard and died.
5	Date and location	Vessel type and name, accident type
	April 12, 2023 Inside the canal at Huis Ten Bosch Town, Sasebo City, Nagasaki Prefecture	Sightseeing boat DELFT Fatality
	Summary	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	Date and location	Vessel type and name, accident type
	May 7, 2023 Off the south coast of Kudaka Island, Nanjo City, Okinawa Prefecture	Recreational fishing vessel SEISHOMARU Injury
	Summary	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	Date and location	Vessel type and name, accident type
	August 24, 2023 Kii Channel	Container ship CONTSHIP UNO (Vessel A) Cargo ship IZUMIMARU (Vessel B) Collision
	Summary	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	Date and location	Vessel type and name, accident type

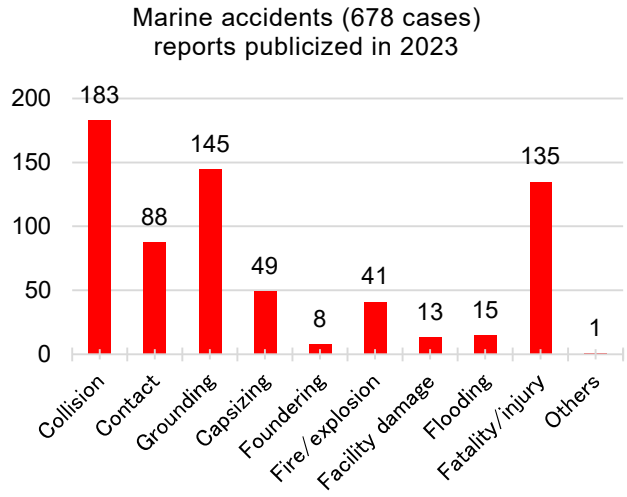
	September 21, 2023 Tokuyama-Kudamatsu Port, Kudamatsu City, Yamaguchi Prefecture	Coal carrier ENERGIA CENTAURUS Fatality
	Summary	While docked, a crew member was crushed between a moving crane and a pillar, resulting in death by asphyxiation.
9	Date and location	Vessel type and name, accident type
	November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

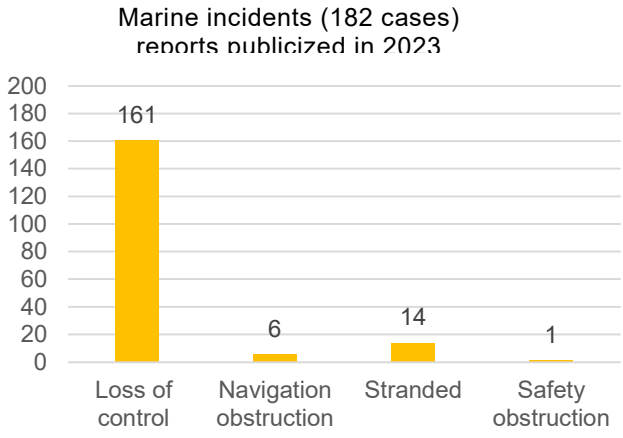
8 Publication of investigation reports

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

(Vessels)

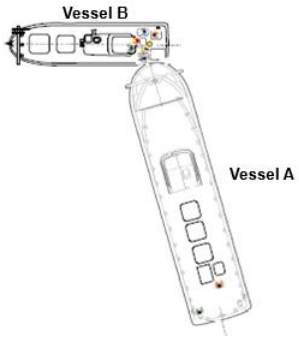
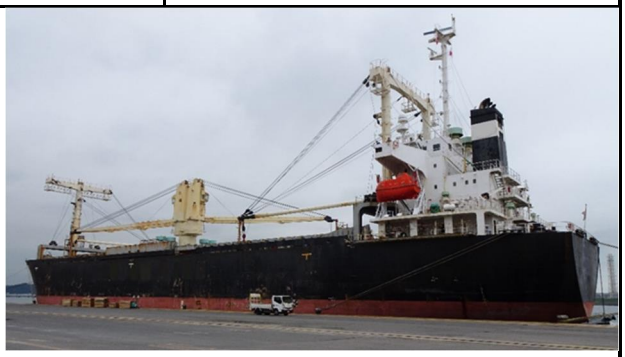
Classification	Passenger ship	Cargo ship	Tanker	Fishing vessel	Tug boat, Push boat	Recreational fishing vessel	Fishing ferry	Work vessel	Barge, lighter	Public-service ship	Pleasure boat	Personal water craft	Others	Total
Marine accident	45	102	38	294	27	52	3	24	15	12	228	60	13	913
Marine incident	10	11	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

<table>
<tr><td rowspan="5">1</td><td>Date of publication</td><td>Date and location</td><td colspan="2">Vessel type and name, accident type</td></tr>
<tr><td>January 19, 2023</td><td>February 16, 2020
Kashima Port, Ibaraki Prefecture</td><td colspan="2">Recreational fishing vessel
No.27 SAKURAIMARU
Contact (with breakwater)</td></tr>
<tr><td>Summary</td><td colspan="3">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.
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.
  </td></tr>
<tr><td>Probable causes</td><td colspan="3">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.
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.</td></tr>
<tr><td>Safety actions</td><td colspan="3">The following measures are necessary to prevent the recurrence of similar accidents:
(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.
(2) Masters should decelerate as much as possible when entering the port, considering the channel’s wave conditions.
(3) Masters should station deckhands at the bow for lookout duties when entering the port.
(4) Masters operating vessels with blind spots should use navigational instruments such as radar and GPS plotters to verify the vessel’s position.
(5) Shipowners should prioritize visibility from the bow as much as possible in designing and constructing new vessels.</td></tr>
<tr><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-1_2020tk0001.pdf (Japanese)</td><td></td></tr>
<tr><td rowspan="2">2</td><td>Date of publication</td><td>Date and location</td><td colspan="2">Vessel type and name, accident type</td></tr>
<tr><td>January 19, 2023</td><td>November 19, 2020
Off northwest of Wasa Island, Sakaide City, Kagawa Prefecture</td><td colspan="2">Passenger ship SHRIMP OF ART
Grounding</td></tr>
</table>

	Summary	The vessel, which had the master, one deckhand, and 60 passengers on board, ran aground on a drying rock[*1] while navigating off the northwest coast of Wasa Island, Sakaide City, Kagawa Prefecture. The vessel sinked, injuring four passengers, after suffering a breach in the outer bottom plate and flooding. *1. The "drying rock" is a rock that submerges at high tide and becomes exposed at low tide. 	
	Probable causes	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. 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[*2] 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. 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. 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. *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.	
	Safety actions	The following measures are necessary to prevent the recurrence of similar accidents: (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. (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. (3) If a waterway survey of the planned navigation area has not been conducted in advance, masters should not change the planned route impulsively. (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. (5) Domestic irregular route passenger transport operators must keep charts marked with hazard lines as specified in the reported safety management regulations on board. (6) Safety managers must regularly conduct safety education on safety management regulations and related laws for employees of their company.	
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-3_2020tk0012.pdf (Japanese)	
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	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. 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.	
	Probable causes	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. 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. 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. 	
	Safety actions	The following measures can help prevent similar accidents: • Masters should always maintain proper lookout and awareness of other vessels while navigating without focusing solely on preparatory work. • 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. • When observing multiple vessel lights, masters should accurately track vessel movements by considering navigation lights as well as mast lights. • Fishing and recreational fishing vessels operating at night should be equipped with radar and simplified AIS to monitor other vessels.	
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-1-2_2021tk0008.pdf (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	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. 	
	Probable causes	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	

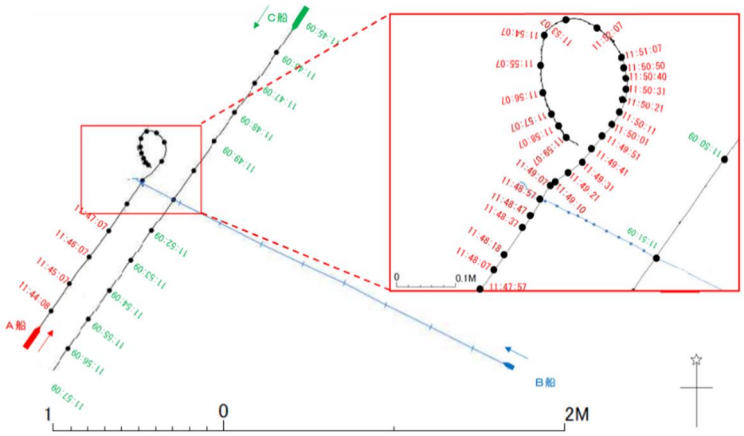
		unloading area, the chain sling (hereinafter referred to as "the chain sling") holding the front gooseneck part of a semi-trailer (hereinafter referred to as "the front part") broke, causing the trucks to tilt to the port side and fall, hitting two welders. The chain sling in question likely had an insufficient maximum working load[*1] 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[*2]. 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. 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. 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. *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.
	Safety actions	The following measures are suggested to prevent the recurrence of similar accidents: • 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. • 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. • 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: ① Work plan (schedule) ② Work procedures ③ Work methods ④ Confirmation of communication methods • Communication between workers during loading/unloading operations should be ensured using portable radios and visual signals such as hand gestures and flags. • The work supervisor should confirm that there are no workers in the cargo's path before instructing the crane operator to move the cargo.
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-3-1_2020tk0005.pdf (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	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. 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.	
	Probable causes	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*1 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. 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. 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. 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. *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.	
	Safety actions	The following measures should be taken to prevent the recurrence of similar accidents and mitigate damage: (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. (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. (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. (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. (5) Crew members of recreational fishing vessels should, even when they notice that their	

		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. (6) High-sided vessels with a small crew should equip ladders or other means to rescue anyone who falls overboard effectively.	
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-4-2_2020tk0002.pdf (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	An explosion occurred lower part of the upper deck while the vessel prepared to depart for a sightseeing trip. 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. 	
	Probable causes	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*1 and was ignited by an electric spark, causing the explosion. 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. 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. *1. “Explosive range” refers to the concentration range of combustible vapor and air that can support combustion.	
	Safety actions	The following measures should be considered to prevent the recurrence of similar accidents and mitigate damage: • 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. • Masters should regularly inspect for looseness in the oil-resistant hoses connected to the fuel oil tank and tighten the hose clamps, as necessary. • Masters should consider attaching supports to the oil-resistant hoses to prevent excessive load on the connections. • Masters should equip portable fire extinguishers on board.	
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-4-1_2021tk0004.pdf (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	Vessel A was heading south towards the fishing grounds, and Vessel B was drifting for recreational fishing when the two vessels collided. 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.	
	Probable causes	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. 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. 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.	
	Safety actions	The following measures should be considered to prevent the recurrence of similar accidents: • Masters or other watchkeepers should constantly watch out while navigating and avoid being distracted by specific tasks, focusing on steering. • 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. • Masters or other watchkeepers should confirm the approach of other vessels by switching radar ranges appropriately in addition to visual observation.	
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-6-1_2021tk0005.pdf (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	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.	
	Probable causes	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.	

<table>
<tr><td></td><td>Safety actions</td><td colspan="3">The following measures should be considered to prevent the recurrence of similar accidents and mitigate damage:
• 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.
• 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.
• Recreational fishing vessel operators should ensure the safety of the anglers by warning them against excessive drinking.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-6-2_2022tk0004.pdf (Japanese)</td><td></td></tr>
<tr><td>9</td><td>Date of publication</td><td>Date and location</td><td colspan="2">Vessel type and name, accident type</td></tr>
<tr><td></td><td>July 27, 2023</td><td>February 23, 2021
Off the southeast of Katakai Fishing Port, Kujukuri Town, Chiba Prefecture</td><td colspan="2">Cargo ship ASAHIMARU (Vessel A)
Recreational fishing vessel No.3 SHOICHIMARU (Vessel B)
Collision</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">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.
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.</td></tr>
<tr><td></td><td>Probable causes</td><td colspan="3">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.
 
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.
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.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">The following measures should be considered to prevent the recurrence of similar accidents and mitigate damage:
• 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[*1] functions to maintain a proper lookout.
• 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</td></tr>
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<table>
<tr><td></td><td></td><td colspan="3">change in the course and speed of approaching vessels.
• 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.

*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.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-7-1_2021tk0002.pdf (Japanese)</td><td></td></tr>
<tr><td>10</td><td>Date of publication</td><td>Date and location</td><td colspan="2">Vessel type and name, accident type</td></tr>
<tr><td></td><td>August 31, 2023</td><td>March 21, 2022
Location unknown (The vessel was found on fire at approximately 145° true bearing, 106 nautical miles from Tanegashima Lighthouse)</td><td colspan="2">Fishing vessel No.5 JUICHIYUJIN MARU
Fire</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">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.
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.</td></tr>
<tr><td></td><td>Probable causes</td><td colspan="3">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.
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.
Furthermore, it is possible that the lack of adequate fire drills and training before this accident contributed to the severity of the damage.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">The following measures should be considered to mitigate the damage from similar accidents involving small fishing vessels:
(1) Fire drills and training
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).
② If a fire occurs, crew members should engage in firefighting activities to prevent or delay the spread of the fire to the vessel.
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.
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.
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.
⑤ Shipowners should monitor the implementation of drills as stipulated by the Seafarers Act Enforcement Regulations and ensure they are carried out appropriately.
(2) Installation of smoke detectors and emergency bells:
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.
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</td></tr>
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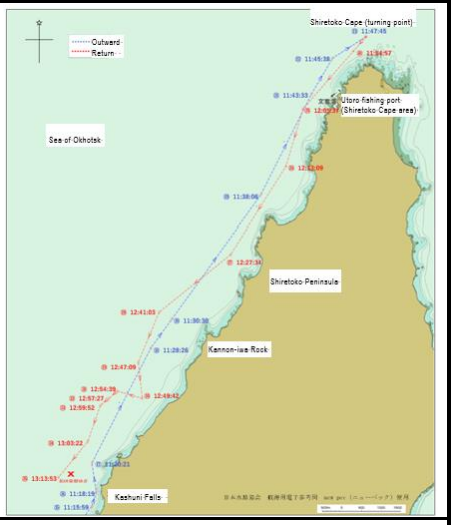
		early. *1. The “radar transponder” is a device that automatically responds to radar signals transmitted by patrol boats or aircraft during a search, indicating the distress position. *2. The “Emergency Position Indicating Radio Beacon (EPIRB)” is a satellite-based radio buoy system that transmits distress signals when activated. It automatically floats and activates when the vessel sinks due to a water pressure sensor.	
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-8-1_2022tk0002.pdf (Japanese)	
11	Date of publication	Date and location	Vessel type and name, accident type
	September 7, 2023	April 23, 2022 Off the western coast of the Shiretoko Peninsula near Kashuni Falls, Hokkaido	Passenger ship KAZU I Foundering
	Summary	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. As a result of this accident, 18 passengers, the master, and the deckhand died, and six passengers were missing.	
	Probable causes	(1) Probable causes of the accident 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 forward 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. 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. 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. 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. 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. Moreover, the vessel continued operating without stopping after departure because the master lacked the necessary knowledge and experience regarding the weather and sea	

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.

The vessel's lack of effective communication was partly due to the JCI's[*3] approval of a KDDI Corporation mobile phone with limited coverage on the western side of the Shiretoko Peninsula as the vessel's communication equipment.

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.

(2) Probable causes of human casualties

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[*4] and the inability to hold their breath, causing them to ingest seawater and die from seawater drowning[*5]. The six missing passengers have not been found, likely due to being swept away in rough sea conditions.

*1. "Buoyancy" refers to the force that lifts the vessel upwards when submerged to the upper deck.

*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)."

*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.

*4. "Accidental hypothermia" refers to a life-threatening condition where the body's core temperature drops significantly due to exposure to cold.

*5. "Seawater drowning" refers to drowning caused by seawater entering the airways.

Safety actions

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.

(1) Vessel's structure and equipment

① Hatches

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.

② Bulkheads

The Maritime Bureau of the Ministry of Land, Infrastructure, Transport, and Tourism should consider safety standards requiring watertight bulkheads to prevent the spread of

flooding and the vessel's foundering.

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.

(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.

(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.

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.

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.

(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[*6] 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.

(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.

*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.

	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-9-1_2022tk0003.pdf (Japanese)	
12	Date of publication	Date and location	Vessel type and name, accident type

	September 28, 2023	July 25, 2020 Shallows off the southeast coast of the island of Mauritius, Republic of Mauritius	Cargo Ship WAKASHIO Grounding
	Summary	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. Although there were no fatalities or injuries to the crew, the Vessel's hull buckled*1 and sustained other damage and, subsequently, fuel oil spilled from a rupture caused by the occurrence and spreading of cracks that resulted from the buckling, contaminating the southeastern coast of the island.  *Photo taken on August 15, 2020 *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.	
	Probable causes	(1) Probable causes of the accident 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. 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. 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. 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. (2) Probable Cause of the Damage (Release of Fuel Oil) 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. 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.	
	Safety actions	Crew members must implement the following measures to prevent the occurrence of a similar accident. (1) Crew members must not engage in any unsafe behaviors, such as approaching the shore,	

		etc., for personal reasons. (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. (3) Masters must station bridge watchkeepers with the proper personnel.	
	Report	https://www.mlit.go.jp/jtsb/ship/rep-acci/2023/MA2023-10-1_2020tk0010.pdf (Japanese) https://www.mlit.go.jp/jtsb/eng-mar_report/2023/2020tk0010e.pdf (English)	

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.

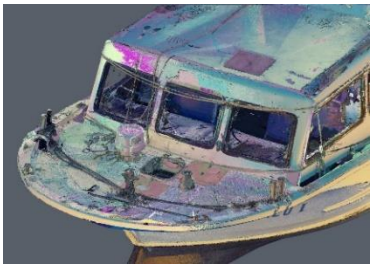
Stationary 3D scanner

Handheld 3D scanner

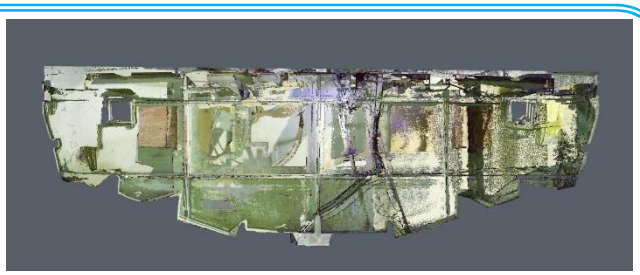
To accurately recreate the shape, it was necessary to obtain as many coordinate points as possible without blind spots (areas not hit by the laser). During the hull investigation of the “KAZU I,” the two types of equipment were used according to the target objects, such as the narrow interior and engine 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.

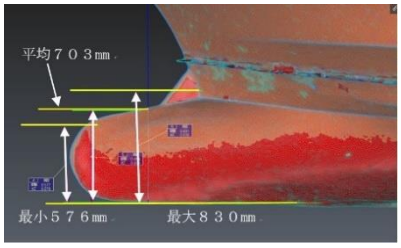
The investigation report on the foundering of the “KAZU I” includes several images of this 3D models. Here is one example.



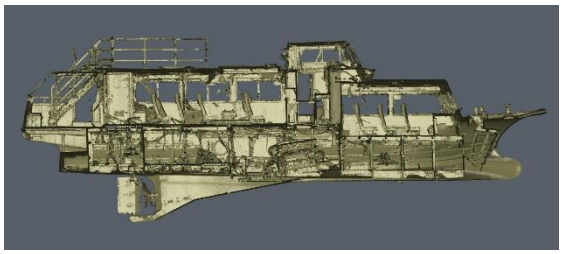
Confirming the shape of the curved deck and the height relationship between the bow hatch and the gunwale



Reproducing interior bulkheads that cannot be photographed entirely due to structures



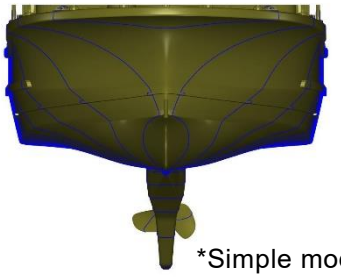
Estimating the draft at the time of the accident



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.

Chapter 6 Information dissemination for accident

1 Information dissemination for accident prevention

The JTSB prepares and issues various publications and individual reports regarding specific cases to better understand the efforts to prevent recurrence and contribute to accident prevention.

We place these publications on our website and, in order to make them more accessible to the public, we also introduce them through our JTSB E-Mail Magazine service (only available in Japanese).

The e-mail magazine distribution service is being used by people, including aviation, railway, and shiprelated businesses, government agencies, and educational and research institutions.

Moreover, from FY2020 to FY2022, we are exchanging opinions with business operators and other parties regarding how the JTSB should disseminate its information and an effective and appropriate dissemination method. Also in the future, we will make improvements based on opinions we receive.

2 Issuance of the JTSB Digest

With the aim of fostering awareness of safety, and preventing similar accidents from occurring, we issue “JTSB Digests.” This publication introduces you to statistics-based analyses and must-know cases of accidents.

We also issue the English version of “JTSB Digests” as part of our efforts to disseminate information overseas.

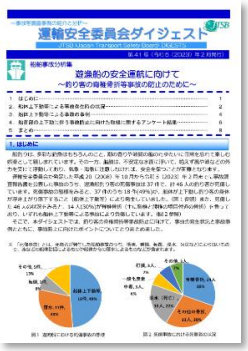
In 2023, we released four issues of "JTSB Digest" (February, August and September: Issue Nos. 40 to 43).

(1) JTSB Digest No. 40 [Digest of Marine Accident Analyses] "For Prevention of Accidents Caused by Dozing Watchkeepers on Cargo ships and Tankers" (issued on February 14, 2023)

This issue introduces the occurrence and case studies of drowsy navigation that can lead directly to dangerous maritime accidents such as grounding or collision due to negligence in the lookout. If such accidents occur, they may develop into serious accidents causing damage to coastal areas, such as oil spills from cargo ships or tankers.

- Statistics on accidents caused by dozing
- Case studies of accidents caused by dozing
- Column "Inattention is not a cause but a consequence: Chronic sleep deprivation doesn't prevent dozing!" etc.

(2) JTSB Digest No. 41 [Digest of Marine Accident Analyses] "Safe navigation of recreational fishing vessels For prevention of accidents involving vertebral fractures of anglers" (issued on February 16, 2023)



Due to the frequent occurrence of accidents where passengers on recreational fishing vessels suffer spinal fractures and other injuries caused by the vertical movement of the boats or falling overboard, this issue introduces the occurrence and case studies of such accidents, along with key points for preventing these accidents.

- Situations where accidents occurred due to pitching
- Cases of accidents due to pitching
- Questionnaire survey results on initiatives to prevent accidents due to pitching of the bow, etc.

(3) JTSB Digest No. 42 [Digests of Aircraft Accident Analysis] "For Prevention of Accidents of Small Aircraft —Do you know flight data monitoring device (FDM)?" (issued on August 29, 2023)

This issue features flight data monitoring (FDM) devices that can record information such as an aircraft's position, altitude, and other data during the flight, as well as audio and video from the cockpit. It introduces how the information obtained from FDM can contribute to safe operations by improving pilots' skills and managing risks in daily operations. It also explains how equipping many aircraft with FDM can enhance the availability of objective flight information, thus contributing to the prevention of accident recurrence.

- Data of recent aircraft accidents
- What is a flight data monitoring device (FDM)?
- Utilization of information stored in FDM by operators for safe operations
- Importance of objective information in terms of accident investigations
- Usefulness of information in accident analysis
- Trends of overseas investigation authorities

This Digest was introduced in aviation industry newspapers and quarterly magazines promoting the safe operation of small aircraft.

(4) JTSB Digest No. 43 [Digests of Analyses of Railway Accidents] “Accident Prevention Measure in Local Railway (issued on September 26, 2023)

Regarding local railways as an essential means of transportation for residents, this issue shows that many train derailments are caused by factors related to the maintenance conditions of tracks and other ground facilities. Additionally, it highlights that measures such as abolishing the crossings are often not taken after level crossing accidents at class 3 and class 4 level crossings. The “JTSB Digest” analyzes each issue, introducing case studies and technical support systems, and discusses accident characteristics, current problems, and necessary safety measures.

- Status of occurrence of accidents and necessary safety measures
- Cases of the accident investigations (train derailment accident caused by track)
- Cases of the accident investigations (Level crossing accidents at the class 3 and class 4 level crossings)
- Introduction of the support systems to prevent accidents

This Digest was featured in industry newspapers related to transportation.

[Link to the page featuring the “JTSB Digests”]

https://www.mlit.go.jp/jtsb/bunseki-kankoubutu/jtsbdigests/jtsbdi_backnumber.html

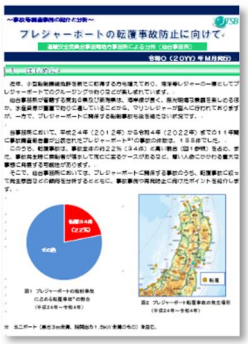
https://www.mlit.go.jp/jtsb/jtsbdigests_e.html

3 Issuance of the Analysis Digest Local Office Edition

The JTSB has issued the analysis digest in the local office edition (only available in Japanese). It has issued this publication to provide various kinds of information to help prevent marine accidents. The information is based on the analyses made by our regional offices and relates to specific accidents that occurred in their respective jurisdictions. This information focuses on cases with characteristic features such as the sea area, vessel type, and accident type.

(Analysis Digest Local Office Edition in 2023)

Sendai	Preventing capsizing accidents of pleasure boats (Main contents) ・The occurrence of capsizing accidents ・Causes of capsizing accidents ・Case studies of capsizing accidents ・Summary



Kobe	Enjoy Safe and Fun Recreational Fishing!—Wakasa Bay (Main contents) ・Characteristics of Wakasa Bay ・Trends in accidents related to recreational fishing vessels in Wakasa Bay ・Case studies of collision accidents ・Summary	
Hiroshima	Learn About Fisheries in the Seto Inland Sea for Safe Navigation! (Main contents) ・The occurrence of collision accidents between large ships and fishing vessels ・The occurrence of accidents where large ships damaged aquaculture facilities, etc. ・Accident locations (Marine accident hazard map) ・Case studies of accidents ・Summary—Towards the prevention of similar accidents	
Nagasaki	Towards safe and secure fishing—Preventing roller entanglement accidents on fishing vessels (Main contents) ・Occurrence of accidents ・Factors causing accidents ・Summary	
Naha	Prevent electrical fires on fishing vessels (Main contents) ・The occurrence of fire accidents on fishing vessels ・Case studies of fire accidents ・Electrical knowledge ・Inspection of electrical equipment on deck ・Conclusion	

[Link to the page featuring analysis digest in the local office edition]

https://www.mlit.go.jp/jtsb/bunseki-kankoubutu/localanalysis/localanalysis_new.html

(Japanese)

As you read these local office digests, you can not only find out the circumstances of local accidents, but can also gain some tips for accident prevention. The local offices will make further efforts to regularly issue the analysis digest local office editions. By doing so, they will ensure that you will be provided with more satisfactory content.

4 Issuance of the JTSB Annual Report

In order to publicize the JTSB's general activities in 2022 and prevent the occurrence of accidents based on what was learned in past accidents, the JTSB issued the "JTSB Annual Report 2023" in March 2023.

As part of our efforts to provide information overseas, we issued the English version of the report "Japan Transport Safety Board Annual Report 2023" in December 2023. We did so to let people overseas know about the topics in this Annual Report.

[Link to the page featuring the JTSB Annual Report]

https://www.mlit.go.jp/jtsb/bunseki-kankoubutu/jtsbannualreport/jtsbannualreport_new.html

https://www.mlit.go.jp/jtsb/jtsbannualreport2023.html

5 Preparation of safety leaflet

The JSTB creates leaflets that concisely summarize information useful for accident prevention, thus utilizing them to disseminate safety-related information.

In 2023, the JSTB created a leaflet to publicize this page to many people in conjunction with the publication of the special safety awareness page "For Safe Flight of Ultralight Planes and Other Aircraft" (for details, refer to Section 8, page 122 of this chapter).

The JTSB promotes safety awareness and dissemination by publishing on its website, distributing through related organizations, and handing out materials at outreach lectures.

Safety awareness leaflet for "For Safe Flight of Ultralight Planes and Other Aircraft"

[Link to the page featuring safety awareness leaflets

https://www.mlit.go.jp/jtsb/keihatuleaflet.html (Japanese)

Column

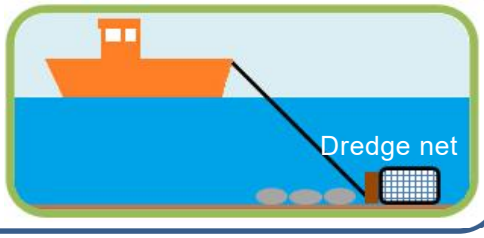
A Story of Scallop Fishing

Hakodate Office
Secretariat

Scallops, popular as return gifts for hometown tax donations, are delicious whether eaten as sashimi, grilled with butter and soy sauce, or fried. Did you know that there are two main methods of scallop fishing: the seabed sowing method and the suspended culture method?

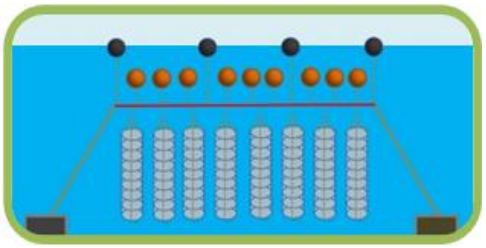
Seabed Sowing Method

This method involves releasing juvenile scallops into the sea, allowing them to grow for two to four years, and then catching them using dredge nets. It is mainly practiced along the coast of the Sea of Okhotsk, and scallops caught using this method are sometimes referred to as “natural products.”



Suspended Culture Method

In this aquaculture method, holes are drilled into the shells of juvenile scallops, which are then tied to ropes or placed in baskets and suspended in the sea to grow for one to two years before being harvested. This method is practiced in Uchiura Bay in southern Hokkaido and along the coast of the Sea of Japan.



Combined, the catch from the seabed sowing method and the harvest from the suspended culture method in Hokkaido account for over 80% of the national production. Each fishing method has inherent dangers. In the five years since 2019, there have been three accidents involving the handling of dredge nets in the seabed sowing method and 13 accidents involving the use of fishing machines to haul up scallops in the suspended culture method.

Examples of Accidents in Each Fishing Method

Seabed Sowing Method

While retrieving a dredge net weighing several hundred kilograms, the crew was caught between the beam of the dredge net and the hull and injured.

Suspended Culture Method

While retrieving scallops suspended in the sea, the crew was injured by getting their hand caught in the winch.

Dredge net

Winch

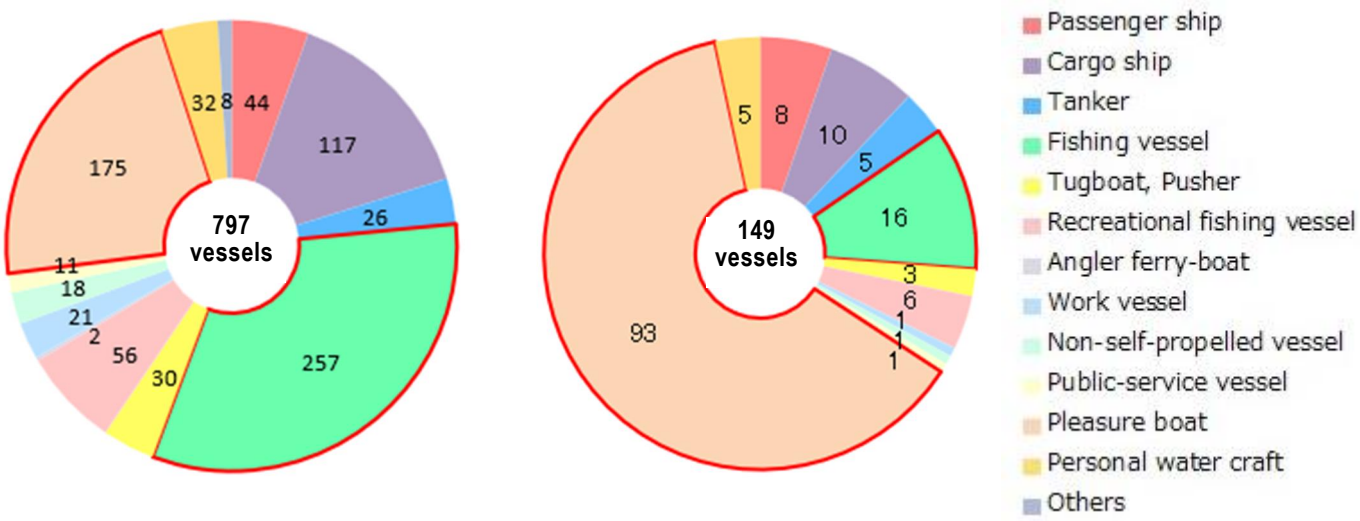
The Hakodate Office will continue to carry out timely and accurate accident investigations and actively disseminate information that helps prevent recurrence and mitigate damage. We are committed to ensuring that everyone involved in scallop fishing can operate safely.

6 Dissemination of information to prevent accidents involving pleasure boats, recreational fishing vessels and fishing vessels

Regarding the number of vessels by ship types involved in marine accidents occurred in 2023 and investigated by the JTSB, the highest number was that of fishing vessels with 257 (32.2%), followed by pleasure boats with 175 (22.0%), and these two types of ships account for 50% or more of the total. In addition, recreational fishing vessels with 56 (7.0%) accounted for a high percentage of the total.

Regarding the number of vessels by ship types involved in marine incidents occurred in 2023, the highest number was that of pleasure boats with 93 (62.4%), followed by fishing vessels with 16 (10.7%) and these two types of vessels account for about 70% of the total, as well as recreational fishing vessels with six (4.0%).

Number of ships involved in marine accidents and incidents occurred in 2023
(Accidents on the left and Incidents on the right)
As of December 31, 2023



In addition, the number of accidents involving small vessels, such as pleasure boats, recreational fishing vessels, fishing vessels, with less than 20 tons of the marine accidents investigated by the JTSB reached 624 mainly including pleasure boats and fishing vessels and accounted for 60.6% to the total number of marine accidents investigated in 2023.

Given the occurrence and trends of accidents involving pleasure boats, recreational fishing vessels, and fishing vessels, the JTSB regularly publishes digests and regional analysis collections to help operators of these vessels prevent similar accidents from recurring or occurring in the first place. These publications are available on its website, and upon request from related organizations, the JTSB also provides printed materials.

Notably, pleasure boats tend to have a high occupancy rate in accidents or incidents, with collision accidents accounting for about 30% of these accidents or incidents and operational inability incidents such as engine failures accounting for about 30%. To help prevent the recurrence and occurrence of similar accidents, the JTSB continuously publishes content titled “For Safe Navigation of Pleasure Boats” on its website, featuring pre-departure inspection, maintenance tips, lookout techniques, and regional alerts. This content is updated alongside its publications, such as digests, regional analysis collections, leaflets, and the JTSB web search system to strengthen the dissemination of safety awareness information.

In addition to the publications mentioned above, the JTSB website features web content titled “For Safe Navigation of Pleasure Boats,” which aggregates safety information based on accident investigation reports. The JTSB also provides the marine accident hazard map, allowing users to search and display accident locations, types, and summaries based on its accumulated accident investigation reports. Furthermore, the JTSB provides an overview of the usage of the Small Ship Engine Trouble Search System (S-ETSS), which allows users to search for accidents involving specific engine types or parts of small ships. The JTSB encourages the organic use of these resources to help prevent accidents.

These search systems, like the “For Safe Navigation of Pleasure Boats” content, can be accessed from its website. The JTSB also includes QR codes below for your convenience.

Page for “For Safe Navigation of Pleasure Boats”

As mentioned above, the “Marine Accident Hazard Map” allows users to search for accident summaries based on accident investigation reports, including information on shipping traffic and fishing grounds. Besides the web version, a mobile version of the marine hazard map is also available for operators to use on-site. The mobile version features touch panel-compatible buttons and layout for improved usability, and it uses the mobile device’s GPS function to display information near the users’ current locations, making it easy for users of small vessels such as pleasure boats and recreational fishing vessels to check accident information and navigation-related information for the intended navigation areas.

Please note that the introduced marine accident hazard map and S-ETSS are free (users are responsible for communication fees).

[Web content “For Safe Navigation of Pleasure Boats”]

https://www.mlit.go.jp/jtsb/guide/pleasure.html (Japanese)

[Marine Accident Hazard Map]

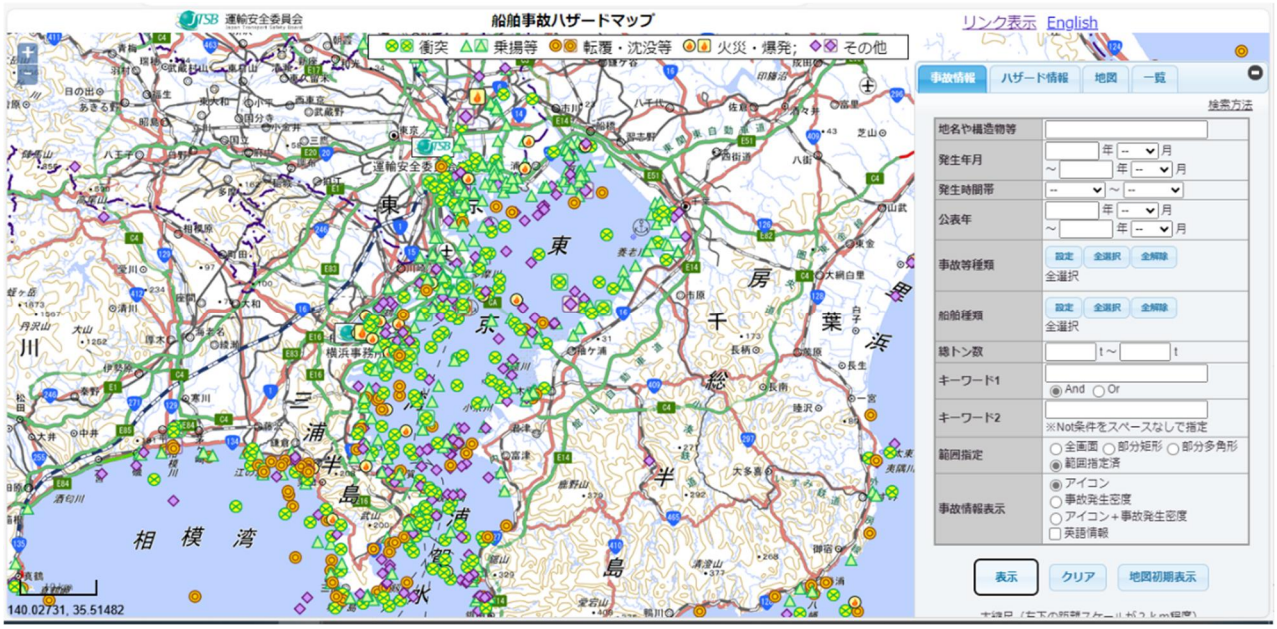
https://jtsb.mlit.go.jp/hazardmap/

https://jtsb.mlit.go.jp/hazardmap/index_en.html

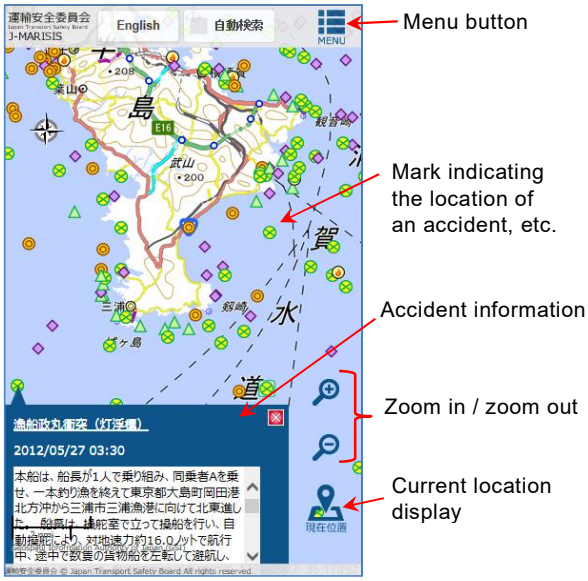
[Small ship Engine Trouble Search System (S-ETSS)]

https://jtsb.mlit.go.jp/hazardmap/s_etss/ (Japanese)

[Marine Accident Hazard Map] Example of search and display screen from the website

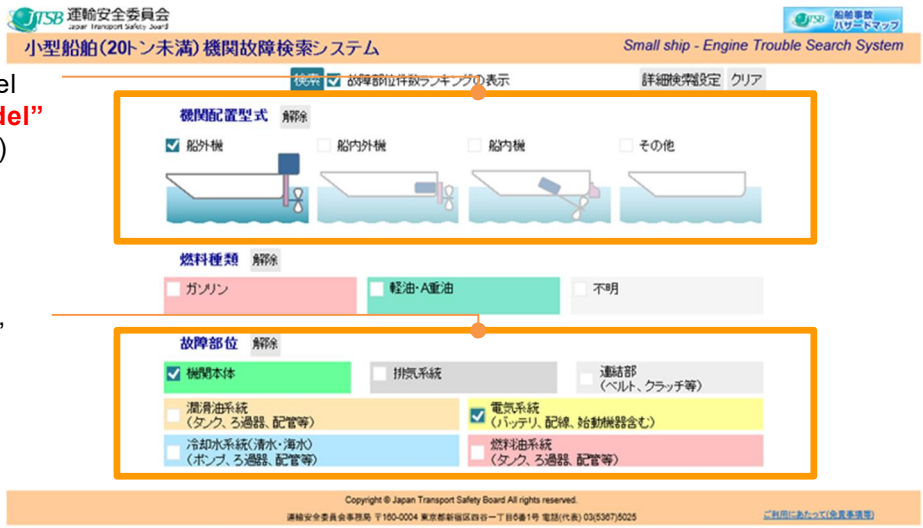


[Mobile Version of Marine Accident Hazard Map] Awareness leaflet and example of display screen



[Small ship Engine Trouble Search System (S-ETSS)] Usage examples

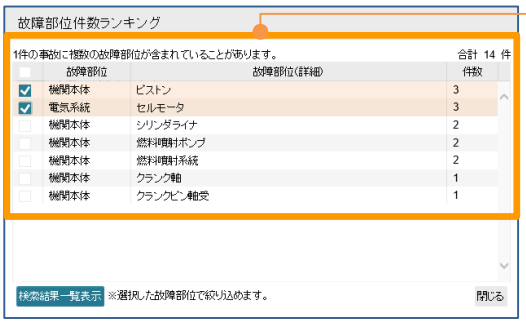
When searching an accident involving an engine itself and an electrical system in the engine layout of your vessel



Select a typel of your vessel in the **"Engine layout model"** field (here, outboard motor)

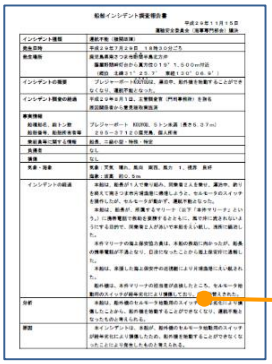
Select failure part you are concerned with in the **"Failure parts"** field (here, Engine itself and Electrical system)

Click the 検索 button.



The "Ranking of the cases with the failure parts" will appear. Select the parts (details) you concern. (Here, the piston and the cell motor)

Click the 検索結果一覧表示 button.



Clicking the relevant part of the accident name field enables you to see the details of the investigation report.

7 Dissemination of information to prevent accidents of medium and large vessels of 20 gross tons or more

In 2023, the JTSB investigated accidents involving vessels of 20 gross tons or more, including general cargo ships, tankers, passenger ships, fishing vessels, and others (various work vessels, public-service vessels, etc.). Cargo ships accounted for the highest number of accidents, with 127 vessels (52%), followed by 33 passenger ships (14%), making up about 70% of the total for these two types of vessels.

Furthermore, looking at the types of accidents for these two vessel types, collisions were the most frequent for cargo ships, with 78 cases (61%), followed by groundings with 30 cases (24%), and injuries or fatalities with 5 cases (4%). For passenger ships, collisions were also the most frequent, with 12 cases (36%), followed by injuries or fatalities with 6 cases (18%), and groundings with 5 cases (15%).

This shows that the common accident trends for these two vessel types are mostly due to collisions in congested waterways and near coastal navigation routes and groundings due to positional errors during close coastal navigation.

Additionally, there were 33 incidents involving commercial vessels, passenger ships, and fishing vessels of 20 gross tons or more each year due to engine maintenance issues or blackouts. Incidents like loss of propulsion can often lead to serious secondary disasters, so it is important to prevent the recurrence and occurrence of such incidents.

Therefore, to prevent accidents involving commercial vessels, passenger ships, and fishing vessels of 20 gross tons or more, not only operational factors but also the owners and operators of these vessels should make organic use of the JTSB's publications such as digests and regional analysis collections, along with the marine accident hazard map and Engine Trouble Search System (ETSS).

The JTSB developed the Engine Trouble Search System in response to requests from maritime stakeholders for a device to search and utilize accident investigation reports related to engine parts failures, and the system has been operating since April 2019. Users can easily view the relevant accident investigation reports by searching for engine parts on the web interface.

[Engine Trouble Search System (ETSS)

https://jtsb.mlit.go.jp/hazardmap/etss/ (Japanese)

8 Website summarizing information on the prevention of aircraft accidents —For safe flight of ultralight planes and other aircraft

In March 2023, the JTSB launched a special page on its website titled "For Safe Flight of Ultralight Planes and Other Aircraft," which compiles information on preventing accidents involving ultralight planes, gyroplanes, and homebuilt aircraft.

Banner and part of the contents from the special page

Ultralight and similar aircraft are simple-structured aircraft that have become popular for sky leisure activities. From 2001 to 2022, there have been 59 accidents involving these aircraft. Among these accidents, 78% resulted in fatalities or serious injuries, and 87% resulted in significant or moderate damage to the aircraft. This rate is higher than that of small aeroplanes and helicopters, indicating that ultralight aircraft and similar aircraft accidents lead to more severe consequences.

In order to prevent accidents, it is effective to reduce risks by focusing on the underlying factors (safety risks) that lead to the causes of accidents and avoiding the situations that cause them. This special page highlights the main factors contributing to accidents (inappropriate piloting, weather (wind) influences, lack of knowledge, skill, or experience, issues with the aircraft or parts, and improper inspections, maintenance, and assembly) identified from analyzing accident investigation reports. It introduces safety points along with case studies of accidents.

Please note that this special page will be updated periodically with new information. Use it as a reference to enjoy safe flying.

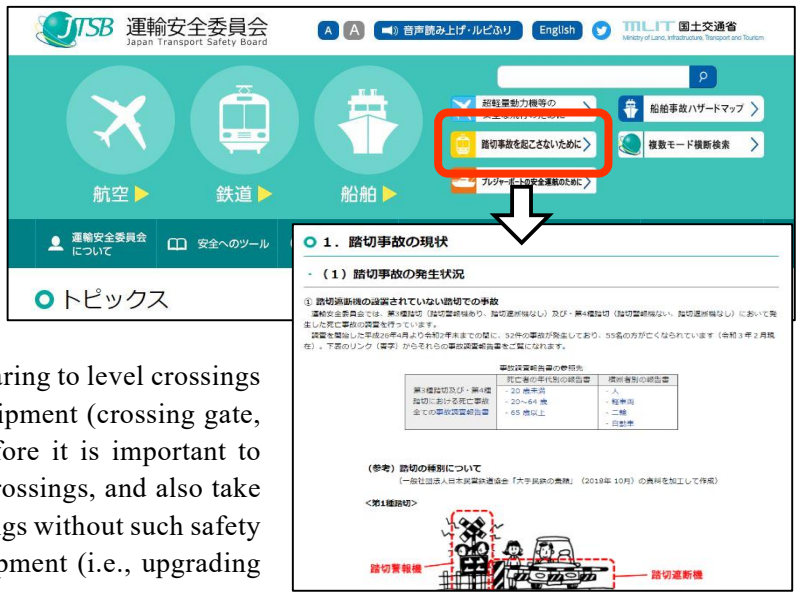
[Link to the special page summarizing information on aviation accident prevention —For safe flight of ultralight planes and other aircraft]

https://www.mlit.go.jp/jtsb/guide/microlight.html (Japanese)

9 Website summarizing information on the prevention of level crossing accidents —To prevent level crossing accidents from occurring

In February 2021, the JTSB posted the "To prevent level crossing accidents from occurring," summarizing information on the prevention of level crossing accidents, on our website.

Level crossing accidents comprise a large percentage (40.0%) of the overall railway operation accidents (in 2021). In particular, level crossings (classes 3 and 4) where crossing gates are not installed have higher accident risk, comparing to level crossings (class 1) where level crossing safety equipment (crossing gate, road warning device) is installed, therefore it is important to comply with rules when crossing level crossings, and also take measures, such as abolishing level crossings without such safety equipment or installing such safety equipment (i.e., upgrading to class 1 level crossings).



Web page on “To prevent level cross accidents from occurring”

The promotion of such measures needs to be understood by many people, including the users. Therefore, the JTSB has been calling for complying with the rules for crossing level crossings with slogans, e.g., “Stop, look, and listen” for users of level crossings. Moreover, for railway operators, road administrators, and other relevant parties, we provide examples of initiatives, e.g., abolishing level crossings, as references for proceeding with discussions and taking measures in order to prevent accidents, so we hope refering them to reduce level crossing accidents.

[Web page on “To prevent level cross accidents from occurring”]

https://www.mlit.go.jp/jtsb/guide/fumikiri.html (Japanese)

10 Outreach lectures (dispatch of lecturers to seminars, etc.)

The JTSB holds a series of outreach lectures as part of its efforts to raise awareness on the work of JTSB, and to create an opportunity for collecting the feedback and opinions of the general public. Seminars that lecturers can be dispatched to cover topics that are useful in preventing or reducing damage from aircraft, railway, and marine accidents. The JTSB staffs are dispatched to or remotely participated in various seminars and schools as lecturers.

We can provide flexible support for the content of lectures, such as by incorporating content to match the needs of participants, based on courses chosen by requesting groups. In 2023, a total of 20 outreach lectures were conducted, including those held by local offices.

Scene of an outreach lecture

[Link to the page for outreach lectures]

From the links below, you can check the list of outreach lectures, how to apply for them, and the implementation results by year.

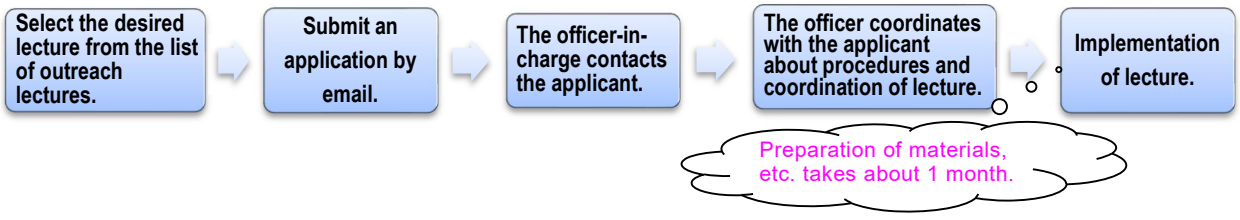
https://www.mlit.go.jp/jtsb/demaekouza.html (Japanese)

List of outreach lectures

No.	Course	Main targets	Contents
1	About the Japan Transport Safety Board	General (High school students and older), transportation businesses, etc.	Easy-to-understand explanation about the organizational background, work etc. of the JTSB
2	What is accident investigation?	Elementary school students and older	Easy-to-understand explanation about accident investigation for elementary school students and older
3	About aircraft accident investigation	General (High school students and older), aviation businesses, etc.	Easy-to-understand explanation about aircraft accident investigations, including the background, concrete examples, etc.
4	About railway accident investigation	General (High school students and older), railway businesses, etc.	Easy-to-understand explanation about railway accident investigations, including the background, concrete examples, etc.
5	About marine accident investigation	General (High school students and older), maritime businesses, etc.	Easy-to-understand explanation about marine accident investigations, including the background, concrete examples, etc.
6	About marine accident investigation (fire, explosion, engine failure)	General (High school students and older), maritime businesses, etc.	Explanation about marine accident investigations related to fire, explosion and engine failure, including the background, concrete examples, countermeasures, etc.
7	About the JTSB Digests	General (High school students and older), transportation businesses, etc.	Introduction to case studies of accidents and explanation of various statistical materials across various modes, based on the JTSB Digests that have been issued to date.
8	About the JTSB Digests (Analyses of Aircraft Accidents)	General (High school students and older), aviation businesses, etc.	Explanation about various themes taken up in the analyses of aircraft accidents in the JTSB Digests.
9	About the JTSB Digests (Analyses of Railway Accidents)	General (High school students and older), railway businesses, etc.	Explanation about various themes taken up in the analyses of railway accidents in the JTSB Digests.
10	About the JTSB Digests (Analyses of Marine Accidents)	General (High school students and older), maritime businesses, etc.	Explanation about various themes taken up in the analyses of marine accidents in the JTSB Digests.
11	Trends in the occurrence of marine accidents, and preventing recurrence	General (High school students and older), maritime businesses, etc.	Schematic explanations about risks and waters where marine accidents frequently occur using the J-MARISIS, and explanations about accident prevention methods.
12	Analysis digests local office edition (marine accident-related) [each regional office in Hakodate, Sendai, Yokohama, Kobe, Hiroshima, Moji, Nagasaki, and Naha]	General (High school students and older), maritime businesses, etc.	Explanations on each topic regarding analysis digests from regional offices. *Lists can be found by clicking the link below. https://www.mlit.go.jp/jtsb/bunseki-kankoubutu/localanalysis/localanalysis_new.html

*No. 12, in principle, is restricted to requests from the areas under the jurisdiction of the local office.

Flow chart from application to implementation of lecture



11 Activities of the Accident Victim Information Liaison Office

The Japan Transport Safety Board gives full consideration to the emotions of the victim and their families, as well as bereaved families. In addition to providing information on accident investigations in an appropriate manner at the appropriate time, a contact point for providing accident investigation information to victims, etc. was established in April 2011 with the aim of providing attentive response to opinions and feedback. Furthermore, in order to promote the provision of information, the Accident Victim Information Liaison Office was established under the directive of the organization in April 2012. Contact points for the provision of information were also set up in local offices to provide integral support alongside with Tokyo.

In 2023, information on accident investigation and other matters was provided to 38 persons, including the 15 cases of aircraft/railway/marine accidents.

Regarding the foundering of the passenger ship KAZU I that occurred on April 23, 2022, explanations were provided to the victims' families during the public hearing and the publication of the accident investigation report (for details, please refer to Chapter 5, page 104).

The Accident Victim Information Liaison Office hands out "Contact Information Cards" to victims of accidents.

The Office receives inquiries and consultation about the accident investigations from victims and families of accidents, as well as bereaved families. Please feel free to contact the following where necessary.

Contact Information Cards

Chapter 7 International efforts for accident prevention

1 Objectives and significance of international cooperation

Aircraft and marine accidents, which are part of Japan Transport Safety Board's investigation scope, includes international in nature. Creating and operating systems for these kinds of investigations therefore involve international organizations. Also, it may be necessary to cooperate and coordinate with the accident investigation authorities of the states concerned during the investigation process.

In addition to the nation where an aircraft accident occurred, the state of registry, the state of the operator, and the state where the aircraft was designed and manufactured are the states concerned. An annex to the Convention on International Civil Aviation (the Chicago Convention) states that the state of occurrence is responsible for starting and accomplishing an accident investigation while the other states also have the right and responsibility to appoint a representative to participate in the investigation. Proper cooperation with the accident investigation authorities of those states concerned is necessary for the accomplishment of the investigation.

Similarly, in marine accidents involving vessels above a certain level, the International Convention for the Safety of Life at Sea (SOLAS) places the obligation of investigation on the flag state of the vessel. Additionally, other states concerned, such as coastal states in whose territory the marine accident occurs and the state(s) of victims are entitled to investigate the accident. The convention defines the standard framework of marine accident investigations. The flag state and states concerned must cooperate with each other in multiple ways, such as through information sharing, when conducting accident investigations.

Based on this background, a variety of international meetings are held for each mode, which JTSB actively participates in. The meetings are for the purpose of facilitating collaboration in the case of accidents or incidents, sharing information on accidents and investigation methods on a regular basis, and achieving results of prevention for repeated accidents all over the world. Additionally, for the investigation of railway accidents, for which there is no international organization, various international seminars to exchange information on accident and incident investigations are held in major countries. Because in regards to this area, the fundamental investigation system of each state is generally standardized. Furthermore, some universities overseas have specialized training courses for accident and incident investigations, to which JTSB is also actively dispatching investigators.

As shown above, JTSB aims to improve transport safety in Japan and all over the world. It hopes to do so through sharing of our findings worldwide, which have been acquired in individual accident and incident investigations. Relating to this, the following sections introduce each of our international activities in 2023.

2 Efforts of international organizations and JTSB's contributions

(1) Efforts of the International Civil Aviation Organization and JTSB's involvement

The International Civil Aviation Organization (ICAO, Headquarters: Montreal, Canada) is a United Nations specialized agency established in 1947. Japan acceded to it in 1953. ICAO comprises the Assembly, Council, and Secretariat, and as of October 2022, 193 states are members of ICAO. The Council has subordinate bodies, such as Air Navigation Commission, Legal Committee, Air Transportation Committee, Joint Operation Committee, and Finance Committee. In addition, it has regional offices in seven locations, including Bangkok, Cairo, and Paris. Besides, there are expert meetings such as Air navigation conference, a variety of working groups, and panel meetings which are called in for certain projects.

The objectives of ICAO are provided in Article 44 of the Convention on International Civil Aviation as being “to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport.” ICAO is engaging in a wide variety of activities, including the drafting of conventions regarding international air transport services and aviation security such as countermeasures against hijacking. It also engages in audits of contracting states’ safety

monitoring systems, and responses to environmental problems.

ICAO establishes the Annexes of the Chicago Convention for items that must be covered by globally unified rules. The Annexes determines the rules for 19 fields, including personnel licensing, rules of the air, registration of aircraft, airworthiness, aeronautical telecommunications, search and rescue, security, and the safe transport of dangerous goods and safety management. Among them, Annex 13 establishes the international standards and recommendations for aircraft accident and incident investigations. In addition, the Act for the Establishment of the Japan Transport Safety Board states that: "The Board shall conduct investigations prescribed in items (i) to (ii) of Article 5 in conformity with the provisions of the Convention on International Civil Aviation and with the Standards, Practices and Procedures adopted as Annexes thereto." (Article 18).

The Accident Investigation Panel (AIGP), which is a subordinate organization of the Air Navigation Commission, is mainly a forum for discussion on the revision to Annex 13 and the preparation of guidance materials. The JTSB has participated as a member since the 4th meeting held in May 2018. The 8th Accident Investigation Panel Meeting (AIGP/8) was held in Montreal, Canada in May 2023, in which panel members and aircraft accident investigators of the JTSB participated. Regarding the working groups (WGs) established under the panel, the JTSB participated in the "Safety Recommendation of Global Concerns WG" and the "Family Information WG."

Additionally, the Flight Recorder Specific Working Group (FLIRECSWG), established under the Flight Operations Panel (FLTOPSP), which discusses amendments to Annex 6 (International Standards and Recommended Practices for Aircraft Operations) and the creation of guidance materials, has been working on the examination and formulation of regulations related to flight recorders since 2014. The JTSB aircraft accident investigators have been participating as the members since the 13th meeting, which was held online in February 2021. The 14th FLIRECSWG meeting was held at the ICAO headquarters in September 2023, and a JTSB aircraft accident investigator participated.

(2) Efforts of the International Maritime Organization and JTSB's involvement

The International Maritime Organization (IMO, Headquarters: London, United Kingdom) was established in 1958 as a specialized agency of the United Nations. It was originally called as the Inter-Governmental Maritime Consultative Organization (IMCO). The IMO comprises the Assembly, the Council and five committees. These are the Maritime Safety Committee (MSC), Legal Committee (LEG), Marine Environmental Protection Committee (MEPC), Technical Cooperation Committee (TC) and Facilitation Committee (FAL). In addition, there is a Secretariat, and the MSC (and MEPC) has seven subcommittees. As of September 2023, IMO has 175 member states/territories and three regions as associate members.

IMO engages in various activities, such as the facilitation of intergovernmental cooperation, effective safety measures and drafting of conventions that relate to technical and legal problems with maritime life safety and safe marine navigations.

The Sub-Committee on Implementation of IMO Instruments (III) is a subordinate group of MSC and MEPC. It discusses how to ensure the responsibility of the flag state, including the investigation of marine accidents and incidents. III analyzes the accident or incident investigation reports submitted from states based on SOLAS and the International Convention for the Prevention of Pollution from Ships (MARPOL) to draw lessons from, which III subsequently makes public on the IMO website. By doing so, III promotes activities for the prevention of the repeated occurrence of marine accidents.

The Correspondence Group (which undertakes analysis during periods outside of the sessions) and the Working Group (which verifies the analysis results during the session period) comprises volunteer investigators from some member states. They discuss these analysis results, which the III plenary subsequently approves. Depending on the matter in question, if III determines that further discussion is required for a convention revision, it will submit recommendations or information to MSC, MEPC and other IMO subcommittees. The 9th session of the Sub-Committee on Implementation of IMO Instruments (III 9) was held virtually from the end of July to early August 2023. A JTSB marine accident investigator

became the group member, and conducted analyses of accident and incident investigation reports submitted by each country. The provisional translation of the past analysis results is shown in the JTSB website:
(URL: https://www.mlit.go.jp/jtsb/casualty_analysis/casualty_analysis_top.html [Japanese])

3 Cooperation and information exchange with foreign accident investigation authorities and investigators

(1) Participation in international meetings

①Chairperson meeting of the International Transportation Safety Association

The International Transportation Safety Association (ITSA) was established by accident investigation boards from the Netherlands, the United States, Canada, and Sweden in 1993. As of June 2023, the international organization has members from the transport accident investigation authorities of 18 countries and territories. Organizations that are permitted to join must be permanent accident investigation authorities that are independent from any regulatory authority. Based on the idea that any findings from an accident and incident investigation in one field can be used as a lesson for another field, ITSA holds annual chairperson meetings where the participating accident investigation authorities present their experiences in accident investigation. These presentations are for all the modes of aviation, railway, and marine accidents and incidents. The chairpersons learn about the causes of accidents and the methodologies of accident investigations, thus aiming to improve transport safety in general.

As for Japan, the Aircraft and Railway Accidents Investigation Commission was approved for accession in June 2006. The board has participated in all the meetings held after 2007. Due to the global spread of COVID-19, meetings have been held in a web conference format since 2020. However, the meeting held in Taipei from June 5 to 7, 2023, saw the Chairperson of the JTSB and relevant staff participating in person for the first time in four years.

This meeting included introductions of investigation activities by various organizations and panel discussions on common high-interest topics. During the panel discussion on new technologies, the JTSB Chairperson presented new technologies utilized by the JTSB, such as X-ray CT scanners, 3D laser scanners, and drones.

Presentation by the Chairperson of the JTSB at the 2023 ITSA

In the panel discussion on reports compiled by various organizations based on accidents handled in each country, the Chairperson of the JTSB served as the moderator, facilitating the exchange of information among organizations and contributing to utilizing the experiences of different countries in conducting accident investigations.

②International Society of Air Safety Investigators and Asian Society of Air Safety Investigators

The International Society of Air Safety Investigators (ISASI) has been organized by national aircraft accident investigation authorities. The purpose of this society is to support accident investigations aimed at preventing repeating occurrences of aircraft accidents and incidents. This aim is to be achieved by improving further a cooperative system of investigation authorities, through the facilitation of communications between member countries about their experience and knowledge, as well as information about the technical aspects of aircraft accident investigations.

ISASI holds annual seminar each year, and Japan has participated in each one of them since the establishment of Japan Aircraft Accident Investigation Commission in 1974. In this seminar, working groups including the Flight Recorder Working Group, the Investigator Training and Education Working Group, the Cabin Safety Working Group, and the Government Air Safety Investigators Group are held in parallel with the general meeting. Japan also participates in these working groups to endeavor to improve investigation technologies for aircraft accidents and incidents.

In August 2023, the Annual Seminar was held in Nashville, United States. This seminar provided three keynote speeches and 25 presentations and Japan participated in two group meetings. ISASI has regional associations in Australia (ASASI), Canada (CSASI), Europe (ESASI), France (ESASI French), Korea (KSARAI), Middle East and North Africa (MENASASI), Latin America (LARSASI), New Zealand (NZSASI), Pakistan (PakistanSASI), Russia (RSASI), the United States (USSASI) and Asia (AsiaSASI). Each of these associations also holds their seminars.

Regarding the Asian Society of Air Safety Investigators (AsiaSASI), the current president is the Indonesian National Transportation Safety Committee, the vice president is the Taiwan Transportation Safety Board, and the secretariat is the Singapore Transport Safety Investigation Bureau. The JTSB serves as an executive committee member.

③ Accident Investigator Recorder (AIR) Meeting and Asia (and Oceania) Accident Investigator Recorder Meeting

The Accident Investigator Recorder (AIR) Meeting is an international conference for aircraft accident investigators who analyze digital flight data recorders (DFDR) and cockpit voice recorders (CVR). At this meeting, aircraft accident investigation analysts from all over the world share know-how by exchanging their experience, knowledge, information relating to the analysis of DFDR, and discuss the relevant technologies on DFDR. The conference aims to further develop the technical capacity of accident investigation authorities. Initially, aircraft accident investigators who analyze flight data recorders (FDR) and cockpit voice recorders (CVR) mainly participated. However, recently, the scope has broadened to include other fields due to the applicability of these technologies.

Established in 2004, the AIR Meeting is hosted annually by accident investigation agencies in different countries. The JTSB has participated in this meeting almost every year since 2006.

The meetings from 2020 to 2022 were postponed due to the global spread of COVID-19, but in 2023, the meeting was held in Farnborough, UK.

The Asia Accident Investigator Recorder Meeting has been held every year since 2020 with the participation of accident investigators who are in charge of digital data analysis of flight recorders to share research cases related to analysis work and study to solve the issues of each country. In 2019 and 2020, Japan hosted the plenary sessions (held on the Web), and the conference in 2022 was held in Singapore, and Taiwan hosted it in September 2023.

Initially, only the three countries mentioned above/regions participated and hosted the meeting on a rotating basis. However, in response to requests from other countries, the scope was expanded, and Japan hosted the meeting in Tokyo in November 2023. With the participation of countries from the Oceania region, the meeting was renamed to the Asia-Oceania Accident Investigation Recorder Meeting, and eight countries/regions participated.

Scene from the 2023 Asia-Oceania Accident Investigation Recorder Meeting

Explanation of analysis devices owned by the JTSB

This meeting aims to understand international technical trends related to flight recorders and analysis devices and promote technical exchanges among analysts in the Asia and Oceania regions, establishing a cooperative system for when investigation cases occur.

④Marine Accident Investigators' International Forum

The Marine Accident Investigators' International Forum (MAIIF) is an international conference held annually since 1992. It was originally based on a proposal from the Transportation Safety Board of Canada. Its purpose is to maintain and develop international cooperation among marine accident investigators and to foster and improve international cooperation in marine accident investigations and thus, advancing maritime safety and prevent marine pollution. In 2008, MAIIF was granted the status of an Inter-Governmental Organization (IGO) in IMO.

Under this forum, marine accident investigators around the world take the opportunities to exchange frankly opinions and share information on marine accident investigations. Recently, there has been more demand to make use of the findings obtained from the marine accident and incident investigations in the discussions in IMO. In 2009, MAIIF made a proposal based on the investigation results from the state investigation authorities to IMO for the first time. Japan has joined the forum every year since the third conference.

The 30th conference was held in London, UK, in October 2023, attended by marine accident investigators from the JTSB.

⑤Marine Accident Investigators Forum in Asia

The Marine Accident Investigators Forum in Asia (MAIFA) was established by a proposal from Japan to build a mutual cooperation system for marine accident and incident investigations in the Asia region and to assist developing countries in enhancing their investigation systems. Since 1998, meetings have been held annually, and Japan has been playing a leading role in this forum, including the sponsorship of the 13th meeting in Tokyo in 2010. The network of investigators that has been established through the forum is now effective in its promotion of rapid and smooth international cooperation in accident and incident investigations. Encouraged by the success of MAIFA, E-MAIIF was established in Europe in 2005. A-MAIF was then established in North, Central and South Americas in 2009. These trends contribute more than ever in furthering the exchange and cooperation between marine accident investigators in each region. In the Asia region, there are not only a lot of straits with sea traffic congestion, but also severe weather and hydrographic phenomena that often give rise to tragic marine accidents. Nonetheless, some countries have insufficient capacities or systems for accident investigations. This situation makes these regional forum very important. The 23rd meeting was held in Shanghai, China, in September 2023, attended by a marine accident investigator.

Scene from the 23rd MAIFA

(2) Examples of international cooperation among accident investigation agencies in individual cases

For the aircraft accident and incident investigations, based on the provisions in Annex 13 of ICAO, the state where an aircraft accident occurred must notify the state of registry, the state of design/manufacturing, and the state of operation. If necessary, these states concerned may appoint their own Accredited Representative (AR) to join the investigation.

In April 2023, a small Textron Aviation 172S aircraft from the Japan Coast Guard took off from Kitakyushu Airport. The engine output decreased during the flight, causing an emergency landing in a rice field in Usa City, Oita Prefecture, damaging the aircraft. The investigation is being conducted in cooperation with the United States, the country of design and manufacture of the aircraft, and Germany, the country of design and manufacture of the engine.

In marine accident and incident investigations, the IMO Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) states that the interested states, including the flag state of the ship and the coastal state of the accident, must cooperate in the marine accident investigation. Also in Japan, if a marine accident or incident occurs that concerns more than one state, Japan's accident investigators are to collaborate with the accident investigation authorities of the other interested states in order to obtain information about the accident.

Regarding the cargo ship WAKASHIO, which went aground on the shallow reef in the southeastern part of Mauritius in July 2020, inquiries about the accident investigation report have been made to Panama, the flag state, and Mauritius, the coastal state, before its publication. (For details on the accident investigation report of the cargo ship WAKASHIO, please refer to Chapter 5, page 107.)

Among the marine accident and incident investigation reports that were published in 2023, the JTSB sent two draft reports to the flag states and other interested states upon request in order to invite their comments.

4 Technical cooperation

In response to requests from overseas railway accident investigation organizations, the JTSB implements human resource development support including the training of railway accident investigators.

So far, we have not only participated in the field of railway accident investigation in the "Indian Railway Safety Capability Enhancement Project" implemented as a technical assistance project of the Japan International Cooperation Agency (JICA), but also have been contributing to the improvement of overseas railway safety by recently establishing a department to investigate railway accidents to provide Japanese railway accident investigation technologies according to their categories, including the provision of training to overseas railway accident investigation organizations which have started railway accident investigations as a technical aid to them.

On-site training for railway accident investigators was conducted in Singapore in 2023. Please refer to 8 of "Major Activities of the Year" (page 12) for details.

These efforts contribute to the initiative "to support efforts related to technology transfer and human resource development to allow overseas countries to properly operate and maintain their own railway" in the "Infrastructure Systems Overseas Expansion Action Plan 2023 of the Ministry of Land, Infrastructure, Transport and Tourism" which summarizes its projects to promote the expansion of the infrastructure systems to overseas, and we will continue to work for improving the transportation safety in the future through technical cooperation with overseas accident investigation organizations.

5 Participation in overseas training

The JTSB is making efforts to advance the capacity of accident investigators through measures such as training and international information exchanges to investigate accidents accurately, and also actively participates in overseas training for accident investigations.

In 2023, JTSB's aircraft accident investigators participated in training on reading and analyzing data from damaged FDRs and CVRs held in Brno, Czech Republic.

Additionally, every year, aircraft and marine accident investigators are sent to Cranfield University in the UK, which has a track record of accident investigation training. This training was suspended from 2020 to 2022 due to the global spread of COVID-19 but resumed in 2023 after four years. The training covers a wide range of topics, from the basics to specialized knowledge of accident investigation. After the training, the participants disseminate the results to other accident investigators in each transportation mode, aiming to improve the overall capabilities of the accident investigators.

Column

Studying at the World Maritime University

International Affairs Office

This article is written by a third-year Japan Transport Safety Board staff in a long-term study program at the World Maritime University. The Japan Transport Safety Board provides a wide range of opportunities for human resorces development, including study abroad programs and domestic and international training.

I am studying at the World Maritime University (WMU) in Malmö, Sweden. The WMU was established in 1983 by the International Maritime Organization (IMO), a specialized agency of the United Nations, as a center for postgraduate education, research, and capacity building in maritime and ocean fields. The university's founding philosophy was to develop highly educated maritime professionals worldwide, particularly in developing countries. These professionals aim to ensure the effective implementation of international maritime conventions, thereby protecting maritime safety and the marine environment and contributing to sustainable economic growth in the maritime and ocean sectors. Additionally, the WMU promotes capacity building in line with the United Nations Sustainable Development Goals, with about 30% of its students being women.

WMU Campus

Presentation in class

The master's program at WMU, which I am currently enrolled in, is a 14-month program aimed at mid-career maritime administrators with specialized knowledge to develop individuals who can play an active role internationally in the future. The lecture content is constantly updated to respond directly to the needs of maritime administration and reflect the latest developments. The master's program is divided into two phases: the first approximately three and a half months cover fundamental maritime knowledge, and the remaining ten months are dedicated to specialized fields based on each student's career characteristics and interests. Additionally, before graduation, students must write a thesis on existing or anticipated issues related to their work in their home country. Furthermore, students attend lectures on campus and participate in unique field studies hosted by shipping companies, port authorities, and various government and non-governmental organizations worldwide, gaining practical experience.

The students at WMU are generally friendly and diligent, and I feel they actively engage in discussions, particularly regarding gender and environmental issues. Many students also enjoy nature and travel, so on weekends, we often explore the Baltic coast together or travel beyond Sweden by ship or train.

WMU's efforts towards SDGs (from the WMU website)

Before coming to Sweden, I was anxious about life here, but since most students live together in dormitories, it didn't take long to make friends with others. Studying at WMU is an excellent opportunity to gain specialized knowledge in maritime affairs and build an internationally diverse network. We frequently contact foreign authorities in the Japan Transport Safety Board's work. Therefore, this kind of international experience and network is extremely valuable. I am grateful for this opportunity and intend to learn as much as possible and apply it to my future work.

Appendices

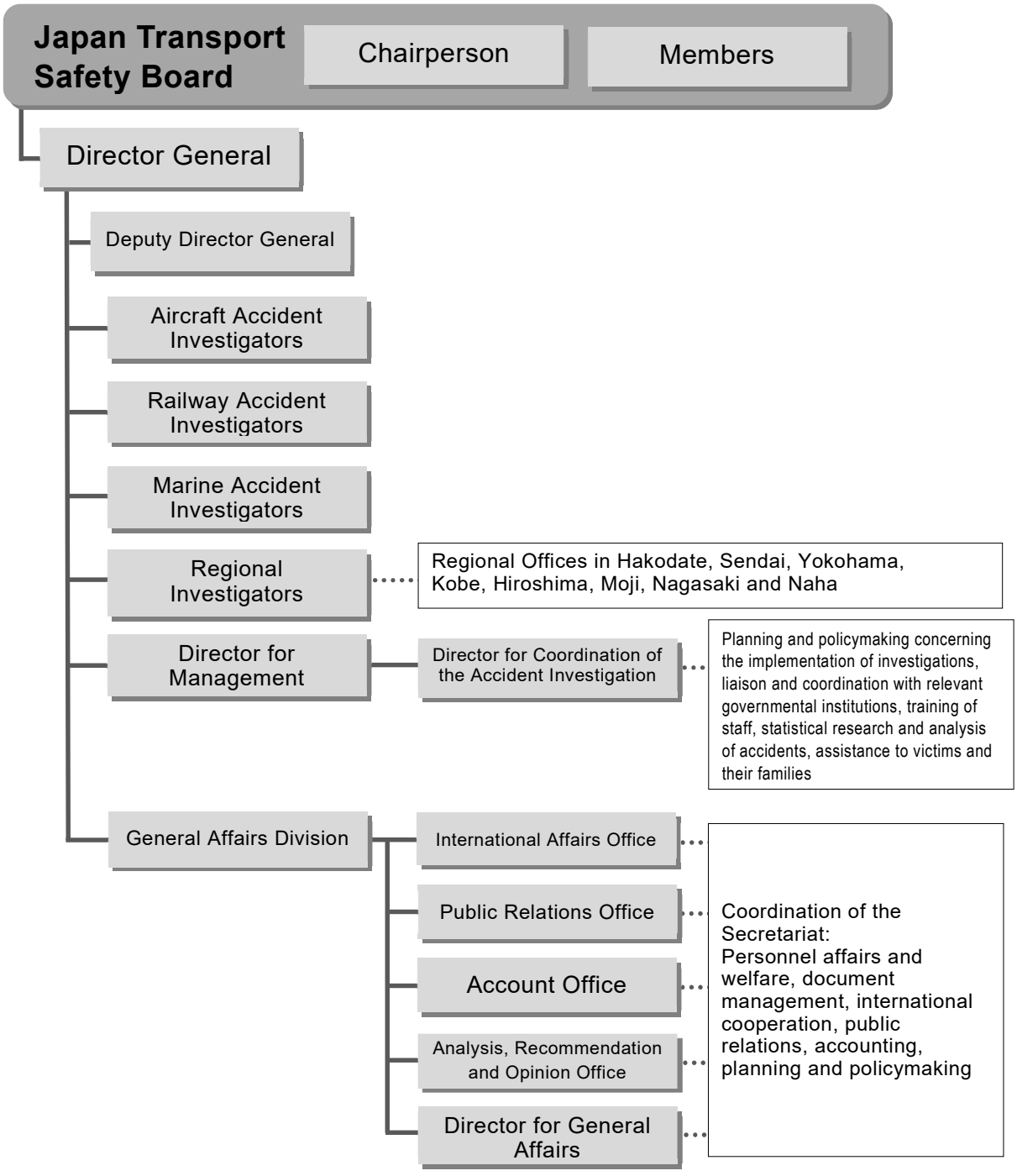
Appendices Contents

1 Outline of the organization

The Japan Transport Safety Board consists of the Chairperson, 12 members, and 181 secretariat staff (as of April 1, 2023). The staff in the secretariat consist of investigators who conduct investigations of aircraft, railway and marine accidents; the General Affairs Division that performs coordination-related jobs for the secretariat; and the Director for Management who is dedicated to the support and statistical analysis of accident investigations, and international cooperation. In addition, special support staff and local investigators are stationed at eight regional offices around the country (Hakodate, Sendai, Yokohama, Kobe, Hiroshima, Moji, Nagasaki and Naha). These local investigators investigate marine accidents (excluding serious ones) and support staff provide initial support for aircraft, railway and marine accidents.

March 1, 2024

Organization Chart



2 Board Members

As of March 1, 2024

TAKEDA Nobuo, Chairperson (Full-time), Director of Aircraft Committee

TAKEDA Nobuo was appointed as Chairperson of the Japan Transport Safety Board on April 1, 2019; belongs to the Aircraft Committee, the Railway Committee and the Marine Committee with special expertise in aerospace engineering, strength of materials and composite materials engineering.
Career summary: PhD, University of Florida and Graduate School of Engineering, the University of Tokyo (doctor of engineering), Emeritus Professor, Former Vice President, the University of Tokyo, Former Technical Advisor in Structures and Advanced Composite Research Unit, Aeronautical Technology Directorate of the Japan Aerospace Exploration Agency (JAXA)

SODA Hisako, Member (Full-time)

SODA Hisako was appointed as a member on April 1, 2022; belongs to the Aircraft Committee, the Railway Committee and the Marine Committee with special expertise in legislation.
Career summary: Graduated from Faculty of Law, the University of Tokyo, Former Judge, Tokyo District Court

SHIMAMURA Atsushi, Member (Full-time), Vice-Chairperson, Deputy Director of Aircraft Committee

SHIMAMURA Atsushi was appointed as a member on February 27, 2022; belongs to the Aircraft Committee, with special expertise in operation and maintenance of aircraft and air navigation services engineering.
Career summary: Master of Engineering, Graduate School of Engineering, Yokohama National University, Former Fellow of Corporate Safety & Security of Japan Airlines Co., Ltd.

MARUI Yuichi, Member (Full-time)

MARUI Yuichi was appointed as a member on December 6, 2016; belongs to the Aircraft Committee, with special expertise in maneuvering of aircraft.
Career summary: Graduated from Civil Aviation College, Former D. Senior Vice President, Corporate Safety and Security, All Nippon Airways Co., Ltd.

OKUMURA Fuminao, Member (Full-time), Director of Railway Committee

OKUMURA Fuminao was appointed as a member on December 6, 2016; belongs to the Railway Committee, with special expertise in railway engineering and geotechnical engineering.
Career summary: Doctor of Engineering, graduated from the Department of Civil Engineering, Faculty of Engineering, Tokyo Institute of Technology
Former Executive Director of the Railway Technical Research Institute

ISHIDA Hiroaki, Member (Full-time), Deputy Director of Railway Committee

ISHIDA Hiroaki was appointed as a member on December 26, 2016; belongs to the Railway Committee, with special expertise in dynamics of machinery, vehicle dynamics and railway vehicle engineering.
Career summary: Doctor of Engineering, graduated from the Department of Industrial Mechanical Engineering, Faculty of Engineering, the University of Tokyo
Former Professor in the Program in Mechanical Engineering, Department of Interdisciplinary Science and Engineering, School of Science and Engineering, Meisei University

ITO Hiroyasu (Full-time), Director of Marine Committee

ITO Hiroyasu was appointed as a member on October 1, 2023; belongs to the Marine Committee and the Marine Special Committee, with special expertise in ship operation and maritime traffic safety.
Career summary: Graduated from Japan Coast Guard Academy
Former Coast Guard Superintendent, Japan Coast Guard
Former President of Maritime Disaster Prevention Center

UENO Michio, Member (Full-time), Deputy Director of Marine Committee

UENO Michio was appointed as a member on October 1, 2023; belongs to the Marine Committee and the Marine Special Committee, with special expertise in naval architect.
Career summary: Doctor of Engineering, Graduate School of Engineering, Osaka University, Former Special Research Leader of National Maritime Research Institute, National Institute of Maritime, Port and Aviation Technology

NAKANISHI Miwa, Member (Part-time)

NAKANISHI Miwa was appointed as a member on February 27, 2016; belongs to the Aircraft Committee, with special expertise in ergonomics (human factors).
Career summary: Doctor of Engineering, School of Science for Open and Environmental Systems, Graduate School of Science and Technology, Keio University
Associate Professor in the Department of Administration Engineering, Faculty of Science and Technology, Keio University (current post)

TSUDA Hiroka, Member (Part-time)

TSUDA Hiroka was appointed as a member on October 1, 2020; belongs to the Aircraft Committee, with special expertise in flight dynamics and control of aircraft, flight simulation and flight test.
Career summary: Completion of the doctoral first course for Department of Human Media Systems, Graduate School of Information Systems, The University of Electro-Communications
Senior R&D Fellow, Aviation Use Expansion Innovation Hub, Aeronautical Technology Directorate, Japan Aerospace Exploration Agency (current post)

SUZUKI Mio, Member (Part-time)

SUZUKI Mio was appointed as a member on December 6, 2019; belongs to the Railway Committee, with special expertise in traffic engineering and human factors.
Career summary: Doctor of Engineering, Department of Built Environment, Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology
Associate Professor in the Department of Civil Engineering, Tokai University (current post)

NIITSUMA Mihoko, Member (Part-time)

NIITSUMA Miho was appointed as a member on December 6, 2019; belongs to the Railway Committee, with special expertise in electrical engineering.
Career summary: Doctor of Engineering, Department of Electrical Engineering and Information Systems, Graduate School of Engineering, The University of Tokyo
Professor in the Department of Precision Mechanics, Faculty of Science and Engineering, Chuo University (current post)

OKAMOTO Makiko, Member (Part-time)

OKAMOTO Makiko was appointed as a member on October 1, 2017; belongs to the Marine Committee and the Marine Special Committee, with special expertise in safety ergonomics.
Career Summary: Doctor of Human Sciences, Graduate School of Human Sciences, Waseda University, Lawyer, Associate Professor in Faculty of Social Security Science, Kansai University (current post)

The chairperson and members of the Board shall be appointed by the Minister of Land, Infrastructure, Transport and Tourism with the consent of both houses of Representatives and Councilors.

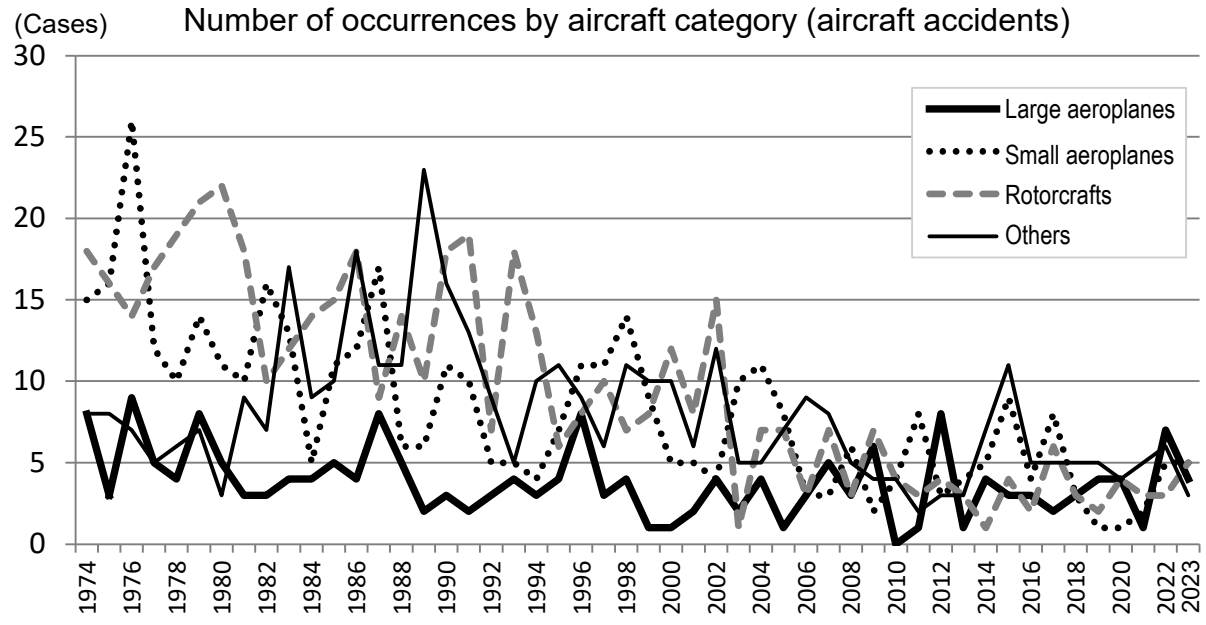
3 Number of occurrences by aircraft category (aircraft accidents)

(Cases)

Category / Year of occurrence	Aircraft			Rotorcraft		Glider	Airship	Unmanned aircraft	Total
	Large aeroplane	Small aeroplane	Ultralight plane	Helicopter	Gyroplane				
1974	8	15	0	17	1	8	0	-	49
1975	3	16	0	16	0	8	0	-	43
1976	9	26	0	14	0	7	0	-	56
1977	5	12	0	16	1	5	0	-	39
1978	4	10	0	18	1	6	0	-	39
1979	8	14	0	20	1	6	1	-	50
1980	5	11	0	22	0	3	0	-	41
1981	3	10	1	18	0	8	0	-	40
1982	3	16	0	9	1	7	0	-	36
1983	4	13	10	12	0	7	0	-	46
1984	4	5	6	13	1	3	0	-	32
1985	5	11	6	15	0	4	0	-	41
1986	4	12	14	15	3	4	0	-	52
1987	8	17	8	8	1	3	0	-	45
1988	5	6	7	12	2	3	1	-	36
1989	2	6	11	9	1	12	0	-	41
1990	3	11	9	16	2	7	0	-	48
1991	2	10	6	19	0	7	0	-	44
1992	3	5	5	7	0	4	0	-	24
1993	4	5	3	17	1	2	0	-	32
1994	3	4	8	13	0	2	0	-	30
1995	4	7	10	6	0	1	0	-	28
1996	8	11	5	8	0	4	0	-	36
1997	3	11	3	8	2	3	0	-	30
1998	4	14	5	6	1	6	0	-	36
1999	1	9	5	7	1	5	0	-	28
2000	1	5	5	11	1	5	0	-	28
2001	2	5	2	8	0	4	0	-	21
2002	4	4	5	15	0	7	0	-	35
2003	2	10	3	1	0	2	0	-	18
2004	4	11	2	6	1	3	0	-	27
2005	1	8	0	7	0	7	0	-	23
2006	3	3	4	2	1	5	0	-	18
2007	5	3	4	7	0	4	0	-	23

Category / Year of occurrence	Aircraft			Rotorcraft		Glider	Airship	Unmanned aircraft	Total
	Large aeroplane	Small aeroplane	Ultralight plane	Helicopter	Gyroplane				
2008	3	6	2	3	0	3	0	-	17
2009	6	2	1	7	0	3	0	-	19
2010	0	4	2	4	0	2	0	-	12
2011	1	8	1	3	0	1	0	-	14
2012	8	3	2	4	0	1	0	-	18
2013	1	4	1	3	0	2	0	-	11
2014	4	5	2	1	0	5	0	-	17
2015	3	9	3	3	1	8	0	-	27
2016	3	4	1	2	0	4	0	-	14
2017	2	8	3	5	1	2	0	-	21
2018	3	3	4	3	0	1	0	-	14
2019	4	1	2	2	0	3	0	-	12
2020	4	1	4	3	1	0	0	-	13
2021	1	2	2	3	0	3	0	-	11
2022	7	5	4	3	0	2	0	0	21
2023	4	5	0	5	0	2	0	1	17
Total	191	406	181	452	26	214	2	1	1,473

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accidents Investigation Commission.
2. Large aeroplanes are aircraft with a maximum take-off weight of more than 5,700 kg.
3. Small aeroplanes are aircrafts with a maximum take-off weight of 5,700kg or less, excluding Ultralight planes.
4. Ultralight planes include self-made, ultralight plane-shaped aircrafts.
5. Gyroplanes include self-made, gyroplane-shaped aircrafts.
6. The number of unmanned aircrafts in 2022 is from December onward.



4 Number of fatalities in accidents (aircraft accidents)

(Persons)

Year of occurrence \ Category		Aircraft			Rotorcraft		Glider	Total	
		Large aeroplane	Small aeroplane	Ultralight plane	Helicopter	Gyroplane			
2008	Crew	0	1	1	2	0	1	5	5
	Passengers and others	0	0	0	0	0	0	0	
2009	Crew	2	0	2	5	0	0	9	9
	Passengers and others	0	0	0	0	0	0	0	
2010	Crew	0	2	1	14	0	0	17	17
	Passengers and others	0	0	0	0	0	0	0	
2011	Crew	0	5	0	1	0	0	6	6
	Passengers and others	0	0	0	0	0	0	0	
2012	Crew	0	0	0	0	0	0	0	1
	Passengers and others	0	1	0	0	0	0	1	
2013	Crew	0	0	0	0	0	1	1	2
	Passengers and others	0	0	0	0	0	1	1	
2014	Crew	0	1	0	0	0	0	1	2
	Passengers and others	0	1	0	0	0	0	1	
2015	Crew	0	1	1	2	0	1	5	10
	Passengers and others	0	2	1	2	0	0	5	
2016	Crew	0	1	0	0	0	3	4	8
	Passengers and others	0	3	0	0	0	1	4	
2017	Crew	0	2	0	2	1	1	6	22
	Passengers and others	0	4	0	12	0	0	16	
2018	Crew	0	0	2	1	0	0	3	11
	Passengers and others	0	0	0	8	0	0	8	
2019	Crew	0	0	1	0	0	0	1	1
	Passengers and others	0	0	0	0	0	0	0	
2020	Crew	0	0	1	1	0	0	2	2
	Passengers and others	0	0	0	0	0	0	0	
2021	Crew	0	0	0	1	0	1	2	3
	Passengers and others	0	0	0	0	0	1	1	
2022	Crew	0	2	1	1	0	1	5	9
	Passengers and others	0	2	1	0	0	1	4	
2023	Crew	0	0	0	0	0	1	1	1
	Passengers and others	0	0	0	0	0	0	0	

Total	Crew	2	15	10	30	1	10	68	109
	Passengers and others	0	13	2	22	0	4	41	
	Total	2	28	12	52	1	14		

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accidents Investigation Commission in 2008
2. Death tolls represent data for the respective years of occurrence relisted from the annual reports published for those years.
3. Large aeroplanes are aircrafts with a maximum take-off weight of more than 5,700 kg.
4. Small aeroplanes are aircrafts with a maximum take-off weight of 5,700kg or less, excluding Ultralight planes.
5. Ultralight planes include self-made, ultralight plane-shaped aircrafts.
6. Gyroplanes include self-made, gyroplane-shaped aircrafts.

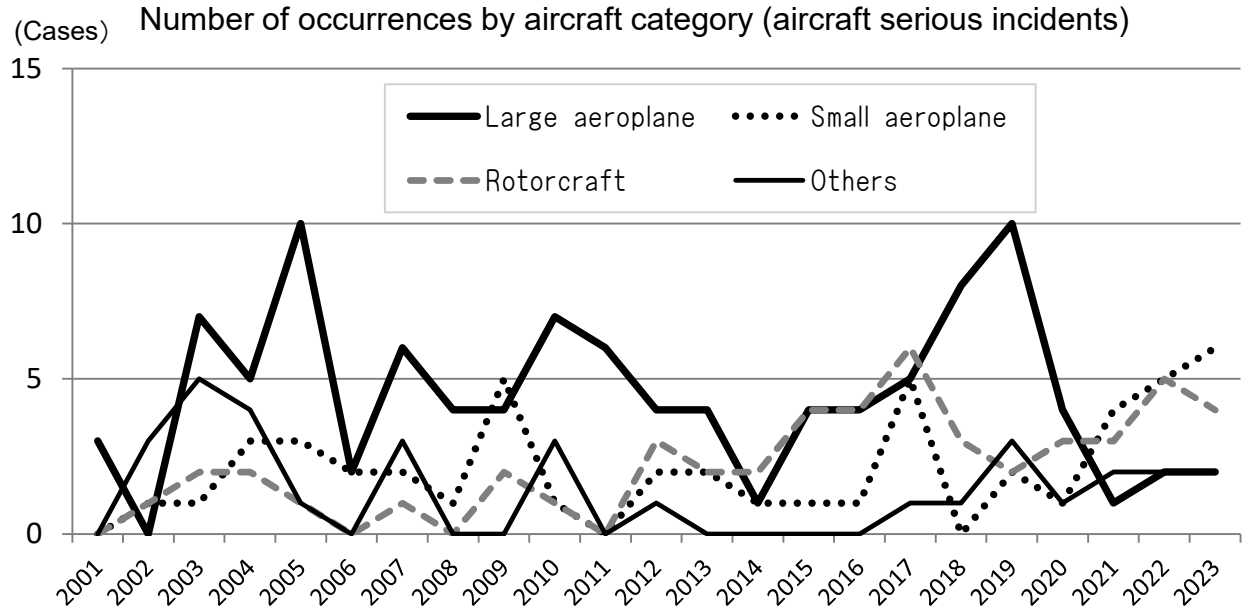
5 Number of occurrences by aircraft category (aircraft serious incidents)

(Cases)

Category / Year of occurrence	Aircraft			Rotorcraft		Glider	Airship	Unmanned aircraft	Total
	Large aeroplane	Small aeroplane	Ultralight plane	Helicopter	Gyroplane				
2001	3	0	0	0	0	0	0	-	3
2002	0	1	2	1	0	1	0	-	5
2003	7	1	4	2	0	1	0	-	15
2004	5	3	4	2	0	0	0	-	14
2005	10	3	1	1	0	0	0	-	15
2006	2	2	0	0	0	0	0	-	4
2007	6	2	2	1	0	1	0	-	12
2008	4	1	0	0	0	0	0	-	5
2009	4	5	0	2	0	0	0	-	11
2010	7	1	3	1	0	0	0	-	12
2011	6	0	0	0	0	0	0	-	6
2012	4	2	0	3	0	1	0	-	10
2013	4	2	0	2	0	0	0	-	8
2014	1	1	0	2	0	0	0	-	4
2015	4	1	0	4	0	0	0	-	9
2016	4	1	0	4	0	0	0	-	9
2017	5	5	0	6	0	1	0	-	17
2018	8	0	0	3	0	1	0	-	12
2019	10	2	0	2	0	3	0	-	17
2020	4	1	1	3	0	0	0	-	9
2021	1	4	1	3	0	1	0	-	10
2022	2	5	1	5	0	1	0	0	14
2023	2	6	1	4	0	1	0	0	14
Total	103	49	20	51	0	12	0	0	235

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accidents Investigation Commission.

The number of cases for 2001 represents those that occurred from October onward.
2. Large aeroplanes are aircrafts with a maximum take-off weight of more than 5,700 kg.
3. Small aeroplanes are aircrafts with a maximum take-off weight of 5,700kg or less, excluding Ultralight planes.
4. Ultralight planes include self-made, ultralight plane-shaped aircrafts.
5. The number of unmanned aircrafts in 2022 is from December onward.



6 Number of occurrences by type (railway accidents)

(Cases)

Type / Year of occurrence	Railway							Tramway							Total
	Train collision	Train derailment	Train fire	Level crossing accident	Accident against road traffic	Other accidents with casualties	Heavy property loss without casualties	Vehicle collision	Vehicle derailment	Vehicle fire	Level crossing accident	Accident against road traffic	Other accidents with casualties	Heavy property loss without casualties	
2001	0	4	1	0	0	0	0	0	0	0	0	0	0	0	5
2002	1	14	1	2	0	1	1	0	0	0	0	0	0	0	20
2003	1	20	2	0	0	0	0	0	0	0	0	0	0	0	23
2004	0	18	0	1	0	0	0	0	1	0	0	0	0	0	20
2005	2	20	0	0	0	1	0	0	1	0	0	0	0	0	24
2006	1	13	0	1	0	0	0	1	0	0	0	0	0	0	16
2007	0	12	2	3	0	0	0	0	2	0	0	0	0	0	19
2008	0	7	2	2	0	1	1	0	0	0	0	0	0	0	13
2009	0	5	1	2	0	3	0	0	0	0	0	0	0	0	11
2010	0	6	0	0	0	1	0	0	0	0	0	2	0	0	9
2011	0	12	0	1	0	1	0	0	0	0	0	0	0	0	14
2012	0	13	2	0	0	2	0	0	2	0	0	1	0	0	20
2013	0	11	1	1	0	1	0	0	1	0	0	0	0	0	15
2014	1	9	0	4	0	0	0	0	0	0	0	0	0	0	14
2015	1	5	1	4	0	1	0	0	1	0	0	0	0	0	13
2016	0	7	0	15	0	0	0	0	1	0	0	0	0	0	23
2017	0	9	0	7	0	2	1	0	0	0	0	0	0	0	19
2018	0	2	0	9	0	0	0	0	0	0	0	0	0	0	11
2019	0	9	0	7	0	1	0	0	0	0	0	0	0	0	17
2020	0	7	0	6	0	0	0	0	0	0	0	0	0	0	13
2021	0	6	0	5	0	0	0	0	0	0	0	0	0	0	11
2022	0	5	0	8	0	1	0	0	0	0	0	0	0	0	14
2023	0	3	0	5	0	3	0	0	0	0	0	0	0	0	11
Total	7	217	13	83	0	19	3	1	9	0	0	3	0	0	355

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accidents Investigation Commission.
2. The number of cases for 2001 represents those that occurred from October onward.

7 Number of fatalities in accidents (railway accidents)

(Persons)

Death Classification / Year of occurrence	Crew members	Passengers	Others	Total
2008	0	0	2	2
2009	0	0	3	3
2010	0	0	2	2
2011	0	0	1	1
2012	0	0	1	1
2013	0	0	1	1
2014	0	0	6	6
2015	0	2	4	6
2016	0	0	15	15
2017	0	0	10	10
2018	0	0	9	9
2019	0	0	8	8
2020	0	0	8	8
2021	0	0	5	5
2022	0	0	9	9
2023	0	0	7	7
計	0	2	91	93

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accidents Investigation Commission in 2008
2. Death tolls represent data for the respective years of occurrence relisted from the annual reports published for those years.
3. As investigations began to cover fatal accidents at third- and fourth-class crossings without crossing gates in April 2014, the number of deaths occurring in those locations were added.

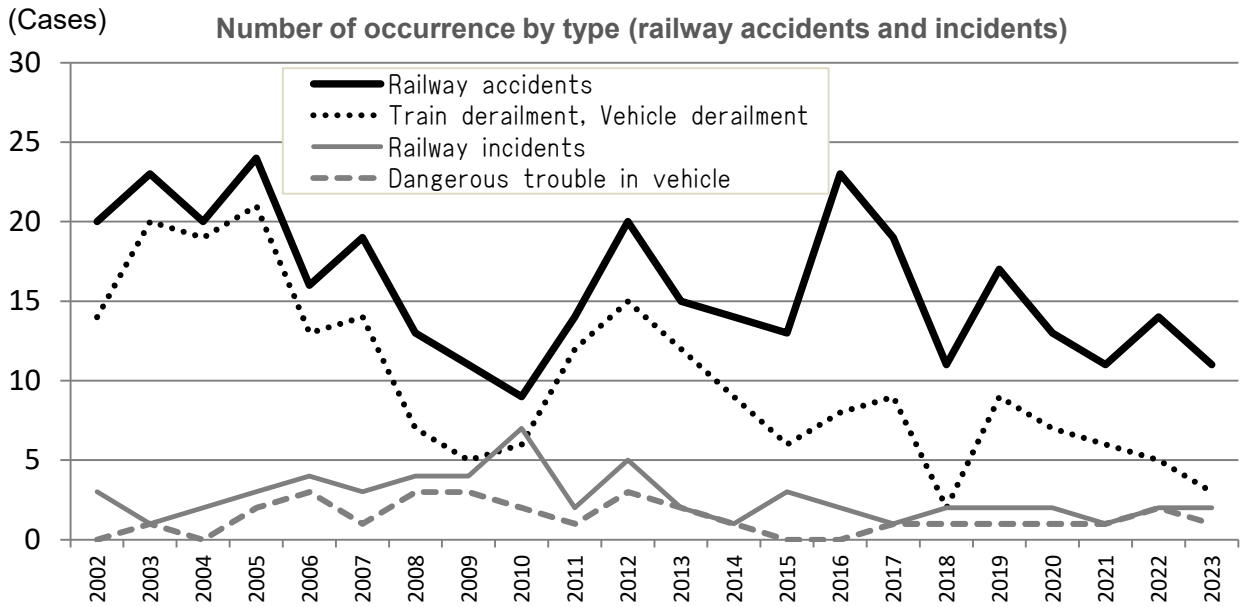
8 Number of occurrences by type (railway serious incidents)

(Cases)

Type / Year of occurrence	Railway										Tramway							Total
	Incorrect management	Incorrect indication of signal	Violating red signal	Main track overrun	Violating closure section	Vehicle derailment	Dangerous damage	Dangerous trouble in vehicle	Heavy leakage of dangerous object	Others	Incorrect management	Violating red signal	Main track overrun	Dangerous damage	Dangerous trouble in vehicle	Heavy leakage of dangerous object	Others	
2001	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2002	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2003	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2004	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
2005	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
2006	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	4

Type / Year of occurrence	Railway										Tramway							Total
	Incorrect management	Incorrect indication of signal	Violating red signal	Main track overrun	Violating closure section	Vehicle derailment	Dangerous damage	Dangerous trouble in vehicle	Heavy leakage of dangerous object	Others	Incorrect management	Violating red signal	Main track overrun	Dangerous damage	Dangerous trouble in vehicle	Heavy leakage of dangerous object	Others	
2007	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	3
2008	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	4
2009	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	4
2010	1	0	0	0	1	1	0	2	0	0	1	1	0	0	0	0	0	7
2011	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
2012	0	0	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0	5
2013	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
2014	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2015	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	3
2016	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2
2017	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2018	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
2019	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
2020	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2
2021	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2022	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
2023	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2
Total	1	7	0	1	7	2	3	30	0	3	3	1	1	0	0	0	0	59

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accidents Investigation Commission.
2. The number of cases for 2001 represents those that occurred from October onward.



9 Number of occurrences by area (marine accidents and incidents)

(Cases)

Area / Year of occurrence	In Japanese waters			Outside Japanese waters	Total
	In ports specified by the Cabinet Order	Within 12 nautical miles	In lakes or rivers		
2007	0	3	0	0	3
2008	227	576	15	55	873
2009	341	1,065	34	82	1,522
2010	305	909	38	82	1,334
2011	238	781	28	79	1,126
2012	224	807	31	53	1,115
2013	214	764	35	69	1,082
2014	193	762	31	44	1,030
2015	153	674	44	39	910
2016	147	638	43	21	849
2017	154	670	35	47	906
2018	186	689	38	44	957
2019	218	761	53	35	1,067
2020	176	641	37	18	872
2021	156	686	26	17	885
2022	180	649	41	21	891
2023	123	581	36	15	755
Total	3,235	11,656	565	721	16,177

(Note) The above table shows the number of accidents and incidents into which the JTSB launched an investigation as of the end of December 2023 (including those carried over from the former Marine Accident Inquiry Agency).

10 Number of occurrences by type (marine accidents and incidents)

(Cases)

Type / Year of occurrence	Marine accidents												Marine incidents				Total
	Collision	Contact	Grounding	Foundering	Flooding	Capsizing	Fire	Explosion	Missing	Facility damage	Fatality/Injury	Others	Loss of control	Stranded	Safety obstruction	Navigation obstruction	
2007	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2008	181	101	255	12	4	28	15	3	0	30	61	0	54	34	8	87	873
2009	325	174	431	16	19	58	42	3	0	38	217	2	105	33	0	59	1,522
2010	356	180	369	15	18	50	35	2	0	26	146	0	83	16	0	38	1,334
2011	282	145	265	12	18	56	32	1	0	23	142	1	103	10	1	35	1,126
2012	246	133	264	5	21	55	44	2	0	33	155	0	113	5	4	35	1,115
2013	264	145	210	10	25	49	33	2	0	38	163	2	106	7	3	25	1,082

Type / Year of occurrence	Marine accidents												Marine incidents				Total
	Collision	Contact	Grounding	Foundering	Flooding	Capsizing	Fire	Explosion	Missing	Facility damage	Fatality/Injury	Others	Loss of control	Stranded	Safety obstruction	Navigation obstruction	
2014	265	116	213	7	11	61	35	1	0	37	150	3	92	15	0	24	1,030
2015	244	102	202	5	12	56	38	3	0	20	122	1	85	4	4	12	910
2016	217	94	163	5	19	46	26	3	0	21	144	0	85	6	6	14	849
2017	200	96	181	14	22	55	27	3	0	23	143	0	115	4	3	20	906
2018	243	86	172	21	26	52	24	2	0	24	180	0	107	10	0	10	957
2019	219	98	201	11	26	67	31	1	0	40	145	2	181	24	0	21	1,067
2020	189	94	156	13	14	52	29	2	0	21	134	1	141	14	2	10	872
2021	199	81	173	3	36	67	26	3	0	33	123	2	122	12	1	4	885
2022	194	98	148	9	17	55	29	2	0	11	137	3	168	17	0	3	891
2023	160	87	142	9	20	42	26	1	0	8	111	1	133	6	0	9	755
Total	3,784	1,831	3,547	167	308	849	492	34	0	426	2,273	18	1,793	217	32	406	16,177

(Note) 1. The above table shows the number of accidents and incidents into which the JTSB launched an investigation as of the end of December 2023 (including those carried over from the former Marine Accident Inquiry Agency).
2. The figures in the column “Fatality/Injury” are the number of cases involving death, death and injury, missing persons, or injury which is not a result from other types of accident.

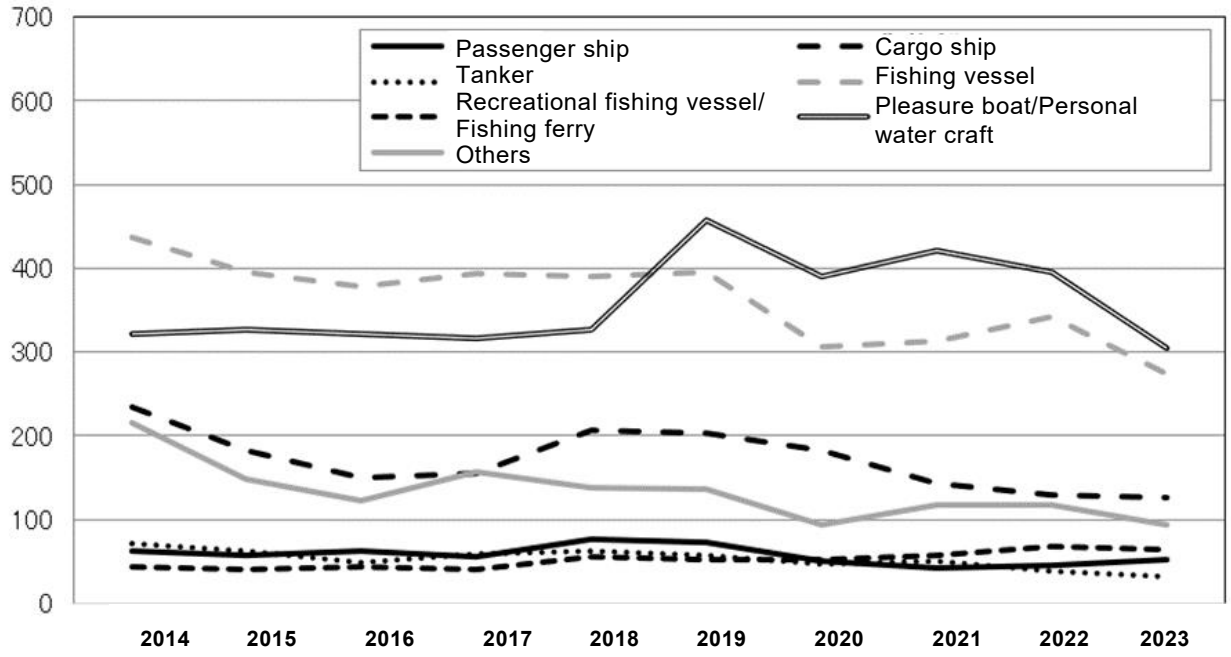
11 Number of vessels involved in accidents and incidents by type of vessel (marine accidents and incidents)

(Vessels)

Type of Vessel / Year of occurrence	Passenger ship	Cargo ship	Tanker	Fishing vessel	Tug boat, push boat	Recreational fishing vessel	Fishing ferry	Work vessel	Barge, lighter	Public-service ship	Pleasure boat	Personal water craft	Others	Total
2007	2	1	0	0	0	0	0	0	0	0	0	0	0	3
2008	55	318	55	307	98	28	6	27	59	11	126	31	7	1,128
2009	103	480	83	605	163	39	5	35	104	40	249	65	23	1,994
2010	99	398	105	555	123	53	6	48	82	24	251	66	18	1,828
2011	68	285	105	504	89	38	6	29	50	16	250	46	21	1,507
2012	79	296	75	467	91	33	8	36	59	14	247	55	8	1,468
2013	62	231	70	485	101	41	4	37	72	24	264	64	18	1,473
2014	63	235	71	436	91	39	5	36	58	17	253	69	13	1,386
2015	57	183	63	396	53	33	7	28	45	14	279	48	9	1,215
2016	62	150	49	379	47	36	7	27	33	11	254	68	5	1,128
2017	55	155	59	393	63	37	3	29	45	13	275	42	7	1,176
2018	76	207	63	391	52	48	8	20	36	14	269	57	16	1,257

Type of Vessel / Year of occurrence	Passenger ship	Cargo ship	Tanker	Fishing vessel	Tug boat, push boat	Recreational fishing vessel	Fishing ferry	Work vessel	Barge, lighter	Public-service ship	Pleasure boat	Personal water craft	Others	Total
2019	72	203	58	396	50	47	6	30	32	10	411	46	15	1,376
2020	50	183	47	306	35	50	2	14	22	10	335	56	13	1,123
2021	42	143	50	313	37	53	5	30	23	12	364	57	14	1,143
2022	46	129	38	342	38	64	4	27	22	17	340	55	14	1,136
2023	52	127	31	273	33	62	2	22	19	12	269	37	7	946
Total	1,043	3,724	1,022	6,548	1,164	701	84	475	761	259	4,436	862	208	21,287

(Note) The above table shows the number of vessels involved in accidents and incidents into which the JTSB launched an investigation as of the end of December 2023 (including those carried over from the former Marine Accident Inquiry Agency).



12 Number of vessels involved in accidents and incidents by gross tonnage (marine accidents and incidents)

(Vessels)

Gross Tonnage / Year of occurrence	Less than 20 tons	20 to less than 100 tons	100 to less than 200 tons	200 to less than 500 tons	500 to less than 1,600 tons	1,600 to less than 3,000 tons	3,000 to less than 5,000 tons	5,000 to less than 10,000 tons	10,000 to less than 30,000 tons	More than 30,000 tons	Unknown	Total
2007	1	0	0	1	0	0	0	0	0	0	1	3
2008	485	52	138	216	77	24	16	17	10	15	78	1,128
2009	903	89	230	288	116	42	34	49	30	14	199	1,994
2010	900	86	175	260	128	36	37	39	25	24	118	1,828

Gross Tonnage / Year of occurrence	Less than 20 tons	20 to less than 100 tons	100 to less than 200 tons	200 to less than 500 tons	500 to less than 1,600 tons	1,600 to less than 3,000 tons	3,000 to less than 5,000 tons	5,000 to less than 10,000 tons	10,000 to less than 30,000 tons	More than 30,000 tons	Unknown	Total
2011	823	59	142	194	101	39	18	32	21	17	61	1,507
2012	790	53	133	199	78	33	25	38	25	20	74	1,468
2013	881	44	113	142	93	47	27	36	19	17	54	1,473
2014	839	46	86	145	87	38	26	29	17	17	56	1,386
2015	762	43	66	111	64	32	18	28	22	19	50	1,215
2016	745	31	64	104	61	23	17	21	18	10	34	1,128
2017	756	39	80	116	69	24	14	22	17	6	33	1,176
2018	798	32	79	118	75	46	31	19	15	12	32	1,257
2019	929	32	47	130	68	29	20	34	11	14	62	1,376
2020	767	19	47	124	54	21	6	27	13	15	30	1,123
2021	810	27	40	98	51	18	18	14	14	16	37	1,143
2022	786	30	42	118	37	19	10	21	9	4	60	1,136
2023	565	21	38	88	39	12	5	17	13	10	138	946
Total	12,540	703	1,520	2,452	1,198	483	322	443	279	230	1,117	21,287

(Note) The above table shows the number of accidents and incidents into which the JTSB launched an investigation as of the end of December 2023 (including those carried over from the former Marine Accident Inquiry Agency).

13 Number of vessels involved in accidents and incidents in 2023 by type of accident/incident and type of vessel (marine accidents and incidents)

(Vessels)

Type of accident /incident / Type of Vessel	Marine accidents												Marine incidents				Total
	Collision	Contact	Grounding	Foundering	Flooding	Capsizing	Fire	Explosion	Missing	Facility damage	Fatality/Injury	Others	Loss of control	Stranded	Safety obstruction	Navigation obstruction	
Passenger ship	2	16	9	0	2	2	2	0	0	0	11	0	3	0	0	5	52
Cargo ship	61	17	30	0	1	0	2	0	0	1	5	0	8	2	0	0	127
Tanker	10	8	6	0	1	0	0	0	0	0	1	0	3	1	0	1	31
Fishing vessel	106	12	34	2	2	20	17	1	0	0	63	0	15	0	0	1	273
Tug boat, push boat	10	7	7	2	1	0	1	0	0	0	2	0	2	1	0	0	33
Recreational fishing vessel	35	7	6	0	0	1	1	0	0	1	5	0	6	0	0	0	62
Fishing ferry	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Work vessel	5	1	4	1	1	6	0	0	0	1	2	0	1	0	0	0	22
Barge, lighter	7	3	4	0	1	1	1	0	0	0	1	0	0	1	0	0	19

Type of accident /incident / Type of Vessel	Marine accidents												Marine incidents				Total
	Collision	Contact	Grounding	Foundering	Flooding	Capsizing	Fire	Explosion	Missing	Facility damage	Fatality/Injury	Others	Loss of control	Stranded	Safety obstruction	Navigation obstruction	
Public-service ship	2	3	4	0	0	0	1	0	0	0	1	0	1	0	0	0	12
Pleasure boat	71	15	39	4	10	14	4	0	0	6	12	0	90	2	0	1	268
Personal water craft	17	3	1	0	0	0	0	0	0	0	11	0	4	0	0	1	37
Others	2	0	3	0	1	0	0	0	0	0	2	0	0	0	0	0	8
Total	329	92	147	9	20	44	30	1	0	9	116	0	133	7	0	9	946

(Note) 1. The above table shows the number of vessels involved in accidents and incidents into which the JTSB launched an investigation as of the end of December 2023.
2. The figures in the column “Fatality/Injury” are the number of cases involving death, death and injury, missing persons, or injury which is not a result from other types of accident.

14 Number of fatalities in accidents (marine accidents)

(Persons)

Year of occurrence / Type of Vessel		Passenger ship	Cargo ship	Tanker	Fishing vessel	Recreational fishing vessel/ Fishing ferry	Pleasure boat/Personal water craft	Others	Total	
2008	Crew	0	2	1	51	1	5	1	61	71
	Passengers	0	0	0	0	2	0	0	2	
	Others	0	0	0	0	1	6	1	8	
2009	Crew	3	1	2	109	0	26	4	145	191
	Passengers	0	0	0	0	3	0	0	3	
	Others	1	5	0	6	0	27	4	43	
2010	Crew	1	10	1	74	0	11	2	99	129
	Passengers	0	0	0	0	1	0	0	1	
	Others	0	3	0	1	1	22	2	29	
2011	Crew	3	4	8	83	3	18	7	12	146
	Passengers	4	0	0	0	2	0	0	6	
	Others	0	2	0	0	0	12	0	14	
2012	Crew	2	6	4	79	1	22	3	117	133
	Passengers	1	0	0	0	2	0	0	3	
	Others	1	1	0	1	0	8	2	13	
2013	Crew	0	17	2	69	0	19	7	114	134
	Passengers	0	0	0	0	1	0	0	1	
	Others	0	2	0	0	0	16	1	19	

(Persons)

Year of occurrence \ Type of Vessel		Passenger ship	Cargo ship	Tanker	Fishing vessel	Recreational fishing vessel/ Fishing ferry	Pleasure boat/Personal water craft	Others	Total	
2014	Crew	0	11	3	89	0	17	3	123	138
	Passengers	0	0	0	0	2	0	0	2	
	Others	0	1	1	1	0	10	0	13	
2015	Crew	3	5	0	44	0	12	5	69	87
	Passengers	2	0	0	0	2	0	0	4	
	Others	0	0	0	0	0	13	1	14	
2016	Crew	1	4	5	45	1	10	4	70	93
	Passengers	0	0	0	0	2	0	0	2	
	Others	0	2	0	2	0	15	2	21	
2017	Crew	2	4	0	46	0	7	20	79	93
	Passengers	0	0	0	0	0	0	0	0	
	Others	0	0	0	0	0	12	2	14	
2018	Crew	0	2	1	48	0	10	2	63	87
	Passengers	0	0	0	0	1	0	0	1	
	Others	1	0	0	1	0	17	4	23	
2019	Crew	0	17	0	57	1	11	1	87	103
	Passengers	0	0	0	0	1	0	0	1	
	Others	0	3	0	1	0	10	1	15	
2020	Crew	1	3	1	47	1	12	2	67	87
	Passengers	0	0	0	0	3	0	0	3	
	Others	0	2	0	0	0	11	4	17	
2021	Crew	0	4	1	51	0	15	3	74	90
	Passengers	0	0	0	0	1	0	0	1	
	Others	0	1	0	0	0	14	0	15	
2022	Crew	2	1	1	43	0	10	5	62	90
	Passengers	18	0	0	0	1	0	0	19	
	Others	0	0	0	3	0	4	2	9	
2023	Crew	2	1	0	31	1	8	4	47	55
	Passengers	1	0	0	0	2	1	0	4	
	Others	0	1	0	0	0	3	0	4	
Total	Crew	20	92	30	966	9	213	73	1,403	1,727
	Passengers	26	0	0	0	26	1	0	53	
	Others	3	23	1	16	2	200	26	271	
	Total	49	115	31	982	37	414	99		

(Note) The above table shows the number of fatalities in accidents into which the JTSB launched an investigation as of the end of December 2023 (including those carried over from the former Marine Accident Inquiry Agency).

15 Numbers of issued recommendations, opinions and safety recommendations

Type and mode / Year	Recommendation			Opinion			Safety recommendation	
	Aviation	Railway	Marine	Aviation	Railway	Marine	Aviation	Marine
2008	—	—	—	2	—	—	—	—
2009	—	—	—	1	1	1	3	—
2010	—	—	—	—	—	1	1	—
2011	—	1	2	1	—	5	—	9
2012	1	1	6	1	—	4	1	2
2013	4	3	4	—	—	2	3	—
2014	4	—	—	—	—	1	2	6
2015	2	—	—	—	1	—	—	—
2016	1	—	—	—	—	—	1	3
2017	1	—	1	—	—	—	—	2
2018	1	—	1	1	2	2	—	1
2019	1	—	1	—	1	1	—	5
2020	3	—	2	—	—	—	—	1
2021	—	1	3	—	1	—	—	4
2022	—	—	1	—	—	3	—	—
2023	—	1	—	—	—	1	—	—
Total	18	7	21	6	6	21	11	33

(Note) These were issued after the establishment of the JTSB in October 2008.

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